7th Annual Undergraduate Research Conference on Applied Computing

URC 2015

April 22 – 23, 2015 | Zayed University | Dubai, United Arab Emirates

Book of Abstracts

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جـامـعـة زايـد
ZAYED UNIVERSITY

7th Annual Undergraduate Research Conference on Applied Computing (URC 2015)

COLLEGE OF TECHNOLOGICAL INNOVATION
ZAYED UNIVERSITY
UNITED ARAB EMIRATES

April 22 - 23, 2015

Zayed University Research
Innovative Research to Support the National Development of the UAE

جـامـعـة زايـد البـحـوث
بحـوث مبتكـرة لدعـم التنميـة الوطنيـة

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Message from
CONFERENCE CHAIRS

Welcome to the 7th Annual Undergraduate Research Conference on Applied Computing (URC 2015). The objective of this conference is to promote undergraduate research activity at educational institutions across the Arab world, by providing a forum for undergraduate students to present their research projects, share ideas and interact with other young researchers, faculty members, and technology leaders from the region.

Contained in this eBook, you'll find 156 abstracts representing undergraduate student research projects from many universities in the Arab world. The abstracts reflect the multidisciplinary character and wide spectrum of emerging technologies. The research projects will be presented, in oral and poster presentation styles, by undergraduate students from 28 educational institutions in 8 countries, namely: Iraq, Jordan, Kuwait, Oman, Palestine, Qatar, Saudi Arabia, and the United Arab Emirates.

We would like to thank everyone involved in this conference. First and foremost, we thank the students and their faculty advisors for their submissions to this conference – without their research projects this conference wouldn't exist! We also thank the rest of our team, members of the organizing committee as well as the technical committee, who reviewed student submissions and provided valuable feedback. We would also like to extend our special thanks to the keynote speakers, and members of the panel discussion, for taking the time out of their busy schedules to participate in this conference.

We are grateful to Zayed University Office of Research, for their continued commitment and contributions that help make this conference a reality.

This conference would not have been possible without the great efforts made by the local arrangements and registration teams who work tirelessly to ensure everything is running smoothly, and for this we extend a heart-felt thank you to Mona Bader, Dr. Huwida Said, Izzeddin Asad and Nagaraj Chandrashekran. We would also like to thank all the student volunteers from Zayed University.

Finally, we take this opportunity to thank Zayed University for hosting this conference.

We hope you will enjoy the conference and the lovely city of Dubai.

Dr. Faouzi Kamoun
Interim Dean, College of Tech Innovation
Zayed University, UAE

Dr. Qusay H. Mahmoud
Conference Co-Chair
Univ. of Ontario Institute of Tech, Canada

Dr. May AlTaei
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7TH ANNUAL
UNDERGRADUATE
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ON APPLIED
COMPUTING

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RFID Tracking System for Alzheimer Patients in UAE

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ABSTRACT

Alzheimer disease is a type of dementia that causes problems such as memory loss, thinking and behavior. Developed symptoms can be severe to interfere with patients daily life. Loss of control is a common symptom for patients with Alzheimer that could make tracking Alzheimer patients is hard. This paper investigates the different emerging technologies (with emphasis on RFID) that could be utilized to track of patients with Alzheimer, and accordingly minimize problems that could happen to patients. In this research paper, the researchers compare and contrast other research studies to formulate a decision on the best technology that could be implemented to track Alzheimer patients. The researchers distributed a survey, and conducted interviews with health practitioners at UAE hospitals. The results of the analysis show that RFID is not yet utilized by the healthcare sector in the UAE, and that RFID has limitations when it is used with a surrounding interference or blockages. However, an ideal environment for RFID could make it more practical. Many organizations have invested significant amount of money into RFID technology. RFID implementations were successful in different fields including warehouses, mail services and grocery industry. RFID can equally be adopted in the medical field to help providing a good monitoring system to monitor Alzheimer patients. Investing on RFID by medical clinics in the UAE, can significantly simplify and improve the process of monitoring Alzheimer patients.

Keywords: RFID, Tracking system, Alzheimer patients.

4G Mobile Broadband Network usage by HCT students

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ABSTRACT

Almost all the students at Khalifa City Women College (KCWC) use their smart devices such as mobile phones to surf the net. Most of smart devices are now equipped with 2G, 3G or 4G network connection. These Internet network connections however are comparable when it comes to feature. The aim of this research paper is to compare and contrast 3G and 4G networks connections and find out the most preferred connection among students at KCWC. The researchers distributed 300 survey to students at KCWC to gather quantitative data, and determine students preference. The researchers used four independent variables to compare and contrast 3G and 4G Internet network connections. These are speed, cost, battery consumption and network coverage. The respondents were asked to respond to different questions covering features of 3G and 4G Internet connections. The result of the analysis shows that most of the students prefer to use 3G Internet connection. The result of the analysis can be generalized to other students at the other HCT Colleges.

Monitoring Aquaponic System Using Wireless Sensor Network

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ABSTRACT

Aquaponic is an indoor closed-loop system that allows a careful control for the fish environment, which will help in providing the plants with nutrient-rich waste water. Common problems of Aquaponic systems are the temperature variations, high ammonia concentration, difficulty in maintaining optimum pH level and water level. The undesired change in these parameters can affect the fish growth or even cause their death. As a consequence, the plant growth will be affected. Plants and fishes may also die because they are not getting enough oxygen due to high water flow or lack of oxygen in water. This project suggests the use of wireless sensor network (WSN) to monitor the various parameters. The system will consist of micro-controllers, wireless transceivers, sensors, gateway, power supplies, PCs, and user interface software. This network consists of 3 nodes; environment node, fish water node and plant water node. Different type of sensors will be placed in each node according to the importance of the parameters that need to be measured. The sensors will measure the parameters and send the digital and analog data to the transceiver. To reduce the power consumption, the transceivers can be put in cyclic sleep and wake up when there is a need to send data. For some of the sensors it is not possible to connect them directly to the transceivers. Some of the sensors send serial data but Xbee transceivers have only one serial port. So the micro-controller is used to interface the sensors to the transceiver and calibrate the sensor data. Preferably it was decided to find a solution to monitor the system remotely. So the network can be connected to the internet to send the data to the user through internet. This is the job of a gateway with Zigbee to Wireless connection. This gateway is the coordinator of the Xbee network and is the charge of controlling the network. Data will be sent to the gateway by the transceivers. Later the gateway will send the data to the Cloud using the Device Cloud application available on this gateway. The resultant graphs will be shown on a web interface for the user. So he/she can have full access to the Aquaponic anywhere and anytime. According to the change of the parameters, a set of thresholds can be defined. In case one of the parameters passed their threshold, an alarm will be sent to the end user via SMS or email. This solution will lead to an increase in fishes and plants growth, in addition of having the advantage of reducing water consumption used in the cultivating process. Another Advantage of having this system in UAE is having the ability of growing plants easily in an arid land which is relatively not suitable for growing fruits and vegetables. In the other hand, the downside of this solution is the environmental issue of using batteries to power up the network. In addition management of the network through the cloud could be difficult for the manager but he/she will be able to overcome this difficulty by a prior training by the engineers.

SDT Android Application: Speech Disorder Therapy

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Supervised by
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ABSTRACT

Different speech disorders /language impairments can have major effects on a person's life. These effects can be treated if they are discovered at the appropriate time, especially during childhood. Reading to a child, and having them name objects and colors are considered a treatment, but sometimes, professional help (specialists) is needed. Using games in speech therapy gives specialists the opportunity to observe the patient (children in our case) in their natural behavior, which allows them to collect informative data about the necessary treatment.

This project proposes an application based on sound recognition, which is designed as a game with two levels: picture level and sound level. The child should pronounce the presented alphabet/word correctly before moving to the next stage whether he/she were under supervision or not. The SLP can follow-up with the patient remotely by viewing his/her scores, which depends on the number of times it took the patient to produce the accurate pronunciation.

The main purpose of this project is to make speech therapy available and portable at all times as well as the possibility to have it remotely. Similar apps have been developed for speech therapy but not all consider all the problems, and most Arabic apps are educational. This Android application supports two languages; Arabic with Saudi Accent and English.

Perception of iPad as oppose to laptops by HCT students: Khalifa City Women's College case study

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ABSTRACT

iPads and laptops have positive and negative impact on students' learning. However, different students have different views with regard the most beneficial, iPad or Laptop? The study compares and contrasts iPads and laptops in terms of the most useful machine to use by students. The research study find answers to questions such as what is the most preferred mobile device among students? Which device is more useful and more utilized by students? Khalifa City Women's College (KCWC) students is taken as the case study for this research paper. A survey distributed to 308 students at KCWC. The survey focusses on the usage of both iPad and laptops by the students. The result of the analysis shows that the majority of students at KCWC prefer to use laptops as oppose to iPads, and that laptops is more useful for their study at the college.

Automated Root Extraction for Arabic Lexicon Lookup

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ABSTRACT

The problem with the Arabic language is that to look up for the meaning of a given Arabic word, you cannot do that directly. Unlike the English language, for example, the root of the Arabic word has to be generated first and used to look up the meaning. The problem is that the generation of the root is not straightforward and needs a long learning curve and is typically error prone. Thus, the aim of this project is to develop an automated system for the root extraction of Arabic words. In other words, the tool will take an Arabic word as an input and generate its root using well known Arabic language techniques. Besides, the meaning of the word may be also generated. This will be done automatically using an associated Arabic lexicon. The system will have several advantages. It does not require prior study and understanding of the process of root extraction . The system will also speed up the process of word lookup in lexicons. Another advantage of the system is that it is intended to be an open-source tool so that researchers can use it in applications that need lookup of Arabic word meanings. For students, it will be used as a learning tool since it will not only extract the root and generate the meaning, but will also produce an explanation of how the root has been extracted.

Development of a Robotic Stealth Device for Monitoring and household Ensuring Security

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ABSTRACT

The popularity of smartphones is rising all over the world. The increased capability and computational power of smartphones increased the interest of developers towards the development of applications for this next generation platform. Smartphones bring the mobility of traditional cell phones and the power of desktop computers in a single package. Besides that, nowadays the monitoring of important things like our home and kids has become even more important. However, it is difficult to keep an eye on our kids when the person is not at home or busy doing something important else at home or outside.

In this paper, the development of a robotic device is discussed and the building of each part is explained. The robot will enable families to watch their loved ones while they are not around. The robot is built using a UDOO based microcomputer, connected with a camera, and a sound chip. It will be connected with a mobile application that has the ability to remotely control it. A live video streaming feature will be available from the robot to the mobile application. The robot will have the ability to move from one place to another via instruction given from the mobile application. The robot will be able to produce different sounds according to the sounds on the sound chip, this would help get the kids and pets' attention while the user is monitoring them.

There are many challenges with the developing of this project. One of the main challenges is to create a user-friendly device so it will be more accepted by the community. Another challenge is to ensure that the device is connected to an app at the same time. Making an authentication mechanism so that only the owner of the device connects to it is a great challenge in this project. Also, one of the challenges is to minimize the delay of the live video streaming between the device and the application. There are similar pre-existing solutions for this problem, but they have some issues. Most of these solutions are fixed-place which limit the capability of monitoring while(but) the proposed device has the ability to move which overcomes this issue. Another main issue is that the majority of these systems provide recording feature rather than sending a live video streaming however the proposed project supplies a live video streaming. This project is expected to be helpful and useful to the families, and the communities for the purpose of monitoring their kids and property even while being away. The project will be built by using next generation modular hardware such as Arduino[1], UDOO[2], and through cutting edge programming models and latest hardware engineering practices.

Laser Tag Game with Smartphone Applications and Wireless Technologies Integration

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ABSTRACT

As a matter of fact, no one can deny that communication systems have been expanded in such a way that covers almost every aspect in our lives. Gaming industry is one of the biggest markets that relies on the evolution of communication. Our project is a system that introduces a real time entertainment game.

Laser tag is a combat game like paintball or airsoft without the pain; it uses infrared light (IR) to simulate the tagging / shooting of other players or targets. Our project includes the full design of laser tag system that has many new features that have never existed before. With the integration of modern smart phones and the use of technologies like; Bluetooth, Wireless LAN, TCP sockets, NFC, PWM, ON-OFF switching and live streaming, all of which increases the game interactivity and Enthusiasm, making it a promising system to be implemented in big places (out door or indoor) and for home users like families and friends in their own LAN.

In particular, many features are added and many could be added in a very big range of possibilities due to all of the technologies we have added to the game. One of the most important features is the ability to track all of the game statistics live, such as health, ammo and location; where they are displayed in real times to players and game administrator. In addition, NFC Technology allows us to make special features such as interacting with the playground and ammo/health recharge using its low range communication. These features and more make it a game that combines the game play of famous video games and the real time physical environment.

Starting from the design and implementation of the electrical circuits required for the system up to the full design of the playground, including the design of guns ,vests and every detail required for the game to be a full package game that is easy to install and can be bought with low price. Figure 1 shows the full overview of the system while Figure 2 and 3 show the hardware and software that is for each player.

The overall system is done and the result is a game that precisely reflects video games experience on the real world with all the technologies implemented and can be used in both entertainment and military purposes.

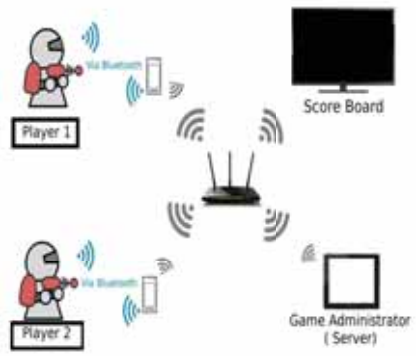

Figure1

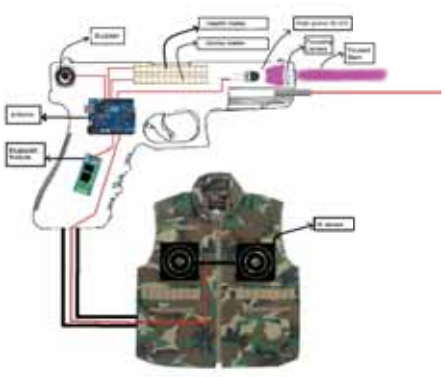

Figure 2

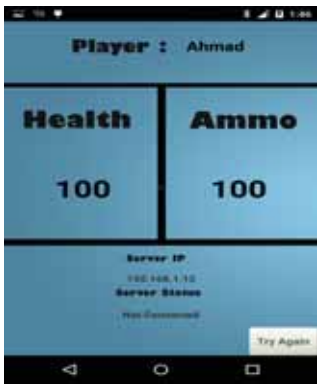

Figure 3

Askmate : Social Network Application

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Supervised by
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ABSTRACT

With the rise of mobile devices and the increase of social media usage, it is becoming essential to get advantage from this technology in developing an infrastructure for business and career field, this is the concern of enterprises today so they develop the way they work in , social networks eliminate borders and distance. Also it helps a lot for information exchange between people from different and far geographical locations. This all ends with integration of knowledge and science .

In today's global open market and rapid development of science technology, knowledge management plays more and more important role in an organization However, people consider knowledge as their personal asset or wealth, but knowledge must be available and free to access for the whole society. The knowledge economy is also seen as the latest trend of development in global economic restructuring.
Askmate will create a platform for employee's collaboration ,knowledge sharing and the best way to promote users to communicate via social media. Where people can have their own profile and their own followers who are interested in their knowledge, so they can market their own reputation and get benefit by sharing their knowledge.
However, there are different social apps that are focusing on user's social and personal life but not their career life. What makes Askmate special is that it provides a social platform that supports knowledge sharing. If the social media in the business field ignore this opportunity, employees will suffer to find out an opportunity to overcome the problems they face in their jobs.

Askmate is an IOS Application that is using cloud service technology(Parse) as a third party ,it's integrated with IOS platform that stores and retrieve all the data of users and their activities by the API calls . The application uses Xcode program , it's developed with objective C language and uses apple platform and libraries such as security framework , network framework, GUI framework and parse framework .This application will be developed using prototyping methodology.

The application will help employees find colleagues in their field or different fields by a simple search. It will help them to follow/unfollow others , ask questions , get answers and they can see anything of the people they are following posts in their timeline . It will ease and shorten the time of finding information and experiences, Improve the relationship between the business and their employees, also the business can get advantage by finding an impressive people and employ them and finally gather knowledge in the same place.

Puzzle Game Mobile Application (PGMA)

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ABSTRACT

Games are one of today's largest entertainment industries with a huge number of games developed every year from all game categories. This project's goal is to develop a puzzle game reflecting positive effect on players along with entertainment. PGMA is a puzzle game application on Android platform as a matrix of boxes where some boxes have numbers and all the other are empty space. The rules are to link two boxes that have the same numbers on them with a trial of boxes equal to that number. As the player completes levels, the matrix's size will increase giving them a harder challenge.

PGMA aims to provide an entertainment to players of all ages while helping them exercising their brains and relieving stress and anxiety caused by the modern, fast lifestyle. Arabic language has been chosen to be the language of the game to attract Arabic players due to the lack of puzzle games applications in Arabic.

This project will be implemented on two stages. The first stage will define the problem and the previous and similar studies, questionnaires and statistical studies for this project. The second stage will include the design, implementation and testing of the system.

Automatic Arabic Text Summarization System (Wajeez)

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Supervised by
Suha Al Thanyyan

ABSTRACT

Text Summarization System has technique to create a small text describe the significant portion of the information in original text by choose the most important sentences based on several steps: Preprocessing, Stemming, Scoring and Extracting a Summary. Moreover, the summarization systems that supporting Arabic language is still in its infancy.

Therefore, we develop an Automatic Arabic Text Summarization System (Wajeez) which proposes a new algorithm for sentence scoring function that based on the linear combination of seven features, then multiplying the score for each sentence by a scale value to normalize fluctuated feature values of each feature to improve the summary extracted result. To maximize their performance, adding Regular Expressions (RE) to deals with Arabic segmentation issues, and some conditions states to Tashaphyne stemmer to overcome its insufficiency in extraction a words root. Finally use a LengthController algorithm that based on the 0/1-Knapsack problem to generate the final summary.

Testing results show the performance of this system with F measure is equal to 0.62 with title feature calculation and 0.56 without title calculation which is consider as a high performance compared to some other Arabic systems.

In addition, Wajeez system gives greater value for its performance at 40%, and this performance will increases up when percentage increases.

ULTRA HIGH DEFINITION (UHD) IMAGE CAPTURING SYSTEM USING SMARTPHONE

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Supervised by
Dr. Samir Tozin, and Eng. Wessam Ghassan

ABSTRACT

The design and implementation of an UHD Image capturing system using a smartphone is presented in this project. The main objective of the system is to capture, using a smartphone, several still images of an object and, using a PC, combine them to form a single UHD image.

The applications of high definition images can be endless; such as using those in medical applications, or in photo editing (ex. Photoshop) will be much more professional and easier to handle with high definition images.

The implementation of the system consist of both hardware and software. The hardware part consist of a 2-axis positioning fixture controlled by an Arduino microcontroller. Two stepper motors are used to control the position of a smartphone which is mounted on the fixture. An ultrasonic sensor is used to indicate the exact position of the phone. The software part consists of mobile phone application which enables the smartphone to capture still images. The mobile phone application also communicates with the microcontroller to synchronize the movement of the position fixture. The images are then transferred from the smartphone to a PC through Wi-Fi. Matlab is used to combine the images, using our novel image combining algorithm.

Figure 1: System Diagram

A user starts the smartphone application which will automatically connect the smartphone via Bluetooth to the Arduino. The user puts the smartphone in the holder to start the image capture process. A voice indication will be given to the user to slowly move backward from the system to start the process. Once the user is in the correct place (correct distance from the camera), a voice message will be given that the process will start. The smartphone will start capturing images from different parts of the face with the original quality of the phone. After each shot, an indication will be sent to the Arduino to move the stepper motors to the next position, until the system captures (n) images. After the process is complete, the photos will be sent to the Laptop via Wi-Fi and will be processed using Matlab to produce an UHD image.

Further addition to the system will be adding the option for the user to choose whether they would like Portrait (9 Images) or Landscape (12 Images), along with the ability of implementing 3D image capturing by using a curved slider in the system base which allows the user to print a 3D image or edit them. The proposed system is a low cost solution for producing UHD images. This system allows all smartphone users to enjoy the experience without the need of buying expensive and complex photo equipment.

Mishwar: System to reduce service time at UAE Federal Ministries

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Supervised by
Dr. Emad Bataineh, Dr. Huwida Said, Dr. Gordon Graber

ABSTRACT

Mishwar is a mobile application that guides citizens in the UAE to any Ministry of Labor services. In addition, it shows the client a workflow of the service chosen, and it helps them to be 100% sure if they are eligible to apply for any chosen service. Thousands of people apply to the Ministry of Labors services yearly, in 2013 around 2,183,785 people applied for a new labor card. Several applications have been conducted but many were rejected due to missing documents, apply the wrong conditions or not following the correct procedures. The app enhances customer satisfaction; reduces time to processes transactions; increases productivity; reduces customer fines; and contributes towards an eco-friendly environment.

The Mishwar application was developed using Windows Phone 8 SDK. In addition, a Microsoft SQL Database was used to store the service information for the application. The Mishwar application works as follows: the user should choose the language of their preference (Arabic or English). Then the application gives an option of selecting the services prior to placing an application for any services. Further to this step, a short summary of the services will be displayed for confirmation. In a later step, the application will display some questions to test the user eligibility for service conditions. Furthermore, and after finishing the questionnaire, a checklist of the required documents is displayed to the user. After this, the Mishwar application displays the required service procedures as a flowchart. As a final step, the application would inform the user if there are any fees needed for this particular service. To conclude an SMS or an e- mail with a short summary would be sent to the user.

The application can be enhanced in the future by introducing the following processes:

a) Adding a geo-location feature to guide clients to the nearest Tas'heel center from their location.
b) Guiding clients to the right Ministry (e.g.: Ministry of Health) from where they can get the required documents.
c) Finally, and after completing all the steps of the app, a QR code will be added, so that the clients don't need to wait in long queues to check their documents. Alternatively, clients can scan the QR code at the Tas'heel center and get their ticket number printed much quicker.

MTripleS: A Multipurpose Secure Smartcard System

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ABSTRACT

With the advancement in technology, smartcards are used in a wide variety of applications that include healthcare, banking, governmental services, to name a few. They are rapidly increasing in popularity due to their convenience and security. Even though smartcards have been around in their modern form for at least a decade, they are just starting to take off. Nowadays, the smart civil cards such as the Kuwaiti ID cards are used minimally in everyone's day-to-day life.

Every account holder is entitled to privacy; however there have been many breaches everywhere into people's different accounts due to minimal security. Furthermore, most individuals have many different access cards, passwords, IDs, and accounts; this causes confusion due to having multiple cards in one wallet and may result in forgetting which password goes with what card.

To address the need for a convenient and secure multi-access card, the Multipurpose Secure Smartcard System (MTripleS) is developed based on the physically-safe national civil ID. MTripleS combines Hardware and Software to create a secure and multipurpose system. MTripleS supports user subscriptions and enables authorized access to service points, such as, payments, restricted areas, etc. The system comprises card readers and smartcards which are supported by a computing system, hardware/software interface, an Internet webserver, and customer-service portal. The system uses modern interfaces such as WiFi connectivity, USB, and self-contained user interfaces. In Figure 1, an overview of the MTripleS prototype is shown. The entire system operates through the smartcard civil ID. The prototype includes authorized access, users' computer login, and banking transactions.

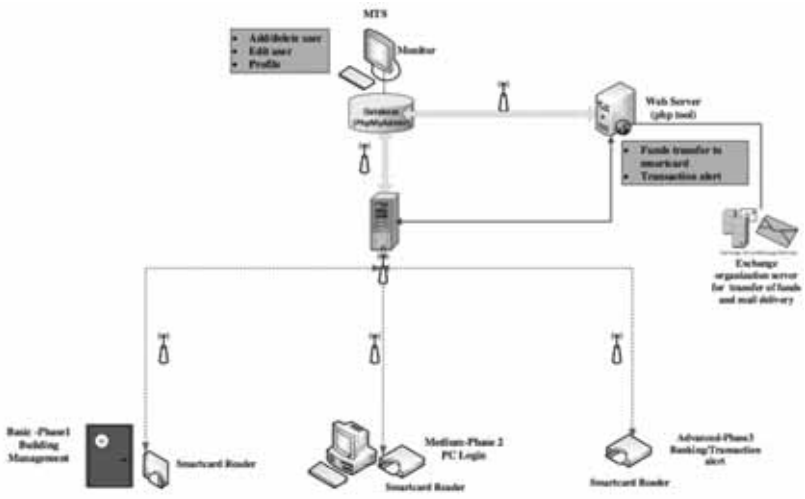

Figure 1: System architecture of MTripleS.

The multi-service smartcard system exhibits high potential for economic and social benefits; it is affordable to companies, individuals and is user friendly. MTripleS increases safety measures as the smartcard civil ID is hard to tamper with and cannot be fabricated. Future work includes adding the option to track lost cards and enhancing system security.

Social Network Application for Qur'an (Khairokom)

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Supervised by
Bushra AlanesiE

ABSTRACT

This research aims to build an application that connects people who are interested in memorizing and reading the Qur'an and aggregate them in one place. It is a social networking site that contains pages for each of the Qur'an centers and users. The primary goal of this application is to attract people to learn the Qur'an and improve their reading in the Qur'an. A lot of people cannot go to these centers to learn the Qur'an either for lack of time or because of the inability to go to the locations of these centers. There is lack of creative and interactive mobile applications that concerns the Holy Quran and its sciences and lack of competitive environments that connect people who are interested in the Holy Qur'an from all over the world. However , through this application we hope attract people to learn and read the Qur'an. Also the users will be able to communicate with those centers at any time without having to go to them. The user can record his voice while reading and send it to these centers to be evaluated and then the evaluation can be sent to the user, If the user is suffering from hearing impairment ,So they can receive the evaluation of the teacher via text messages, Also the centers and users can deploy various activities on their pages. This application provides other feature for the users. They can find the nearest center to learn the Qur'an from their location , serves the Muslim in the countries that does not have the centers to learn the Qur'an and the application contains the icon report for reporting publications offending the Islamic religion. To build this application several techniques were used, including the algorithms used for the construction of social networking sites and implementation of the digital voice recorder technique to enable users to record their voices. Also a shortest path algorithm will be used to find the nearest center from the user's location.

Random Section of Pixel-pair in the Tri-Way Steganography Algorithm

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ABSTRACT

Exchanging information over the Internet is a challenging task due to the possible attacks that may occur during the transmission phase. Several encryption algorithms have been proposed to secure the information and made them illegible once detected by an illegal interceptor during transmission. However, encrypted information can be vulnerable to analysis and then decryption. Another technique is proposed to secure the information. It consists of embedding them into a cover image (or a portion of text, an audio or video files) and making it imperceptible to human vision (e.g., we cannot notice the changes made on the image). This technique is known as steganography and the cover image that hides the information is called a stego-image. Several image-based steganography algorithms have been proposed recently. However, they require major improvement in terms of efficiency in preserving the quality of the stego-image from distortion and maximize the amount of the embedded information.
The most challenging problem consists of finding the right pixels or areas of the image to embed the information in without deteriorating its quality. In this paper, we study the well-known tri-way pixel value differencing algorithm (TPVD) proposed by [Chang et al. 2008] aiming at improving its performance. This algorithm split the cover image into 2x2 blocks of pixels (i.e., four pixels). It then follows a regular sequence in selecting the pixel-pair combination to embed the information as shown in figure-1 below.

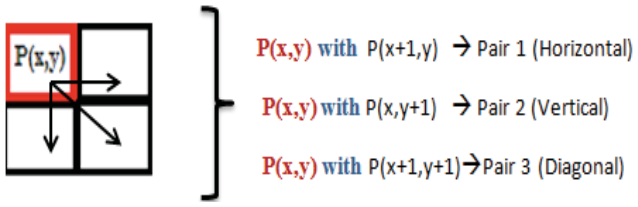

Fig. 1. Pixels-pair combinations of the TPVD algorithm.

The TPVD algorithm ignores the other possible combinations with different starting point as shown in figure-2.

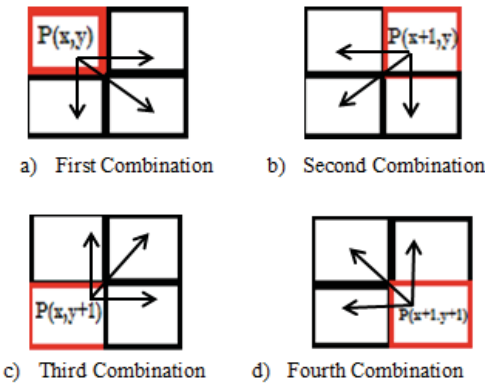

Fig. 2. All possible pixel-pair combinations.

In this work, we select randomly the starting pixel of the pixel-pair combinations to hide information rather than starting always with the first pixel as in the TPVD algorithm. Our first experiment shows that a slight improvement can be obtained with these selections in preserving the quality of the stego-image. We study also the encryption of information that should be embedded using the AES algorithm. This encryption renders the retrieval of the hidden information very hard once the image is spotted as suspicious to be a stego-image and the hidden information are extracted. Our second experiment shows that the encryption of information deteriorates the quality of the stego-image and makes it vulnerable to steganalysis techniques.

Swap or Share Management System

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ABSTRACT

Exchanging and donating goods is a fundamental human activity. People exchange or donate many items including computers and other electronic devices, clothes, books, toys, furniture, appliances, and many more. In exchanging or donating, people will need to find shops or people to facilitate such transaction whether physically or online. The process of swapping or sharing goods can be tedious and cumbersome.

With this problem in mind, the project was conceptualized to provide an avenue where people can easily exchange or donate their items. Swap or Share Management System is a web-based application with two main functions; swap which facilitates the exchange of items and share which facilitates the donation process. The system allows the user to register and upload details about the items they want to swap or share, as well as provide a way for communication among users. Figure 1 shows the user main screen of the system.

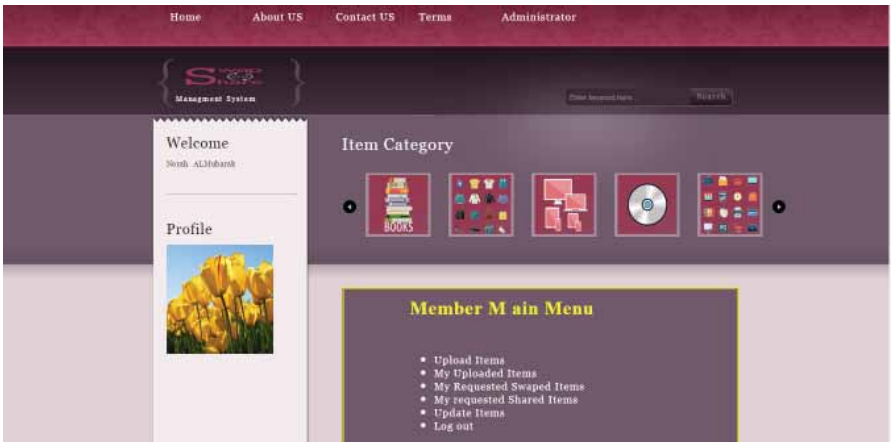

Figure 1: User Main Screen

The project was developed with Structured System Analysis and Design Method (SSADM) using a combination of Logical Data Modeling, Data Flow Modeling, and Entity Behavior Modeling techniques. Software technologies used include ASP.NET, CSS, JavaScript and MS SQL. Software testing has been conducted primarily by executing the program with the intention of finding errors or defects, ensuring that it responds correctly to all kinds of input, perform its function and is usable. Software verification and validation was conducted to ensure that it meets identified specifications and identified requirements of the user.

With the development of the system, which is designed to organize and facilitate the process of exchanging and sharing of items, it is expected that it will not only ease the process, but as well as promote such noble act of sharing and exchanging in the community.

SMEs & Ecommerce in KSA-Current Issues and Suggestions

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ABSTRACT

E-commerce has become critical factor to transform most of the world countries into an information society. However, different studies analyzed the association between the perceptions of e-commerce adoption barriers in developing countries. This paper focuses on the main challenges facing the growth of e-commerce in SMEs in Saudi Arabia. Further, a thorough investigation was carried out to find the barriers in SMEs' ecommerce adoption by exploring different factors such as: postal system suitability, banking system services, internet safety and customer's culture upon the growth of e-commerce. In order to achieve the objectives of our study, questionnaire surveys have been distributed to forty business managers to get their opinion about e-commerce adoption in Saudi Arabia. The study showed many challenges that the managers are facing e.g. lack of technological needed skills, unavailability of Internet service at all places, and some other legal and technical issues. Suggestions are provided on the basis of these problems.

Keywords: E-commerce, SMEs, Development, Challenges, Saudi Arabia, small enterprise, medium enterprise, barriers.

Diagnosing blood related diseases with the help of a Mobile Microscope and Computer Vision Algorithm on a Mobile Application platform.

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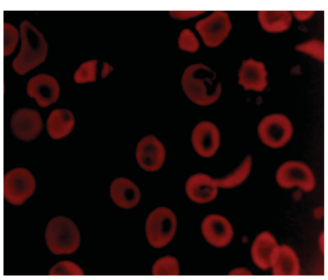
ABSTRACT

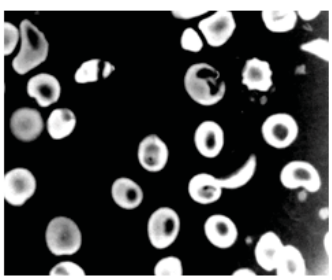
This project aims at designing and implementing a handheld field microscope system which will enable the user to get the reports of their blood and other samples. This will be accomplished with the help of a cell scope through which the user will click images of the sample which will be sent to the server to analyze the sample using computer vision algorithms and generate a report accordingly. This technology will enable the users living in remote areas who do not have easy access to hospitals and laboratories to get a quick report of the sample being examined.

In rural areas there is lack of medical facilities like laboratories, mainly because there are not enough resources and funds to come up with one. Hence, people residing in such areas usually end up ignoring their health and serious medical issues because they do not want to travel long distances or spend a lot of money on getting these tests done.

In today's world, research related to medical studies has advanced. Our research project aims at analyzing one of the real-world scenarios which is medically-related and to develop and deliver a suitable product for the benefit of the people. Most people living in remote areas find it difficult to have immediate access to clinics and hospitals in case of an emergency or for any medical reasons. Keeping this in consideration, our product will be of immense benefit to such people. Due to the lack of availability of medical resources, the proposed product for development will help resolve health-oriented struggles. The product is an entire package that consists of a mobile application, mobile portable cell scope along with a web cloud computing service

The medical field is very advanced and makes use of latest technologies. It moves at an unpredictable speed with accurate technologies that we couldn't even imagine few years ago. In 2001, the first ProScope(mobile microscope) was created by Japanese inventor Masao Yamamoto, CEO of Scalar Corporation. Scalar Corporation partnered with Bodelin Technologies to develop a variety of use with this latest technology. By 2005 and 2008, Bodelin Technologies brought other technologies like ProScope HR and HR2 with advanced facilities. In November 2013, Advanced Microscopy Group (AMG), manufacturer of EVOS microscopes partnered with Life Technologies to bring a solution for cell analysis with better performance and ease of use. Our product is a type of mobile microscope that can be attached to a Smartphone and works with the application we developed to analyze the sample and provide the user with an accurate report generated using computer vision algorithms. If a person can access this technology as a technologist, he can save thousands of lives whereas a doctor can only save one at a time. This application with the mobile microscope can provide vast data on different types of diseases and their characteristics by determining the samples we provide.





Three-Dimensional Design and Implementation Methodology for Field Programmable Gate Arrays (FPGAs)

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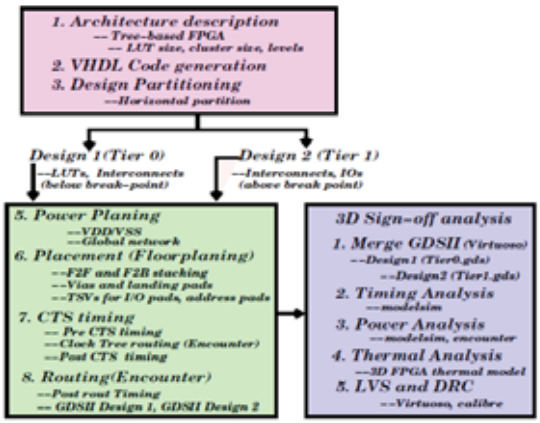
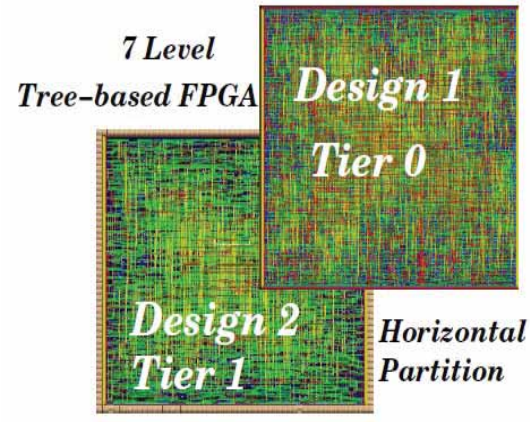
American University in Dubai, Dubai, UAE

ABSTRACT

The CMOS technology scaling has greatly improved the overall performance and density of the Mesh-based Field Programmable Gate Arrays (FPGAs), nonetheless the gap between FPGAs and ASICs in terms of logic density, speed and power consumption remains very wide mainly due the programming overhead. This paper propose a three-dimensional (3D) design methodology to develop Three-dimensional integrated Circuits 3D-ICs. We have introduced a horizontally partitioned 3-dimensional (3D) design methodology to optimize the BFT based programmable interconnect delay of the Tree-based FPGA. Though the tools we developed are more generic in nature, we use FPGA design models as the design test chip to demonstrate the capabilities of our 3D Design flow. In this paper we describe a 2 tier horizontally partitioned 3D stacked Tree-based FPGA demonstrator, designed and implemented using Tezzaron's 130nm, 3D technology.



Our main focus is to figure out how to utilize this emerging technology to improve the performance and manufacturability of high density Field Programmable Gate Arrays (FPGAs). FPGA chips offer an attractive solution for improving the design productivity through re-use of the same silicon implementation for a wide range of applications. FPGA is programmable and can be reconfigured for yield improvement and defect tolerance. These features become absolutely necessary when CMOS technology scales down to nanometer scale, because the yield of the fabrication of semiconductor components hardly ever reach 100%. FPGA consist of configurable logic blocks and I/O blocks that are interconnected by a configurable routing network. FPGA is configured to implement circuits by writing into the configuration memory that are embedded throughout the FPGA and defines the logical function of each block and connections within the configurable routing resources. Re-configurability of FPGAs is fundamentally different from traditional general-purpose microprocessors. Microprocessors are attractive for their flexibility. The main contribution of this work as follows. To design and implement 3D multi-tier Tree-based FPGA, we developed a 3D physical design methodology using Global Foundries 130nm technology node modified to use Tezzaron's TSV technology as presented in Figure on the right side. The design flow covers all areas of 3D design, including the design partitioning, merging multiple tiers (gds files) and design sign-off analysis. In addition, we also address the specific issues that 3D designers will encounter dealing with tools that are not specifically developed to meet their needs. We developed additional design support programs to enable the designer to perform 3D DRC/LVS and TSV implementation using six metal back-end offline (BEOL) technology. We developed an automated 3D physical design methodology including a RTL description code generator based on Tree-based FPGA architecture description and design constraints. The HDL code generator is based on a hierarchical design approach that partitions the design into smaller sections, which implement clusters separately and assemble them together at the final design phase. The physical design is performed using Global Foundries 130nm technology node (Tezzaron 3D Design platform). A timing evaluation system based on Mentor's circuit simulator Eldo is attached to design module to accurately estate the networks delays. The two-tier 3D chip presented in the Figure 2(left).



We finally evaluated the speed and area overhead of the proposed 3D Tree-based FPGA using the newly developed experimental design and evaluation methodology and show that the horizontally partitioned BFT programmable interconnect topology based 3D Tree-based FPGA improves speed by 2.06 times and reduce interconnect area by 2.8 times compared to 3D Mesh-based FPGA with identical logic resources.

Unified Electronic Medical Record System (UEMRS)

Hanan Baset and Sherin Alnajjar

Supervised by
Dr. Ahmed Al-Gindy and Dr. Ezz Hattab
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ABSTRACT

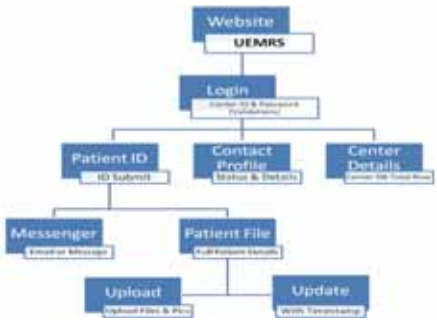
Technologies are being used in all aspects of the life including the healthcare sector. However, it is being used only to manage transactional records but not clinical or health records. Patients waste their time to provide their basic information each time they visit healthcare center including emergencies' cases. Further, such personal data and health records are stored in isolated online transaction processing systems (OLTP) rather than unified and centralized online analytical processing systems (OLAP) that store historical data to support future decisions and diagnosis.

This project proposes a system to overcome the above mentioned challenges by (1) standardize and unify all electronic medical records in one country (e.g. using HL7, PACS- which are formats for exchanging information between medical applications.), and (2) process clinical data in addition to transactional data to formulate a medical history to support decision and avoid medical errors (e.g., allergies, drug reactions, etc.). The proposed system will be available for all health services providers including medical centers, hospitals, clinics, labs and pharmacies. All patients will have a unified identifier under which all diagnosis, medications, and surgeries will be stored as medical history.

Each center will be granted sufficient privileges to update the patients' record under its responsibility. As mentioned above, the content of the records including text, images, and videos will use standards to assure interoperability of the medical record in case of being imported and exported into other platforms.
The proposed system manages the workflow and the life cycle of the patient's visit from diagnoses, tests, and medication.
It has a messaging/ email feature, which facilitates the communication between the doctors of the same patient, to ensure the best cure. The format of the message will depend on the priority of the question from the first doctor to the second one (high- normal).

To build this system, we use open source VistA platform which is built around an Electronic Health Record (EHR), using MUMPS programming language (Massachusetts General Hospital Utility Multi-Programming System) that provides atomic, consistent, isolated, and durable (ACID) transaction processing. VistA consists of 160 integrated modules for clinical care and financial functions which can automate the data processes, and it has a web portal that allows patients to access and update their personal health records and schedule appointments. The system is ideal for large organizations and hospitals, and has almost daily updates to make improvements.

Legally and ethically, this record should be owned by the patient her/himself. No one has the right to access it unless a written approval and consent of the patient. Therefore, the proposal suggests that such a record should be stored and maintained in the cloud of Ministry of Health in each country, which will have the chance to generate intelligent reports at an aggregated level to analyze data and support high level decisions or so-called OLAPs.



Three-Dimensional Thermal Modeling Methodology for 3D-Integrated Circuits

Bassel Hussein, Lilan Haj Hussain, Sharma Anurdh, Vinod Pangracious
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ABSTRACT

2D integrated circuits, since the heat produced in a 2D chip easily removed using heat sink on top of it. However our aim is to build high density multi-stack 3D MPSoC (Multiprocessor System on Chip) and FPGAs. For this reason we developed a 3D thermal resistance mesh based multi-layer thermal model for multi-layer 3D integrated systems in which TSVs (vertical interconnect for 3D-ICs) and power distribution network (PDNs) are used to control the inter-tier heat transfer. Using this 3D thermal module, the inter-layer temperature is optimized by considering spatial distribution of TSVs and PDNs. The 3D thermal model considers the impact of TSVs material (Cu, Tungsten or doped Poly-silicon) while estimating the temperature profile. This paper present the tools design, heat transfer methodologies for 3D stacked high density chips.

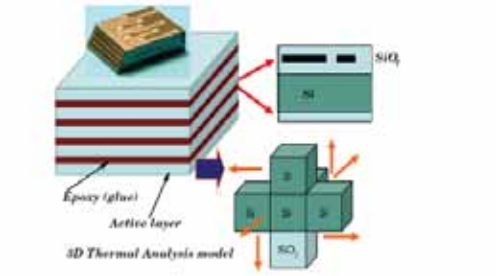


Figure 8.1: Illustration of how 3D-ICs are structured into thermal units for 3D thermal analysis

Heat transfer analysis in 3D-ICs is complicated by the presence of multiple heat sources and the introduction of new thermal resistances posed by inter-die materials including interface resistances whose values are not readily available. In this paper we present a 3D thermal model developed for an n-tier 3D stack FPGA chip using 3D R-C mesh-based model. The design and implementation of this fast and accurate thermal analysis model depends on the characteristics materials and layers used to manufacture VLSI chips. There are several heat fluxes associated with each active layer: 1. in-plane heat transfer due to thermal conductivity of silicon; 2. vertical heat transfer between layers through adhesive layers, BEOL (back-end-of-line) metal dielectric layer and TSV material and location. The heat transfer in an adhesive layer is considered to be perpendicular to the device plane and no heat flux occurs along the adhesive layer due to its low thermal conductivity. The heat transfer in TSVs is considered as one dimensional and perpendicular to the device plane. Heat fluxes for top and bottom layers are also defined by heat transfer through a heat sink and packaging. The heat flow inside the 3D stack is diffusive in nature and hence it can be modeled by its equivalence to an electronic RC circuit. This is done by first dividing the entire chip structure into small cubical thermal cells as illustrated in Figure 1. Each cell is then modeled as a node containing six resistance that represent the conduction of heat in all the six directions (top, bottom, north, south, east and west), and a capacitance that represent the heat storage inside the cell as shown in Figure 2. The hotspot temperature estimated is using hardware-based heat transfer in 3D designs is well within the acceptable level. Nevertheless it's an expensive method and applicable only in the case large and complex chip designs. The measured peak temperature of 2D Tree-based FPGA is 73°C and average temperature is 70°C as illustrated in Figure 3 (right). The main contribution of this work is the development of dedicated 3D thermal model for 3D-ICs. The model takes into account of in-homogeneous localized heating, heating exchange with the layer, heat transfer through external surface of the device, inter-tier heat transfer dedicated hotspot zones assisted with help of thermal-TSVs and thermal design techniques.

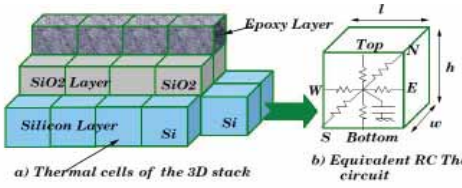
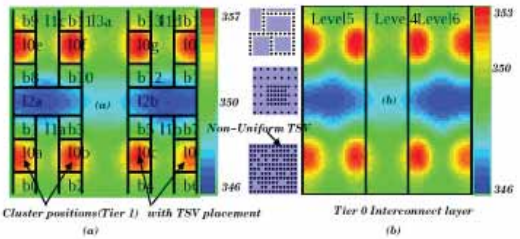


Figure 8.2: (a): The unitary thermal calls of the 3D stack (b): Equivalent RC Circuit of single cells



Motion detection and speed calculation of moving cars

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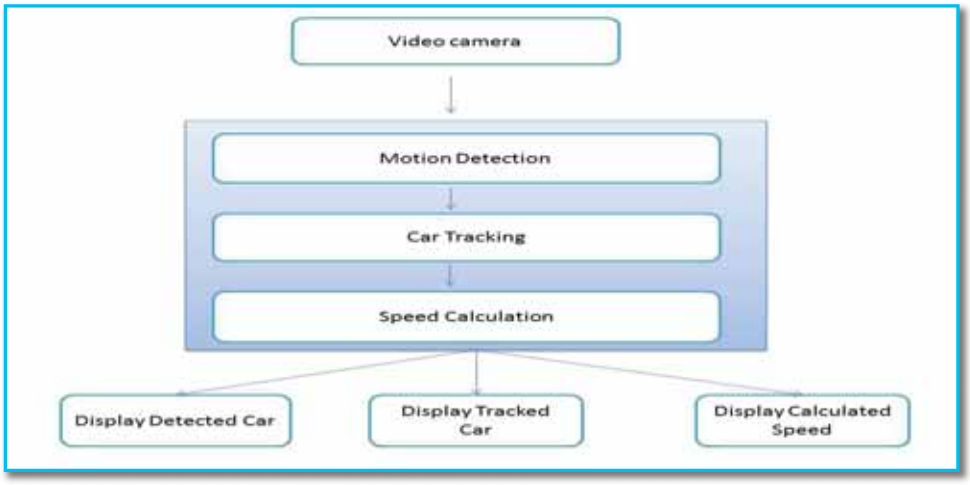
Supervised by
Dr. Abdulqadir Khoshnaw

ABSTRACT

A major part in traffic control system is car motion detection and speed calculation. Traffic control system includes several aspects such as, car detection, estimating the speed of the car, counting number of cars passing through a point. The aim and task here is to detect the motion of cars and estimate their speed throughout utilizing a video camera and MATLAB program. The reason of developing such a system is due to over increasing the numbers of cars daily in which more and more problems occur in traffic systems such as traffic accidents that put the danger the life of people The implementation of the proposed algorithm will be used to detect motion of cars and estimate their speed in a real time. In a real time monitoring, object (car) detection is a problematic and challenging task due to unexpected physical or forecast changes. So, there should be a solid algorithm for detecting the motion of the cars and at the end estimate their speed. Previously, radars were the most common method used for that purpose, but nowadays image processing is showing up to be a successful method for motion detection and speed estimation. There are several other methods for detecting the moving objects such as optical flow, frame differencing and background subtraction. In this research background subtraction is utilized and applied for detecting the moving cars. Background subtraction method facilities us to compare and subtract all the frames of a video with the background to find the moving object (car). The reason why background subtraction is used is because it is easy to implement and it has a better performance for motion detection than optical flow and frame differencing, Furthermore, through specifying the center of each object (centroid) the speed can be calculated via the changes of the center of each car in each frame. Some possible applications of the system is security systems, surveillance system and traffic monitoring system. The motivation for doing such a work is designing the traffic control systems in a cost-effective way without using very expensive hardware or radar and ultrasound devices as we are going to use only a laptop, video camera and MATLAB. The speed results will be available which will estimates the speed at each frame number /time, based on the real speed “km/h” and will be compared to the real car speed for efficiency. Motion detection result is currently available, and it detects the motion with minimum amount of error and multiple lane car detection.

Below diagram shows the system architecture:



Project Leap (A Smart City)
Where Future Matters

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American University of Kuwait, Kuwait

ABSTRACT

Traditional cities lack innovation and element of intelligence which have caused various problems and many aren't resolved till now despite of countless efforts and investments. Traffic congestion is among the leading problems causing vast amount of carbon emission and reducing the quality of air. This results in many diseases such as Asthma. Availability of parking space is among serious issues in many cities including Kuwait and often leads to traffic congestion due to illegal parking. The traditional houses are nothing more than a box made up of cement and wood. Today, technology is touching the skies but houses still lack safety and aren't very efficient by any mean. The high power consumption in the cities is common and causes power outage in many developing countries. It is very crucial to curb the carbon emissions and resolve the problems that exist in cities because population in urban areas will be at the peak in near future.

Project Leap proposes to incorporate the element of technology in cities to resolve the problem of today and future. It comprise of parking system, traffic system, street light system, monitoring system and smart house, which address the aspects of smart living, smart environment, smart governance and smart mobility. The whole project is consist of five microcontrollers and graphical user interface (GUI) is designed using Processing IDE. Figure 1 provides a visual of the complete project. Our traffic system basically informs drivers about the condition of route ahead of time via LCD display allowing users to switch route in case of any congestion. The diversion of traffic flow prevents roads congestion, which minimizes carbon emissions. Our parking system, shown in Figure 2, provides users with an interface to reserve parking space ahead of time via web technology using unique ID of RFID/NFC tags and that facilitate users to save their time, prevent illegal parking, and also curb the carbon emission which benefit the environment. The traditional houses lack standards and safety. Figure 3 illustrates the smart house, which guarantees safety of users by automatically notifying the tenant in case of fire or gas leakage via sms. Appropriate authorities are notified as well reducing the response time to attain the help. In addition, users can control the appliances both remotely and via a graphical user interface providing the aspect of convenience. Street lights in cities are usually controlled manually, which is obviously not very reliable and leads to over power consumption as light intensity in the environment changes from time to time. Our street light system, highlighted in Figure 4, inspects the light intensity and is triggered only when no light is detected in the surrounding. It provides automation and also aids in saving energy. The monitoring system primary designed for authority/ministry to ensure the aspect of smart governance and to keep track of ongoing events or activities in the parking system, traffic system and smart house. As it is known that any city without a mosque is incomplete. Therefore, mosque is another key element of the Project Leap which plays azzan (prayer) automatically based upon the time. All these aspects combined indeed make the city of future.


Figure 1:Model Overview

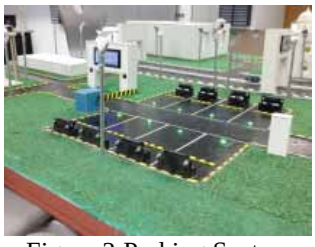
Figure 2:Parking System


Figure 3:Smart House


Figure 4:Street Light System

Life Donors

Fatimah Abdullah AlDossari, Manal Mohammed AlMubarak, Marwa Khalil AlBukhowa, and Maryam Khalifah AlSaif
King Faisal University, Al ahsa, Saudi Arabia

Supervised by
Dr. Noor Zaman

ABSTRACT

It is well known fact that health is wealth and a primary necessity of human beings. Money can't buy health but can buy modern technologies to ensure better possible enhancement in health care standards by involving sophisticated latest technologies. New era technologies are being used almost in all aspects of humans' daily life to bring comfort and ease together. In today's modern technological era people demands solution on finger prints for their daily life issue faster, better, cost effective and efficient. Governments as well as private sectors are paying maximum attention to enhance health facilities by providing all necessary resources, hospitals, medical equipment, and doctors to help protect health issues. It is matter of fact, that besides of all available mentioned facilities, we are still striving hard at the point of blood transfusion timely, which leads to high risk to human lives. Based on the statistics available, provided by the Government officials in Saudi Arabia that several peoples are losing their lives daily in road accidents & in emergency situations, as we are suffering from lack of blood in blood banks while there a great number of peoples are ready to donate. Few existing online systems are trying to do their best for arranging blood by motivating people to donate when they are available but still success is far away as we cannot manage them in emergent cases due to inefficient communication. Our proposed system namely Life Donors, address these issues by providing live link among patients, donors and hospitals whenever needed. Our proposed system will be the combination of an Android Application and a dynamic Web-Based-System. Life Donors Web-Based System is available for KSA hospitals. It reserves the confidentiality of the information in the database which will be accessed only by designated officials in the hospitals and it will enable hospital management to trace possible willing donors along with their nearest possible locations with the help of GPS coordinates considering their free times, blood type, and last donation time, then communicate with them at the time of need either by sending a notification message or calling them by their phone number. On the other hand, Life Donors Android Application will enable donors to use the application in order to specify their information and availability. Our proposed system will increase awareness in the community and register donors for the time of the need and will make registered donors enable to receive notifications and calls through Life Donors system.

Our research is using the latest technologies and the available tools to find a modern system which full fills the gap between blood donors and needy people and provides an organized solution for blood donations process. The system will make the ability to find out donors for needy people easily. Therefore, the number of donors and the awareness about the importance of blood donation will increase in the society. Our proposed system will increase the efficiency of blood donation system in urgent cases close to 70% and it will also become source to maintain blood banks reserves to be used in case of emergency.

All-in-One Pass NFC Wallet

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ABSTRACT

A technology that is able to integrate the multitude of accounts into one safe, convenient, and wearable pass is an attractive modern setup. The idea provides the user with the ability to customize, secure, and use wearable technologies by adding the information of all of their accounts. Since all of a user's accounts are stored in a single device, the act of carrying around copious amounts of smartcards becomes obsolete. The presented prototype has three main elements: the wearable technology that contains an embedded smart chip within, a web-based phone application by which the account to be accessed is chosen, and a smart reader that recognizes the chip and enables a security method to ensure the owners' privacy. The application allows the user to add/remove accounts, enable/disable the secured hardware, or backup the accounts as well. NFC Wallet is ubiquitous; the software is web-enabled so that the user can control it using smart phones, tablets, laptops and other computing devices. The system provides a true pervasive computing experience.

Carrying a larger quantity of smartcards has become a necessity. According to our local survey, a typical resident has four to seven smart cards in his/her possession. Some people carry more than eight cards at a time. In many of the cases, passwords are required to be memorized in the event that a card is needed to be used. Often, these passwords are forgotten and this leads to an impractical solution of this issue.

The approach to integrate smart IDs into wearable technology, such as ring or a bracelet, is relatively new and as a result, few primitive solutions for the same problem are currently available. NFC Wallet is useful in a variety of contexts; the main focus of the developed prototype is on payment transaction and building management systems.

Figures 1 and 2 show the general system architecture and the supported network security mechanism. The main idea behind this architecture is that a gateway server is connected to the main database-server and links it with the other merchants that the user desires to use their account. In this case, the database-server communicates with the gateway and the phone app directly. This reduces the burden on the reader as it merely relays the information to the main server which is responsible for the majority of computing. The gateway then checks the connection and authenticates the user to access and potentially update the database information. The supported network security mechanism uses two firewalls to create demilitarized zones (DMZs). The aim of the DMZs is to protect the server, as well as, any payment gateway.

The presented system enjoys several characteristics including its convenience, secrecy, robustness, reliability, scalability, to name a few. While all of the users' information remain secure, the system could be extended to incorporate biometric scans like fingerprint scanners. Future work includes supporting the palm signature recognition as a part of human signs of uniqueness ensuring personal privacy, and will be synchronized in order to access the secured hardware.

Fig. 1. NFC Wallet system architecture.

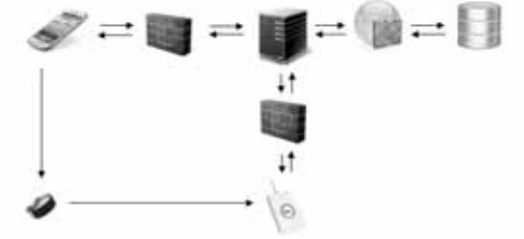

Fig. 2. The supported network security mechanism.

A Client/Server Application to Remotely Control Water Level in a Reservoir Using Microcontroller & Networked Sockets

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ABSTRACT

This project proposes to use a client/server scenario to monitor and control premises using IP networked microcontroller. The chosen case study is to track the water level in a reservoir. The server monitors the client messages continuously, evaluates the current situation and directs the client for the appropriate action according to the current level of the water. On the client side, a microcontroller equipped with sensors to measure the water level continuously and actuators in order to respond to the server's orders. The client and server are connected to each other through wired IP network. Hence, the system has two way communication between client and server using TCP or UDP sockets. The server is also connected to a database to record the data received from the client for future analysis and evaluation. This system has vast applications in today's world. Although the application chosen in this project is to monitor and control the water level in a reservoir, but other applications such as oil and gas storage controlling, and many other systems that need their monitor to be automated and controlled remotely are possible too.

In order to have such a system, a server is used for decision making. It receives data from the client and, evaluate the current situation of the water in the reservoir, makes the decision and sends it back to the client to take action accordingly. The action is to shut down water flow in the reservoir if water level is above maximum threshold, or to open the flow of water if it is less than a minimum threshold.

The general architecture of this system as shown in Figure 1, consists of a server connected to a client through an IP network, which is assumed to be wired network in this work (but it can be implemented using wireless technology as well). For the server side, the programming language is Java and the server is connected to a MySQL database to store the data fed from the client for future analysis. The client is a microcontroller (Raspberry Pi) equipped with a sensor to read the level of water in the reservoir, and two motors, one for opening flow of water to the reservoir and the other is for closing. The programming language for the client side is python. The server and the client are communicating with each other through the wired IP network using TCP or UDP sockets and they interact automatically without the interference of any user.

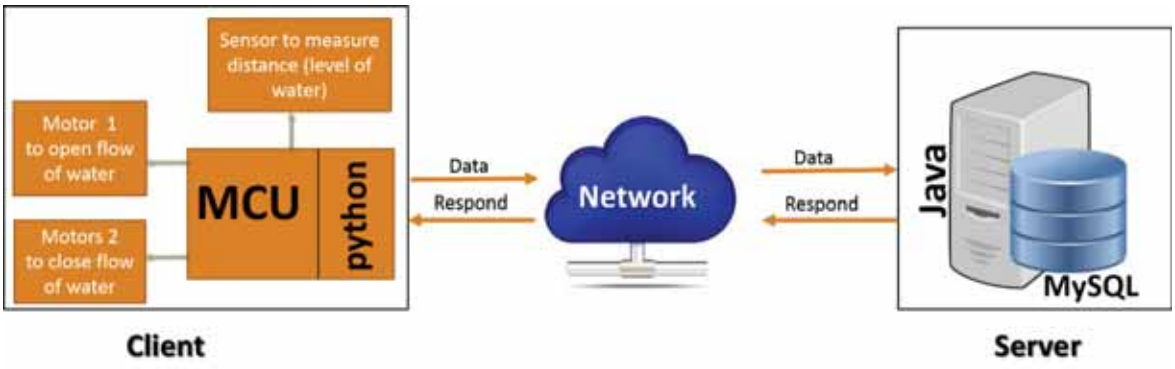

Figure 1: Client / Server architecture to remotely monitor and control water level in a reservoir

The advantage of this system is that the control is remote, therefore, there is no need for any user interaction with the operation of opening/closing the flow of water to the reservoir. Moreover, it is cost effective and more accurate.

Mine-Sweeper Robot

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ABSTRACT

Kuwait is the fourth in ranking among the top 10 countries with the most landmines in the world according to an article by the CNN. This led us to decide on build the "Mine-Sweeper Robot", which is capable of detecting buried land mines.

The main goal in this project is to save humans' lives and improve areas that are landmind affected. Also to have a safer world that is free of landmines. Finally, the goal is making the affected landmine areas useful for economical purposes such as roads or electricity pylons and much more.

Thus, we came up with a number of features that the "Mine-Sweeper Robot", shown in Fig. 1, should have in order to solve the risks of mine detection. Firstly, we built the robot based on Arduino technology. It is programmed to move autonomously. While moving, the robot is continuously searching for mines and efficiently sweeping in a respectable time manner, along with energy and cost limits. When the robot comes across a mine, it immediately notifies the officials and allows them to locate the suspected mine, highlights the area, and issues an auditory and visual alarm. In case the robot faces an obstacle along its way, it is able to detect the obstacle and avoid it. The robot operator has two different controlling methods: controlling the robot using Bluetooth communication within near vicinity and by using an *RDM app (Remote Desktop Management)* named *Team viewer* to allow the user to control the PC/GUI through their mobile phone, tablet or other PC from anywhere that is desired. The user is notified with the location of any landmine. This is achieved using a GPS (*EM-406A SiRF III Receiver with Antenna GPS-00465*) that identifies the exact location of the detected landmine. Another unique feature is sending an SMS to the operator's mobile phone when a landmine is detected containing the Longitude and Latitude that are recorded by the GPS, as shown in Fig. 2. Afterwards, the robot will continue to search for landmines at the request of the operator.

As one of the approaches to disable a landmine is the use of chemical substances, a similar capability is integrated in our robot by having a pump (*ZL25-02 mini brushless water pump*) that pumps colorful liquid to mark the detected landmine surface. Finally, the "Mine-Sweeper robot" can be used in Military or in any de-mining campaigns. It is non-environment specific; meaning that the robot can work in a wide variety of environments such as desert like areas, and green areas.

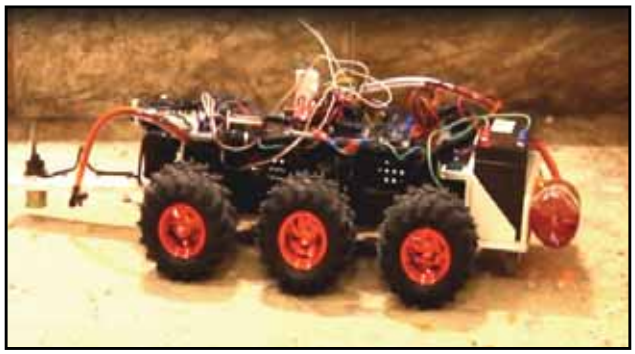

Figure 1: Mine-Sweeper Robot

Figure 2: SMS when landmine is detected

Screening System for Retinal Disorder

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ABSTRACT

Since blindness is an intimidating problem, efforts to keep sight are not terminating. Early diagnosis of retinal diseases is on the top of methods of sight keeping. Diabetic retinopathy and age-related macular degeneration are the most two common causes of blindness. Exudates, Hemorrhage and Micro-Aneurisms are the common symptoms of these diseases. If these symptoms are early detected, then the diagnosis is reached. Many algorithms for the early detection of these symptoms from fundus photographs have been conducted. These algorithms range from simple threshold to complex shape recognition algorithms. The main problem with these algorithms is that the physician can't choose between them easily. Usually, doctors try all of the available algorithms and visually check the results. In this work, we provide a comparative study between these algorithms, which in turn lead to a recommendation to the physician to apply the most appropriate ones. About thirty Fundus images were collected and improved by filtering, histogram equalization and contrast stretching. Exudates, Micro-Aneurisms and Hemorrhage were detected using edge detection and morphological image processing algorithms. Exudates were differentiated from the other two symptoms by their yellow color. Micro-Aneurisms were differentiated from Hemorrhage via the detection of regularity of their edges. Finally, a computer-aided screening system was implemented to help the physician select the proper algorithm to be applied to an image. After processing, the physician can easily find the symptoms to decide the correct diagnosis. This system is promising and foreseen to add value to the existing diagnostic tools.

Book ChatRoid: Book Discussion Chat-Based Android Application

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ABSTRACT

Book ChatRoid is an Android application that targets book readers who are interested in participating in book discussions and be able to share their views and opinions with others. The main motivation of this application is to present an exclusive environment for book discussions, where readers can search for book discussions and participate in them. Moreover, readers have the ability to create book discussions for a specified book of their choice. All book discussions are held in chat rooms that users can join and begin participating in the ongoing discussion.

Many books related applications provide the ability to view books, rate and review them, or provide the ability to get in touch with other book readers and post ideas to discussion boards. However, these applications do not provide independent discussions platform neither they offer interactive discussion feature. Book ChatRoid application provides an environment where users have the ability to create, view and participate in book discussions. Each book discussion session is a chat room, where participants send instant messages to present their opinion regarding the book that is being discussed. Therefore, the application provides an interactive platform for book discussion purposes. Book ChatRoid comes with an Arabic and English interfaces and can be used to discuss books in these languages. To the best of the authors' knowledge, no such application exists for books written in Arabic or has an Arabic user interface.

Figure (1) shows the component diagram of Book ChatRoid. The application consists of the following components:

1. Android smartphone application.
2. Openfire server for real-time communications.
3. Web server provides database layer for accessing requests to the centralized database.

The Android application communicates with the web server using web services to retrieve discussions information. Selected discussion book information is retrieved from Goodreads' database using a web service. Also the application has directed access to Openfire server for sending and receiving instant messages. We choose this design for Book ChatRoid to promote extensibility and lose coupling between components.

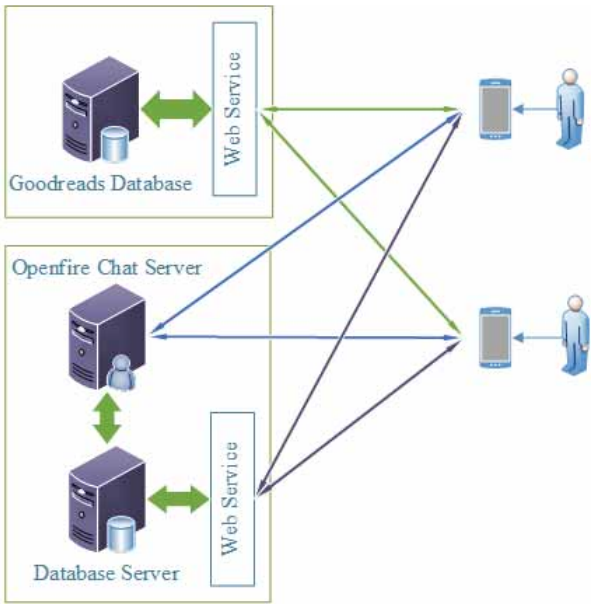

Figure (1): Component diagram of Book ChatRoid

The application is being developed using Android Software Development Kit (SDK), with Ignite Realtime's aSmack client library to support chat based discussions, Openfire XMPP server, MySQL online database, and Goodreads API.

Computer Aided Brain Tumor Detection Segmentation and Detection

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ABSTRACT

Brain tumor is an uncontrolled and abnormal growth of cells inside the skull. According to the cancer journal for clinicians, the estimated deaths in USA by brain tumor during the year 2012 were 13,700. Actual detection of tumor depends on the expertise, knowledge and experience of the technician that he acquired in the field of radiology but some practitioners fail to detect the brain tumor because their interpretation is limited to their mood and level of understanding. The researchers have found that stressed, tired and anxious doctors are more likely to talk less to patients, prescribe more medications, send them for more diagnostic tests and refer them to specialists. Brain cancers are frequently misdiagnosed, especially the early staged tumor. These diagnosis errors could lead to a serious harm. To reduce these diagnostic errors and save lives and money, an image processing software has been developed that can detect the presence of brain tumors at an early stage from the Magnetic Resonance Imaging (MRI) scans and show an accurate result. The proposed methodology used in Computer Aided Brain Tumor Segmentation and Detection system, successfully segments and detects brain tumor along with obtaining useful key features of tumor progression such as Cross-sectional Area, Region, Severity, Hemisphere and Class.

A large database of MRI Scans has been created with the help of online medical resources. Pre-processing involves the conversion of loaded image in RGB (Red Green Blue) format to grey scaled. In order to enhance the tumor region in the image, histogram equalization technique is applied followed by thresholding, which involves the conversion of image pixels from Grey-scaled to black and white. For sharpening and improving the contrast of the image, two morphological tools "imclearborder" and "bwareaopen" are used. The tumor is then extracted out from the rest of the image. For the purpose of extraction, the function "ginput" is used to select the Region of Interest (ROI) in polygonal shape with the help of the cursor followed by the function "imfill" which fill the holes in the extracted tumor region. After the detection of the tumor, features like Cross-sectional Area, Region, Severity, Hemisphere and Class are calculated.

Up to this day, tumor detection from MRI images is very challenging. The main reason is that the abnormal cells mix with the homogeneous (normal) cells in the brain. The images provided by different patients have different dynamics of intensity and contrast values. In previous approaches, many people have detected tumor by using texture analysis, but the problem arising with such an approach is that it is challenging for the practitioner to distinguish between normal cells and benign tumor cells. Our approach as shown in Fig. 1, detects the brain tumor faster with increased precision rate of segmentation along with accurate features detection. Fig. 2 shows the result of 8 patients' MRI scans that went through various image processing algorithms. This software can be used by people with medical background.

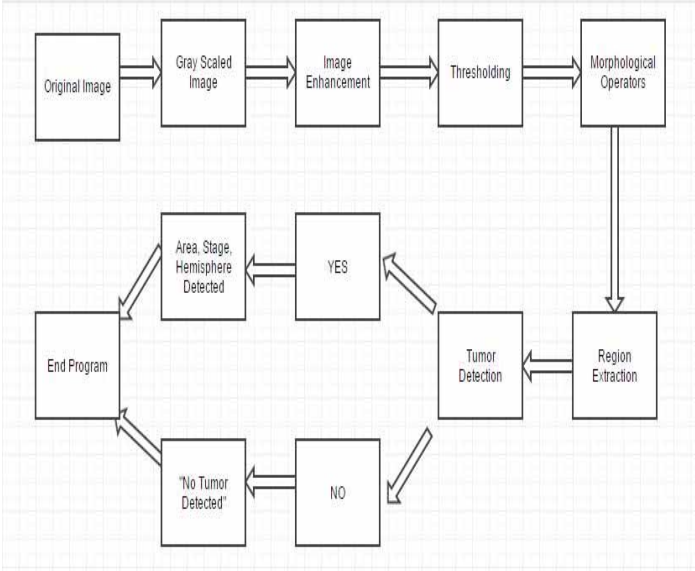

Figure 1: Proposed Methodology

MRI Images	Tumor	Hemisphere	Area mm²	Class	Region	Severity
		Right	3.085	1	Frontal lobe	Non-Critical
		Right	5.612	1	Occipital lobe	Non-Critical
		Right and left	16.47	4	Temporal lobe	Extremely Critical
		Right	11.68	3	Temporal lobe	Very Critical
		Left	9.489	2	Temporal lobe	Critical
		Right	14.13	4	Frontal lobe	Extremely Critical
	No Tumor	None	None	-	None	None
		Left	11.08	3	Occipital parietal lobe	Very Critical

Figure 2: Compiled Result

ActPre: Active Presentation Mobile Application

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ABSTRACT

As the technology evolves, many tasks become more interesting when they involve technology. Engaging technology would make the execution of tasks more fun and efficient. Professional events, such as workshops, usually include tasks like collecting information about the event's attendees (prior the presentation time), checking the attendance, distributing surveys, collecting questions from attendees, etc. These tasks are usually done manually. This consumes lots of time and error prone. Therefore, the objective of ActPre (Active Presentation) is to automate these activities to enable better utilization of the events' time and to make the presentation more interactive and interesting.

What makes our goal challenging are two factors. First of all, our lack of experience in the business field, and hence, we had to meet some experts in the business field to collect their opinions and responses about our application. In addition to that, since our application is new of its kind and there are almost no open sources to use for implementing the application, we had to write most of the logic by ourselves which required a huge amount of analyzing and thinking to implement any feature.

ActPre is a mobile phone application that aims to provide many services for event management. Features of ActPre were decided after analyzing the existing tools and meeting with professionals. As a result, we decided that ActPre allows the presenter to: 1) collect information about the attendance, the collected information can also be displayed in a graphical form, 2) distribute surveys and collect their results back, collect questions from the attendees, and create groups either manually or based on some criteria in their profiles.

After analyzing the market, we found that previous solutions are insufficient for several reasons. Firstly, some of the required features are not implemented yet, or they are separated in many applications which make it even harder for any presenter to use them all. Our goal is to integrate all the required features in one platform to achieve the goal behind this application. Secondly, Actpre is very fixable, where the presenter can choose which features to use in the presentation. Actpre gives the opportunity to the presenter to use whatever components of the system as needed.

Using ActPre, the presenter can focus more in the content of the presentation rather than spending time in other tasks. Attendees are more engaged with presentation. We believe that ActPre will change the way people tend to interact in workshops and presentations.

NEUTRINO for virtual learning

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ABSTRACT

The rapid and constant pace of change in technology is creating both opportunities and challenges for schools. There is a saying: "Technology will not replace teachers, but teachers who use technology will replace the teachers who do not". This Project attempts to suggest solutions to replace low tech (classic class room), with new high tech (a 3-D interactive visualization). The project will employ latest technologies in chemistry field.

Problems that led to initiate this project:

- Students get bored easily and lose attention in class.
- Sometimes scientific fundamentals are abstract; hence, it's hard to understand.
- Experiments that can't be done in real world due to many reasons, e.g. high cost, riskiness, shortness of the tools, etc.

This is generally. However, chemistry field has its own extra problems:

- Some of the chemicals are dangerous, expansive, and rare, e.g. Nicotine, contact with the pure liquid form can cause death within hours!
- Student may have anxiety to touch or be around chemicals.
- Some chemicals could have strong smells such as organic chemicals.

NEUTRINO application employs virtual reality technology to provide a better learning environment for chemistry. Generally, it aims to allow students to interact with the elements to learn more about them. Moreover, they can perform dangerous reactions virtually. Hence we are solving some of the difficulties that students may suffer from. This solution is adaptable; it can be applied in many different fields such as biology, astronomy and physics…

One of the applications in the same field is Chemist app but it's hard to learn and 2D. However, NEUTRINO will have 3D virtual lab that is more realistic, easy to learn for beginners and more interesting with the effects that it's going to provide. Tools to implement are Unity, Kinect sensor and oculus rift (VR helmet) to increase the level of immersion. As a result, safety, creativity, participation in learning will be increased, cost will be reduced significantly and the environment will be saved from pollution.

The Figure illustrates NEUTRINO application:

- **Step 1:** shows the pig picture, where student is standing in front of a Kinect and a screen that has 3D projection to give the illusion of the virtual world.
- **Steps 2, 3, 4, 5:** student can choose from a set of elements to find interesting information. Such as carbon can be found in nature as diamonds or coal.
- **Steps 6, 7, 8, 9:** Student can mix between elements to perform reactions virtually. Then, the system will ask the student to pronounce the chemical name of the compound.

Figure: NEUTRINO

In the future, we will turn the traditional classroom into a 4D class, where students not just can perform those reactions, but also they can feel and even smell the aroma of those reactions. Involving more senses while learning will increase the ability to retain information for long time. Hence education will be improved and become more effective.

Avatars in E-Commerce

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Supervised by
Ms. Fatima Khan

ABSTRACT

This research is aiming to investigate the increasingly rising role of humanoids, also known as avatars in the discipline of E-commerce. A humanoid is a virtual or robotic character that has human characteristics and resembles a human in its form and/or appearance. Humanoids have not been associated with E-Commerce businesses for a long time, but lately online businesses have shown a lot of interest in using humanoids with the aim to provide their customers with a better user experience. The use of humanoids is a very large and vast field in the online world; it could range from simple tasks like representing a person in a certain online game to more complex tasks like giving the customer a virtual tour and also answer his questions. The study would also suggest new areas where the introduction of humanoids specifically in online shopping of garments and accessories can significantly contribute in increasing the customer satisfaction.

There have been many technological advances in the online shopping industry that have helped it grow dramatically in the past decade. This is because many people are now choosing to shop online rather than in malls, especially in the United States, which alone has over 196 million digital shoppers. (Avatar New York, 2014) One of the most important technological advances in the online shopping world is the use of customized avatars for every customer to try on the outfits, shoes.. etc. that they have chosen. (Korzeniowski,P. 2008) This use of avatars has drastically improved the connection between the customers and the company, and also enhanced the customers' online shopping experience. Avatars in the e-retailers' world are not only used as customized models, they can also serve as electronic agents to provide recommendations to customers, or to introduce customers to the website using an animated tutorial. Although avatars are still not used in all E-Commerce businesses, the number of avatar-using companies is increasing constantly as it is a very promising e-marketing booster.

It is not certain when avatars first appeared on the internet, but one of the most remarkable early avatars to debut on the internet was Ananova, the world's first virtual newscaster, which first came to life in April of the year 2000. (Egen, 2005) Ananova was originally British, but was programmed to speak multiple languages to appeal to a wider range of people globally. The reason why Ananova was created in the first place was because the Ananova programmers believed in the timeless principle that face-to-face interactions with people are far more effective than other interactions. One of the leading companies to realize the importance of personalized avatars in online retail stores is My Virtual Model. My Virtual Model is a 3D avatar designing and modeling website that provides its services to customers and other sites. Based on the MVM website, customers can integrate Virtual Model technology into their web sites or mobile apps using MVM's API. Another website that implemented the use of avatars is Sizeable. Sizeable is an Australian shopping website that provides items from different brands, and pre-customized models with different body types. The customer first logs in into the website, chooses the model closest to them in body type, and starts shopping by trying on outfits on that model. Last but not least, avatars have been proven to be one of the most effective marketing strategies that an E-business can use.

AR-CODE: a color-coding application for Arabic text

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Supervised by
Dr.Hend Al-Khalifa

ABSTRACT

For the past years, the number of Arabic language learners worldwide has grown at a remarkable pace and the race to learn Arabic do not know any national boundaries. The problem that faces new Arabic learners is in founding proper reading and comprehension abilities of the Arabic written text, since this is a mean for extracting the linguistic and cultural knowledge. This process is complex when teaching the Arabic language since the script is interwoven, which complicates identifying word units for new learners. The researchers in the field of teaching Arabic for non-native speakers are doing many efforts to simplify teaching the language for them; however, there is a lack of an electronic mean for teaching Arabic as a second language. Most of these works are either incomplete, not well designed, or have some drawbacks.

AR-CODE, a color-coding application can provide solutions for such difficulties. AR-CODE is a mobile application with a website backend, which will also have an interface and do the same functionality as the mobile app does, in addition to “upload file” property that enable users to upload Arabic text files.

The goal of AR-CODE is to help learners of Arabic language to recognize Arabic text, and read it correctly, so the application will accept Arabic text and apply color-coding, text Transliteration and provide Text-to-Speech technology. Color-coding is the process of analyzing and identifying attached affixes, particle and silent letters of the selected text based on the sentence morphological structure by using different colors. Transliteration is the approximate representation of the sounds of one language in the characters or alphabet of another language across scripts. TTS is the technology that enables computers to read electronic text aloud using phonemic voice synthesis.

The application will encodes and presents a colored conversion on word parts in a sentence. It also organizes and simplifies linguistic data that helps in reading comprehension. The application will consist of two stages. The first stage is the reading stage that will focus on silent letters. They will be colored with gray to display that they are omitted in succession of reading. The second stage is the comprehension stage that is done by identifying and coloring the affixes (prefixes & suffixes) in red, prepositions in blue, silent letters in gray, conjunctions, vocative, and other particles in brown. Interfaces were designed to be user friendly simple and consistent. Figure 1 shows the mobile-based interface

The importance of our proposed application lies in providing a special learning way to improve reading and comprehension ability for Arabic language learners using a new learning method. So in order to make our application reachable by wide range of learner, we implement it as a mobile application with a backend website using iOS programing language and JSP/servlet language in association with “MADAMIRA and ACAPELA” tools.

Figure 1 mobile-baased interface

Beyond Passwords: A Practical Alternative for User Authentication

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Supervised by
Dr. Abdullah M. Almuhaideb

ABSTRACT

In this paper we propose a practical solution to the problem of forgetting passwords using a hardware device as a memory alternative. Many users around the globe are having trouble with their passwords. One of these troubles consists of forgetting these multiple passwords. One of the alternatives that can be used is based on biometrics like fingerprint. Biometrics does not require the user to remember any passwords, but it require dedicated device to read them.

The aim of our project is to find a practical alternative solution for the passwords that is both secure and easy to use. This project is based on a USB flash drive that works as replacement for the user memory so that the user won't have to remember any passwords. It is a software program that can be installed in any third party USB so it can work as a human memory replacement.

The way our project work is simply as follow: the user plug his/her USB and then a window promoting the user to enter his/her PIN number, after successfully entering the PIN number a new window called interface window will appear that the user can interact with. These interactions windows are: adding new credentials or editing them, configuring the PIN number and the most important thing is having access to the credentials. After done using the USB the user can simply unplug it and any source of his/her credentials will be removed from the computer history. In case of theft or lost, the user may protect the credentials by doing back up to another USB that called the Master USB.

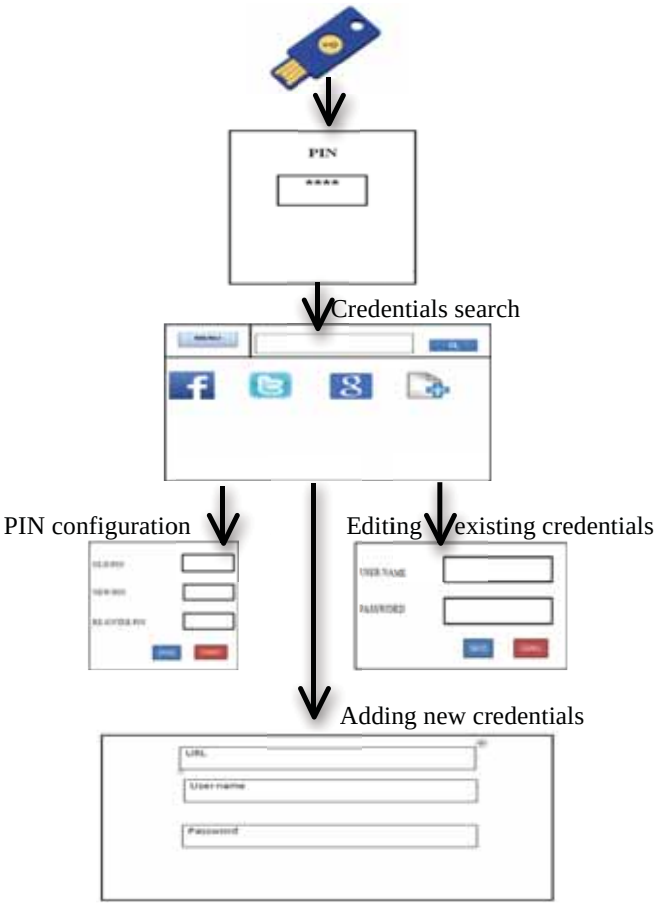

Figure 1: Overview on how the USB authenticator works.

Let's Learn Colors: A toddlers Learning Application

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ABSTRACT

The term toddler is indicating a very young kid of the ages between 1-3 years, when they tend to begin a complex sense of themselves and need to be admired for their new abilities, can create images in their minds, express these ideas as emotions, and organize their abilities into schemes to make things happen. In 2-3 years of age, they reasoned about their feeling and start following up to two or three directions, sort objects by shape or color, imitate the actions of others, and express a wide range of emotions. This is right age of introducing the new games and activities. We can help the toddlers to learn the new things with some activities such as reading, singing, talking, visiting places, introducing objects and colors. Earlier, these activities where only available in the form of human interaction. However, there are many tablet devices or smartphones applications are offering for toddlers multiple paths of learning and playing without getting bored.

In this study, we evaluated the four different toddles applications on Neilson's ten heuristics: (1) Learning colors with kids, (2) toddlers colors, (3) color for kids, and (4) kids learn color with Kissta. We found that mostly applications were easy to use however, these applications not or partially supporting the system visibility, error prevention and recovery, help documentation, and the recognition. We aimed to develop an easier to use android application which is focused on learning the basic colors in many different ways at one platform.

Our application Let's Learn Colors (LLC) is android based mobile application that can help children develop their skills and learn the colors. Our application LLC teach basic concepts of color might result in richer vocabulary, easy communication and be creative. One activity of this application is sing-along, featuring seven different pages; each page contains four icons: two icons (back and previous) to switch between the pages, and the other two icons for educational purpose. The click on pen icon plays a repetition of the color name and selection of the colorful character icon plays an interactive educational video. There are two categories of the videos: (1) characters based on real people, and (2) cartoon characters. The background design of the application is simple and help the kid in easy differentiation between the background and icons. The videos selection is great, and pictures are very colorful and baby friendly.

We have implemented our design in Eclipse with other supporting tools. We evaluated our system with 8 expert participants on Neilson ten Heuristics. Our system does not support the error recovery, partially participants not supported the functionality, and system was not visible to a few users. However users evaluated that the application is compliance with the Nielsen proposed heuristics. We conclude that this easier to learn application and will provide the color learning in the simple way along with entertainment to the toddlers. However, this application could be updated in the future to overcome the problem of error recovery and including more activities.

Mobile Robot Assistant

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Supervised by
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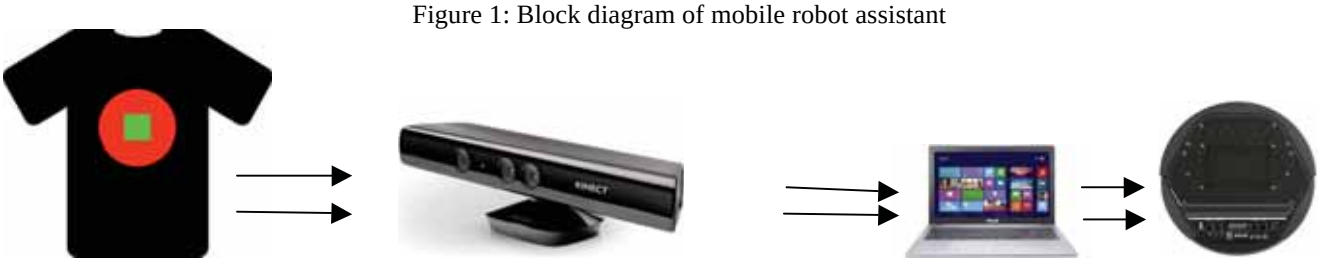
ABSTRACT

Robots were first introduced to the world in the 1940s, after that they became popular. In the 1960s, they were fixed machines inside factories that do tasks without any human help. With time, technology became more advanced, so did Robots. Assistant robots are little, slow robots, they have sensors, motors, they are efficient, strong and live for a long time, and they support human beings with their daily tasks (they are mostly used in hospitals, and elderly houses)

The mobile Robot Assistant system has mainly three phases, the first one being the image processing, the second phase is controlling the robot (Kobuki robot), and the third one is the interface between them. In this project there will be a t-shrit that has a circle and a square printed on it, and by using C# and c++ and with the help of open CV and Emug (Emug and open CV are functions that can be used with many programming functions) we will be able to find the person. For controlling the robot there are so many ways to do that with different programming languages, this robot will be controlled by C++ code through a laptop or a tablet which will be used with one USB wire, and also we will be using ultra sonic so the robot will knowif there is any obstacles (also a smartphone can be used instead of the laptop or the tablet). For the third phase we will be using a linker between the two previous phases, and we will be using a kinect instead of the laptop's or the tablet's camera.

Figure 1: Block diagram of mobile robot assistant



T-shirt kincet the laptop the robot

A Robotic Restaurant Waiter

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ABSTRACT

Restaurants are widely spread in Kuwait; therefore, dining out has become a popular mean of socializing. In order to make socializing a noteworthy experience, the problems that people may face should be tackled. Some of these problems include forgetting the order or not arriving in a timely manner. In addition, the order might arrive to the customer in non-hygienic conditions. Moreover, a human waiter can have an attitude problem, which can make the customer feel uncomfortable. Not only human waiters affect the customers, they also affect the restaurant managers. Managers in restaurants have to find ways of motivating human waiters, which can usually be costly and time consuming. Depending on the size of the restaurant, manager must have an appropriate number of human waiters to be able to handle the orders from customers, thus adding more wages prearranged for them.

Implementing Robo-Waiter is beneficial since robots are able to carry out certain tasks more effectively and efficiently than humans, and for that reason the demand for more robotic applications is on the rise. Looking at the bigger picture, this technology can be used in any environment that needs a specific item to be moved from point to point, regardless of the fact that Robo-Waiter will be used in a restaurant environment. With that being said, in this paper, Robo-Waiter will be introduced to be used in restaurant as a modern way of dinning.

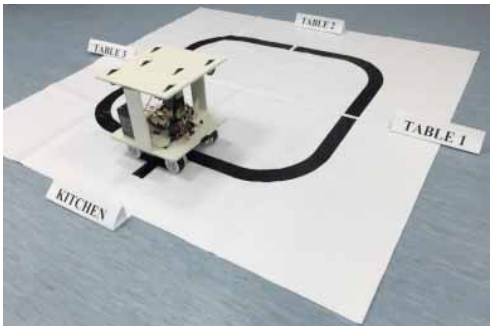

Figure 1: Robo-Waiter in its Environment.

The Robo-Waiter shown in Fig. 1, based on Arduino technology, successfully follows the set path to reach the correct destination, using three IR Sensors, by receiving voice (using the EasyVR shield) or wireless commands (using XBee communication) to reach the required table while detecting any obstacles (using Sharp Distance Sensor) that may interrupt the route of its destination. Robo-Waiter is capable of delivering the tray on to the table by using six wheels attached to servos. Another feature is that Robo-Waiter will take orders from customers (using an attached tablet running TeamViewer ©) and send them to the kitchen. In addition, Robo-Waiter has a multitasking capability, where it can deliver an order and take another order from the customer. Finally, the kitchen worker has the option to control the robot wirelessly and alert the customer using LED's to indicate that the tray is hot.

There are numerous projects done in the field of Robotic Waiters. Some of these projects were implemented to participate in the Trinity College "Fire Fighting Home Robot Contest". This competition has a specified arena, where the robot picks up the plate and delivers it to the table, detecting any obstacles in its way. When a comparison is made between all those robots and Robo-Waiter, it is evident that Robo-Waiter stands out due to the additional functionalities over those implemented for the contest. This includes the two ways of communication with the robot, giving a voice or a wireless command, its unique upper body design used to deliver the tray, taking orders from customers, multitasking, and LED's to represent the different states of the robot.

Interactive Physiotherapy for Edutainment

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ABSTRACT

Interactive Physiotherapy for Edutainment (IPE) system is the result of integrating different fields which are: medical, technological and educational. It goes beyond the traditional way of treatment, especially for the children, to a new effected one. IPE mainly focuses on simple cases on lower limb aiming at making the session more attractive and fun for children. Indeed, during the session time, IPE instructs the children how to control their lower limb while playing funny and attractive games. Moreover, IPE will be of a great help for doctors by providing them with a continuous feedback about the child progress and especially by alleviating their monitoring task.

IPE system contains different educational levels. Every level is a set of games aiming at solving specific lower limb problems. For every newly added child, the doctor not only provides the child information but most importantly specify the level to start with depending on the current child state. To successfully accomplish its objectives, the IPE system is made of three basic components namely; Kinect sensors, virtual graphical game projector and a hologram projector. The Kinect sensors will be used to track the children movement during the treatment. The virtual graphical game projector displays a virtual mat showing the appropriate game. The hologram projector displays a three dimensional picture instructor who is responsible of monitoring the child movement during the session by explaining the game and encouraging the child.

IPE system has two kinds of users: administrator and the doctor. The administrator can do the following: adding or editing (change or delete information) of the doctors, patients or session. The doctor can start new session by adding the patient's information and determine the appropriate level.

The benefits of using IPE system are twofold. From the children patients point of view IPE helps them enjoying their treatment hours thanks to the graphical mat displaying interactive games. From the doctor point of view, IPE facilitates the doctor's works thanks to the hologram technique displaying 3D instructor that guides and motivates the child during the session.

It is worth noting that IPE system is an extension of previous group work. Our contributions can be summarized as follows: adding the 3D hologram function, much more precise leg coordinate detection, more than one educational level and finally more funny and attractive games.

Circuit Analysis World: Smart Trainer for Circuit Analysis Course

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ABSTRACT

The rapid expansion of information and communication technologies has significantly contributed in widespread use of new forms of teaching and learning methodologies including e-learning and virtual labs. While face-to-face learning and hands-on experience in physical labs have their own advantages, their access to students is for limited time and alternative support solutions are needed to provide students an opportunity to master on their both theoretical concepts and practical skills. This paper presents Circuit Analysis World (CAW), software that acts as a smart tutor for Circuit Analysis course. Its main objective is to develop students' critical thinking and problem solving skills. It provides an alternative support solution for students taking Circuit Analysis course to help them enhance their understanding of the core concepts and learn through practice both theoretical and practical contents of the course.

Circuit Analysis World is a user-friendly interactive software that includes PowerPoint presentations, tutorial videos, quizzes and virtual lab sessions. The presentations provide theoretical background on Circuit Analysis, giving the users the opportunity to download them and practice. Tutorial videos comprise of videos, created by a team of 2 students as well as some very useful internet videos from prestigious institutes like MIT etc. The quizzes are designed in 'multiple choice questions' format and are of three different levels namely beginner, intermediate and advanced according to the students' level of understanding. They are categorized chapter-wise and students are required to solve those within specified time depending upon the level selected by the user. In addition to providing the correct answers when desired by the user, their scores are displayed and their progress in the quizzes is monitored. They can also review the quizzes for practice, their progress reports are also being sent to their email addresses provided at the login screen. The quizzes are designed such that the software can identify user's weaknesses in specific topics and thereby provide additional support in the form of videos, presentations, and internet links to master the relevant concepts. The virtual labs provide an opportunity to practice a number of Circuit Analysis experiments using Multisim as well as provide data sheets for various Integrated Circuits (ICs) for the ease of the student. Survey has also being provided to students which should be taken by the end of the course as to get their feedback and comments on the software for future enhancement. The Circuit Analysis topics covered by CAW are as follows: Basic Concepts, Resistive Circuits, Nodal and Loop Analysis Techniques and Additional Analysis Techniques.

Circuit Analysis World software has also been embedded into mobile technology, such as smartphones and tablets, so that the students can use it as an application compatible with different platforms like IOS, Android, Blackberry, HTML and Windows. A website has also been developed using Weebly and a forum to provide online assistance to students with their queries and doubts on WordPress. Students will be able to access the website from the desktop software or through the mobile application. This is a continuation of a project named "Logic Design World" presented in URC 2014. Students showed noticeable improvement after using CAW which can be seen in the column "After CAW." The average performance of the students improved by 32.6%.

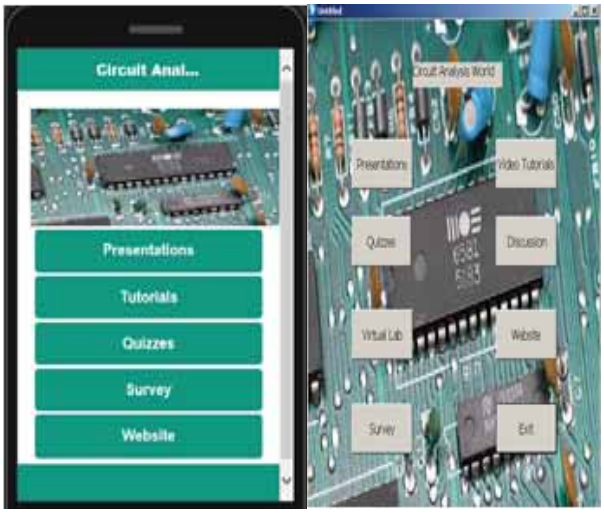

Fig. 1: Desktop Software and Mobile Application

Student No	Before CAW (out of 10)	After CAW (out of 10)	Improvement
1	9	10	10%
2	7	10	30%
3	6	10	40%
4	3	9.5	68.4%
5	6.5	8.5	24%
6	5	8	37.5%
7	4	8	50%
8	8	10	20%
9	8.5	10	15%
10	6	10	40%
11	7	9.5	26.3%
12	4	8	50%
13	6	10	40%
14	7	10	30%
15	9	10	10%

Fig. 2: Results

Shop&Go: Mobile Application to Improve Shopping Process

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ABSTRACT

As societies advance technologically, more and more people are turning to supermarkets for their shopping experience. However, the traditional method of the shopping in supermarkets in the Middle East have not kept pace with rapid technological advances. Customers to supermarkets are still forced to stand for extremely long periods of time. Although several methods have been proposed in order to solve this problem, including increasing the number of the cashiers to decrease the waiting time. However, these solutions have proved insufficient primarily because it does not address the root problem. The objective of this study is to design an application that will address the root cause for dissatisfaction with the shopping experience at supermarkets, primarily the long waiting periods at checkout counters. In this study, we designed a mobile application "Shop&Go," which provides multiple features aimed at solving different issues for various types of customers. The "Shop&Go" application is a smart phone application that provides multiple features for an easy and convenient shopping experience. Our smart application is designed to be used on iOS operating system. The services provided by our application are designed to make the shopping experience easier for both shopkeepers and customers. The "Shop&Go" application allows customers to self-checkout at supermarket through scanning the barcode of items they wish to buy and paying the bill electronically. A receipt will be shown to the customer for their purchase allowing them to bypass queues at the store. Additional features include, allowing customers to order their items online, set up a weekly budget, and be reminded of ingredients they need to purchase. In addition, an option allows users to share their shopping lists/wish lists with others via email, capturing the customer's location using GPS for accurate delivery. Shopkeepers are also able to benefit from this application, as they are able to instantly view all invoices and customer payments. When shopkeepers purchase the app and sync it with their inventory, their store will appear within the app and will be available to customers for free. The "Shop&Go" application accepts all major credit card options, including Visa, MasterCard and American Express. Preliminary tests reveal that the "Shop&Go" application is unique due to its integrated idea. In comparison with previous apps that perform online shopping services, which only address one or a few shopping stages. The "Shop&Go" application importantly is characterized by its ability to provide an easy and complete life cycle of the shopping process starting from searching for particular item to auto-payment. Currently, many local shops have shown great interest to use the "Shop&Go" application. As part of the future work we are implementing an Android version as well as adding more features. In conclusion, this study presents a unique mobile application, "Shop&Go," which addresses the root cause for major dissatisfaction with supermarket shopping, primarily the long waiting periods at checkout counters. The "Shop&Go" application provides an easy and complete life cycle of the shopping process starting from searching for particular item to auto-payment. Therefore, "the Shop&Go" application stands as a major breakthrough in improving the shopping process.

KRIS: Kinship Recognition Intelligent System

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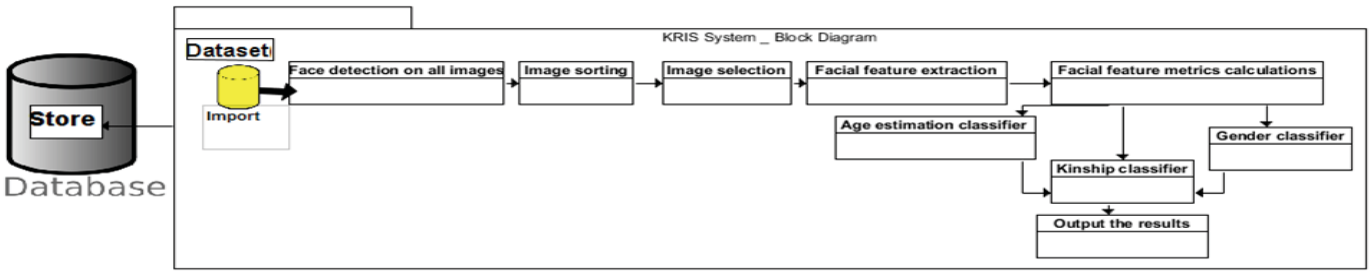
ABSTRACT

The amount of personal images uploaded online every day is huge. Most of these images show family members, friends, etc. Many research efforts focus on such images to extract useful information such as kinship identification (KI) which is concerned with identifying kinship relationships between individuals based on the features extracted from their images. In this work, we look into this challenging problem by applying a set of computer vision and machine learning techniques.

With the current widespread acceptance of online social networks and the huge amount of images shared on them, one can easily think of many interesting applications of KI. For example, in the world of criminal investigations, many cases are affected by the ability to establish or refute kinship relationships, which is usually handled using DNA tests. However, when DNA tests are not feasible, investigators might consult KI systems for guidance, supporting evidence, etc. Another application of KI is for reuniting families torn apart by wars, natural disasters, etc. A child that has been separated from his/her family can benefit from KI systems to locate his family members based on the pictures available online.

In this work, we introduce the Kinship Recognition Intelligent System (KRIS), a desktop based application to help users find kinship relationships such as the father-son relationship between individuals based only on the features extracted from their images. The core component of KRIS is built using supervised learning techniques. During its development, it is provided with annotated images from a large enough dataset. Basically, it "learns" how to detect kinship relationship by extracting "distinguishing" features of the faces appearing in the annotated dataset. Then, a classification model is built based on the extracted features to answer the question of whether a kinship relationship exists or not between two individuals. During the development stage, it is tested to ensure that it does not suffer from issues like low accuracy, overfitting, etc. Figure 1 shows a block diagram of this component. After building the core component, other components are added. E.g., KRIS can take a set of images of several people and return the relationships between them. It can take an image of an individual and a type of relationship (a parent looking for his lost child) and searches through online images for candidate individuals satisfying this relationship. Finally, it can be trained on specific dataset to learn special relationships.

The above description hides in its details many challenges. The first one is to find a large dataset that is versatile enough to cover the rich variety of human faces. Luckily, the existence of social network websites and the high volume of images uploaded into them present us with a rich source for the dataset. Now, regarding the human annotation, we can benefit from the "celebrity" phenomenon of many families. E.g., the royal families of many countries (such as Jordan) enjoy such a status and the images of most members of such large families are spread across the Internet. Another challenge is to extract facial features of the subjects such as the distances between the eyes and between the nose and the mouth. The final main challenge is to use proper classifiers such as k-nearest neighbor (KNN), support vector machine (SVM) and neural networks.



Exploring Historical Mathematical Tables

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ABSTRACT

Before calculators and computers, anyone needing to look up mathematical values such as cosines or logarithms, had to make use of mathematical tables. Historically, these have evolved from the time Napier invented the logarithm and published the first tables in 1614. The early tables had errors in them which when found, were corrected in later editions. The level of errors in these tables remains an interesting unsolved problem.

Recent years have seen libraries scan such tables, save them making them freely available to researchers for further processing. The French National Library provides Gallica (http://gallica.bnf.fr/) and a consortium of Swiss libraries provides a similar platform (http://www.e-rara.ch/). As a result, historic mathematical tables are readily available for further processing.

This project investigates the scanned version of Georgio von Vega's "Thesaurus logarithmorum completus" from 1794 which was downloaded from e-rara.ch and saved in its original PDF file format in which it is available on that website. As a pilot project, it was limited to analyzing the logarithm values for the numbers 1 to 1059 as they appeared in that manuscript. The pages of the document were scanned images and not native PDF which meant the digits were not easily convertible and the table was not searchable as would be the case for native PDF documents.

The next step was to convert the pages of images of tables into modern computer code digits so that the values could be compared against the values that a modern day computer using EXCEL would generate. To that end, the optical character recognition software ABBY FineReader (http://www.abbyy.com/solutions/id_recognition/) was considered and found to be suitable. Being an old manuscript, the font that was used was not modern, and the software needed to be trained to recognize the digits in the font in which they were type set. Thus the image of the digit 0 in the old manuscript needed to be converted to Unicode equivalent of the digit 0.

During the process of conversion from image to digit, an additional problem emerged, Not all pages had been scanned at a 90 degrees angle and there was a slight distortion that had to be straightened using the page editing tools that are included in the software. Pages from the "Thesaurus logarithmorum completus" had to be extracted one by one using Adobe Acrobat. The reason for using one page instead of multiple pages is that multiple pages caused the software to crash. In addition, the results that were returned when using multiple pages resulted in inconsistencies compared to when a single page was processed. Once the page was straightened, ABBY's pattern recognition rolled into action by recognizing Vega's type set font and outputting the logarithmic tables into a tabular format.

The next step of the process was the verification of the outputted table in which ABBY detected symbols it thought were incorrectly deciphered. The process required manually checking in which each character from the "Thesaurus logarithmorum completes" was compared to its significant digitized value. This process also updates ABBY's learning capabilities in respect to its pattern recognition algorithm. These digitised tables were then ready to be exported in EXCEL.

With the tables digitized, it was then possible to compare these values against those as calculated by Excel, and some errors were indeed found. For example, the logarithm value of 869: in the "Thesaurus logarithmorum completus" has a value of 2.9390197765 compared to the excel value which had a value of 2.9390197764.This error is in the last decimal point accuracy. It is known that publishers of tables in those times included deliberate errors as a way of trapping publishers who simply copied other people's work, and this may well have been such a case. It is worth delving deeper into the manuscripts available online to try to find an answer to this.

This project demonstrated that it is indeed feasible to process historic mathematical tables from their scanned images. It would be interesting to examine older tables and also tables available in the region such as a manuscript dated 1273 Hijri and held by the Juma al Majid Center for Culture and Heritage in Dubai.

Automatic Attendance System Using QR Codes

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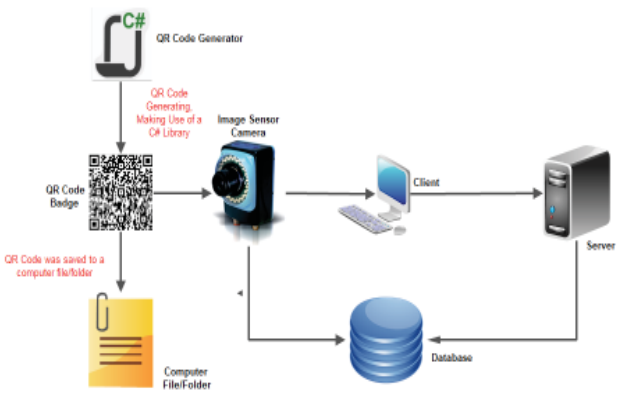
ABSTRACT

Many organisations and educational institutions track their employees, workers, students and so on. Manual way of tracking still exists in different mediums. Main problems in educational institutions with “Manual Attendance Taking” and difficulties that are usually encountered are lack of transparency about arrival and departure times. Absent students are objected many times to have been marked as “present”. In addition to that “Manual Attendance System” is said to be time consuming.

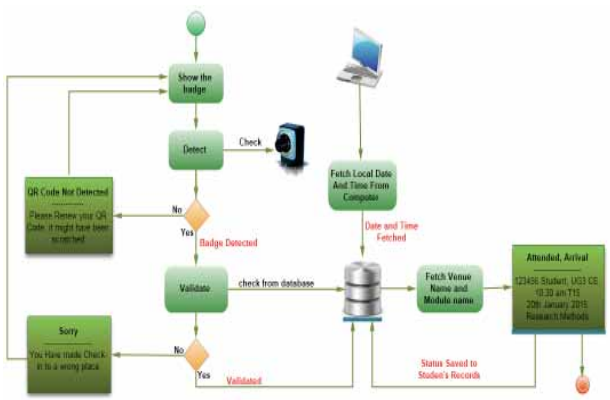
People within the mentioned institutions have been experiencing difficulties. The first prototype of the system will be deployed to a single classroom. In real world scenario, multiple classrooms should be considered. For that purpose, a Windows application is planned to be developed using C# and the data will be stored in Ms SQL server database or in XML files. A detector should be fixed close to the venue, as students check-in, the detector –which can be an image sensor camera- scans the badge. The system validates the user. After the user is validated, then the details of the user will be saved in the database.

Within the system there are different kinds of users, such as: administrators, instructors, and students. Users are granted different privilege levels. Administrators have full privilege of adding, modifying, and deleting the data. The instructors can view and modify attendance sheets of their own classes while students can only view their attendance records. All the students and instructors will have their own unique badge (which is created by administrator). On the surface of the badges QR (quick response) codes are attached. QR codes are two dimensional codes containing small black squares on a white background, although they are limited to hold a specific amount of data, they can hold much more information than barcodes. The data is encrypted inside QR codes based on a specific convention and decrypted back based on the same convention. Attendance system in an institution (school or university) should be automated because it is very much related with daily educational life and it engages instructors and the university in a convenient, enjoyable and reliable way to retrieve data about the attendance at any instance. In addition to that, such kind of system is said to be influential because it aids a better attendance, and it is believed by many researchers and ordinary people that attendance has impact on learning process and academic achievements.

For automatic attendance system, there are various kinds of technologies so as to be used as a kind of protocol or convention that make connection synchronised between two ends (badge, and the detector end): such as Bluetooth, GPS, RFID, smart cards, contactless cards, other biometrics (Fingerprint, face detection, iris detection) and so on. Among different technologies for such project QR codes are preferred because of cost effectiveness, fast detection and quick data transfer.



System Architecture Diagram



Activity Diagram - Check-in Process

Mobile Application for Remote Controlling a Robot through Wi-Fi

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ABSTRACT

Smart phones have integrated with all our daily duties. In present, mobile application is going to its next phase of life cycle by building connection with utilities nearby the user. For this purpose we should take care of the various types of appliances require different kinds of wireless technologies. Previously wireless technologies such as Infra-Red and Bluetooth have been broadly used. However Wi-Fi applications have not still satisfied the market despite it possesses longer range of coverage and faster rate of data transfer.

For this reason an android application is developed to use smart phones Wi-Fi module to build connection with a robot. For initial step open source platform and reach libraries for supporting Wi-Fi are preferred that is why android is chosen. The application is working on all of the android operating system cell phones and tablets. After a network is established between both sides using Wi-Fi through IP, the mobile application will be able to remotely send commands to the robot. Then the robot would take the commands and convert them accordingly.

The general block diagram of the system is in *Figure 1* consists of two parts which are smart phone and robot part. In the first part the mobile application sends data through Wi-Fi transmitter to the second part. The robots Wi-Fi module receives the data and the microcontroller use it. This happens when the communication is established.

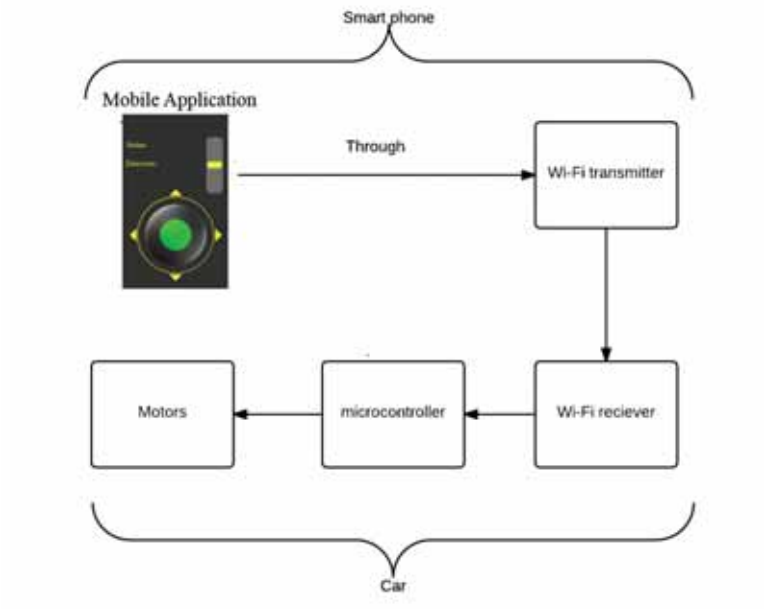

Figure 1 General Block Diagram of the System

One of the applications of the system can be distance measurement by calculating ping time between both of the device and robot. Despite of it has a major weak point, which is electromagnetic noise affects the accuracy of the measure but still this can be counted as another tool for surveillance measurement. This approach might be helpful especially for those places that high precision is not required. As well as transmitting plenty of commands by the mobile application via Wi-Fi, could also be used for automating home appliances such as light, AC, chair dedicated for handicapped people, or receiving data from the robot showing the status of the place such as gas, motion …etc.

Dawakom: An application for finding medications and locating pharmacies

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Supervised by
Dr.Fadi Wedyan

ABSTRACT

Dawakom is a Smartphone application that allows customers to locate pharmacies and request information about available medications. In Jordan and most of the Middle East countries, the majority of pharmacies are run by small business owners. While this business trend has a positive impact on the economy and helps in developing the middle class, it raises a challenge when building an application that retrieves information about available medications. This is because these pharmacies run different types of database systems and different types of programs that use variety of technologies. Therefore, there is no uniform interface with which an application can deal with in order to retrieve medications information.

Dawakom is a Smartphone application that aims at finding medications and locating independent pharmacies. The application provides a variety of services for users including: (1) finding the nearest open pharmacy that contains the requested drug, (2) sorting pharmacies that contain a certain drug depending on the drug price or the pharmacy distance, (3) providing direction to the chosen pharmacy, and (4) search capabilities on the name of the medicine in English. The user can communicate with the pharmacist by phone or email. A user can report about pharmacies that provide incorrect information. From the pharmacists' perspective, the app can help them in boosting their sales and reach more customers.

The application is provided with many features that facilitates usability. For example, while searching for a medication, the commercial names of the requested medications are stored. The application is provided with an Arabic interface and a convenient flow of control between different GUIs, which makes the application easy to use for wide range of clients. The application provides also an Auto complete option when typing a medication name.

Figure (1) shows the component diagram of Dawakom. The application consists of the following components: (1) two light weight Smartphone applications (in terms of computational and memory requirements): a user side and a pharmacist side, (2) web interface, and (3) a server program. The two Smartphone applications communicate with a centralized server using web services. The central server provides a database layer for accessing request to the centralized database. The server also provides a web interface that the pharmacists can access directly from the web. The pharmacists can use this web interface for registration of available drugs in and update their information. The applications are developed using Android while the server program is developed with Personal Home Pages (PHP). We used MySQL for the database management. This loosely coupled design promotes extensibility since new component can be added without affecting existing ones (e.g., an application/n for iPhones or MS Windows phones).

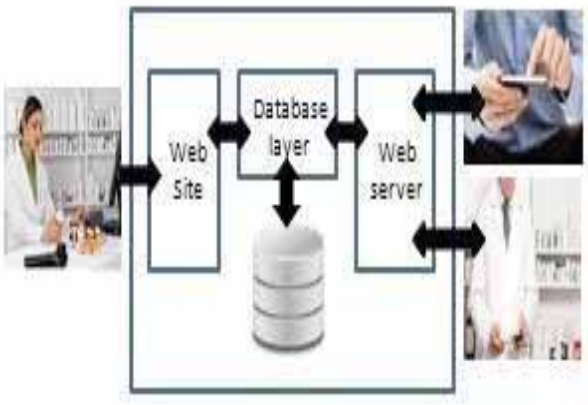

Figure (1): Dawakom Workflow

Jolly Phonics: An early childhood application for learning alphabets

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ABSTRACT

Today's children are learning from different sources such as computers, iPad, and smartphones, so the applications should be carefully designed relevant to their needs. Jolly Phonics international program is a fun and child centered approach of teaching through synthetic phonics with actions for 42 letter sounds. This multi-sensory method is very motivating for children and teachers to in an appropriate way. To explore these teaching techniques through jolly phonics, we made a visit to best international school in our city. We explored that instructors tend to use games, songs, and stories to get the students' attention and to make the education process more interesting. Therefore, we developed an android application for international jolly phonics program for the kids of ages 4-5 years to help them in learning the letters with sound, spelling and reading simple of words.

Figure 1: User interface of jolly phonics app

There is a difference between the design of the applications of kids from the adults. The design for kids should follows different usability guidelines, such as the kids can constantly touch the bottom part of tablet accidently so that part need to be avoided in design. We divided our application into main activities called cards: letter sounds, songs, stories, and games. In the first letters sound activity, the children had to find objects beginning with the same sound. This activity is further divided into the seven jolly phonic groups. Each group allows the kid to recognize the group number; furthermore, the repetitions and movements are easily supported within these groups. The second activity *songs* is for letter sound songs, the children watch the songs along pronouncing the sound and move their arms according to each letter. The third activity called *stories* is for letter sound stories. The stories are relevant and make it easy for children to recognize the letter and the sound of the letter, so they can learn new word that contain the letter sound. This card is making the application interesting for the kids, because they know the stories as well the letters related to stories. The last activity is providing the *painting and drawing* options which help them to draw the letters, and access the name and pronunciation of each photo. Furthermore, the kids can recolor and save their photos to improve their writing ability.

The implementation is done with eclipse development program to works with android devices. We evaluated the application with 25 kids ages between 4-5 years, studying the international jolly phonics syllabus in their school. The kids answer the questions on each of the four activities cards. The participants liked, and found it funny and easier to use in the all four activity cards. Furthermore, the kids understand the song in the song activity. We concluded that our application is making it more funny and interesting for kids to learn in their initial years at school, besides learning through the typical teaching methods in the class.

Student Information System For Small Educational Institutes: A Case Study of Saudia City Playschool

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Supervised by
Dr.Diala Abi Haidar

ABSTRACT

Education is considered to be one of the basic necessities of life. The demand for education is increasing around the world, as people understand its importance in leading a better life. In a presentation at the Saudi International Space and Aeronautics Technology conference 2012, Dr. Khalid Al-Sabti, the Vice Minister of Ministry of Education, stated that there were over 33 thousand schools, more than 5 million students and about half a million teachers in Saudi Arabia. He also mentioned that the number of students, teachers and schools had increased in the past forty years at a rate of 200% per decade. As the Saudi education sector continues to grow so does the need for information systems. The author looks into developing an information system that will benefit the small educational institutes (under 500 students) across Saudi Arabia.

"Saudia City Playschool" located in Jeddah was chosen as a case study, to investigate the problems faced by small schools in managing their information. Group interviews were conducted with the top management, samples of existing data were collected and the day-to-day processes were observed in order to identify the problems faced by the school. During the process of data collection it was found that the school had a manual system and faced difficulty in handling student information. The problem of data redundancy was seen throughout the process in addition to problems with retrieving data and updating existing data, thus leading to inefficiency in the school processes. The findings were used to develop a computerized solution that will be beneficial for Saudia city playschool, as well as other similar educational institutes in Saudi Arabia.

The computerized system, namely TIMS[1], increases the efficiency of the student admission and information management process. It allows parents to fill online applications whilst allowing the management to review the applications and make a decision. The system allows the management and teachers to take attendance and it also creates certain customized reports specifically requested by the school.

Small educational institutes in Saudi Arabia look for low cost solutions that fulfill their requirements and are not clustered with unwanted features. The in-house developed software (TIMS) was compared to other on-the-shelf solutions offered in the market, a feasibility study was conducted and each candidate was compared in the fields of operational, technical, cultural, legal, schedule and economic feasibility. TIMS was declared as the most appropriate solution for small schools. It is easy to use, customized to meet the user requirements, not clustered with unwanted features and finally it is free (excluding the installation fees). Onsite training and an instruction manual are also offered for the users of this system.

This project was part of a community service initiative to support small schools that are unable to afford the solutions available in the market. All big initiatives start with small steps and using information systems, such as TIMS, is one of them. The education sector of Saudi Arabia needs to keep up with the changing trends of the global society and adapt accordingly. The author looks forward to seeing TIMS being implemented in small educational institutes, across Saudi Arabia that are still using manual systems or using MS office solutions.

[1] TIMS – Toddler Information Management System

Remotely Monitoring Temperature for Children (RMTC)

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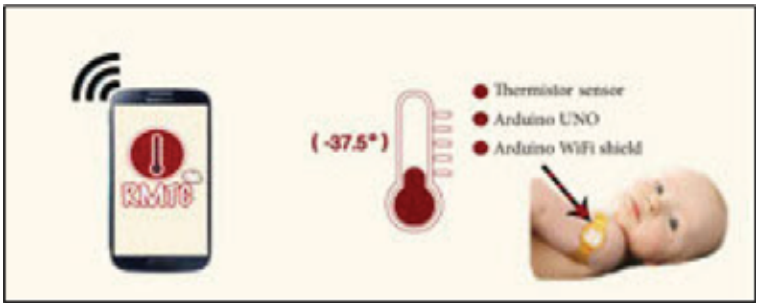
ABSTRACT

RMTC is an interactive medical technology that provides to public, which aims to monitor the children body temperature in interval of sickness. It helps in preventing the tragic death of children or having future risks caused by hyperthermia. We decided to provide a technical way to measure body temperature remotely. RMTC helps parents to monitor the body temperature of their children. RMTC is especially targeted children who are away from their parents or children who can't talk because of their age. It will connect the parents and their children in a way to notify parents about the increase of body temperature of their children, so the parents can provide the necessary protection for children from potential risks of hyperthermia.

RMTC consist of two parts (Shown in the figure), first part is the Temperature Monitoring System with the child, it is a band that contains a temperature sensor and integrated with the Arduino. The system starts to measure the child's temperature frequently via temperature sensor. The second part is the mobile application that will notify the parents when the child's body temperature increases above the normal. The application allows the parent to know about child's temperature any time. Finally, the application provides a speed call. The communication between two parts will be by Wireless connection.



According to the gathered data in analysis phase, 99% of the responders never used any mobile application to monitor the children temperature. 96% of the responders think that the system will save the efforts and provide safe, comfortable and a useful method to monitor the children temperature. These statistics showed good results that prove the importance of RMTC project.

After studying similar products, it showed that the device which is monitoring the child's temperature and synchronized with a receiver device. Obviously since we need to alert the parent remotely, the phone application is the suitable solution to apply for RMTC project, among other receiver devices because of the wide use of the mobile phones; in addition to their flexibility, accessibility and availability.
Also, we noticed that some body temperature monitored devices which should be connected and synchronized with the same Wi-Fi network. Moreover, the distance to transmit the reading of the measured temperature is limited to 15-20 feet distance via Bluetooth technology. While in RMTC System, we intend to send the measured temperature reading for over long distance via any wireless networks.

There are several criteria we used to measure the RMTC system's quality which are:
Reliability: The ability of the system to deliver services as specified. In RMTC system, is the ability to measure body temperature accurately.
Availability: The system must be available all time since the increasing the degree of the temperature for child, the device must be available to compute temperature.
Usability: RMTC system is easy to use and user-friendly application.
Safety: RMTC system provides the safety for children to avoid dangers of high temperature.
Performance: RMTC system is real time system and ability to send temperature in the same time.

Medical Data Classification: Case Study of Thoracic Surgery

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ABSTRACT

Lung cancer is one of the most common cancer types among cancer patients around the world. Treating lung cancer could be done in several ways, including chemotherapy, radiotherapy, surgery, etc. Like all other treatment types; surgical treatment can be used in a certain cases, and even after defining these cases, the treatment could fail and the patient may die within one year or less after the surgery. Defining accurate survivability rates before making surgeries is highly important, since it will help both patients and clinicians taking better decisions, which in turn will improve lung cancer treatment process. The factors that affect the survivability of a patient cannot be stated easily; in this case, statistical methods and artificial intelligence approaches are usually used. Supervised machine learning is one of artificial intelligence approaches, and it can be used to predict survivability effectively by recognizing patterns among data and classifying the data depending on specific factors. The purpose of supervised machine learning techniques is to learn from given data (training examples) and construct models to make decisions on new unseen data. The importance of medical data classification field rises from its ability to find patterns among medical datasets, which can be used effectively in disease prediction process. Classification of medical data has been investigated in many researches, and due to its connection to the medical field, reaching a high accuracy in predicting outcomes is highly important. The accuracy of classification task depends on different factors. The technique, for example, has a significant impact on the accuracy of classifying process, therefore choosing the right technique is important.

Naïve Bayes is a machine learning technique that is considered to be powerful, and when it comes to medical data classification; Naïve Bayes proved to be effective and robust. This study aims to increase the accuracy of predicting survival rates for post-operative lung cancer patients by building a system based on Naïve Bayes technique. The system consists mainly of a classifier that uses a probability model to predict the outcomes, the model is built by the application of Bayes' theorem on each attribute in each record resides in training set. After the classifier is constructed, records reside in testing set will be entered to the classifier, the classifier then will output a label for each record indicates whether the patient will be able to survive or not (figure1). A dataset from the UCI archive is used. The dataset includes 470 records for lung cancer patients with 17 attributes represented in a .txt file. Using such a system can help clinicians to support their decisions regarding treatment plans, which in turn will help to improve the overall lung cancer treatment process.

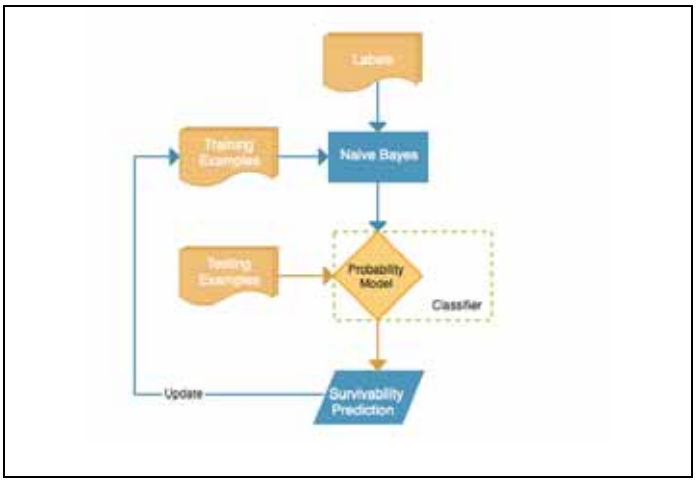

Figure 1: Medical Data Classification Subsystem Using Naïve Bayes

I Speak

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Supervised by
Dr. Wadee AlHalabi

ABSTRACT

In this fast-paced world that we are living, quick and accurate communications are important. Despite the rapidly-growing advancement of technology, there is still a communication gap between the deaf and normal people because normal people are not familiar with the sign language and the deaf are unable to hear audible sounds properly. Even though many people tried to bridge that gap by proposing many ideas, there is no available application that educates the deaf how to speak. The common belief among people is the deaf cannot speak. In fact, they do. With their teachers' help in the beginning, they use methods of lip reading and feeling the throat vibration to get the right articulation of the letter origin.

Thus, our primary project, the 'I Speak' program, is going to educate and train the deaf on how to speak Arabic. Firstly, the letter is displayed in front of the students and then the pronunciation is recorded in their voices, using fast Fourier transform (FFT) applied to the fragmented signals. These signals will be then normalized and later MFCCs will be used. Finally, files are to be saved in the database (MS Access). Second step is the training level. The student is going to speak the letter which will appear using the voice recognition method that loads the recorded data. Then, both signals are matched using Euclidean distance (ED) and actual results will be shown as a letter or word. When s/he are able to recognize more than one letter, the application will analyze logical and meaningful words with pictures in the learning words category. Suggested words will also be shown. Furthermore, the application will serve as a motivation for the students by showing his/her achievements or progress with letters and words. As a last step, a report of the student's performance will be generated to be sent via email to the teacher and parents.

The objectives of 'I Speak' are helping the deaf to articulate letters and words and supporting Arabic language since there is an extreme lack of Arabic-supported programs in the region. Moreover, it aims to improve the field of people with special needs education, particularly the deaf by inserting technology assistance as a teacher's aid. I Speak primarily focuses on young learners so they may start speaking at an early age. Furthermore, in communication, it helps the deaf to slowly get rid of sign languages and depend on their own voices and lip-reading. Therefore, it bridges the gap between the deaf and the outside world in terms of communication within the community and giving them the opportunity to independently succeed in life without the heavy reliance on others.

In conclusion, the students are going to learn the letters and their example words under the supervision of a teacher. They will be motivated and enthusiastic to learn more about how to speak by viewing their achievements. As a result, the application will be considered as a technology for enhancing articulation and verbal skill of deaf learners.

SSAC: Smart System to Assist Citizens

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Supervised by
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ABSTRACT

Wherever you look, cities are on the rise. Cities are growing in number and in size and part of what makes each city unique is its infrastructure. Each government is responsible for facilitating public by providing different civic facilities through local municipalities but in the real world, preserving these services is often difficult for cities as they face the pressure of growing population and changing economic demands. So, improving the infrastructure while cutting costs and saving time became a major factor to provide services that ensure the best life quality for every citizen it became one of the main concerns of developed nations. Alhasa is one of the cities at eastern of Saudi Arabia that is facing this issue since it was a traditional oasis region on the past and still needs a lot of efforts to keep pace with other nation cities .Since the total area of Alhasa is 534,000 km^2 which almost a quarter of Saudi Arabia, the municipality of Alhasa will never be able to discover every single issue without involving the citizens help and support in this mission. On the other hand, citizens find it difficult to communicate with the municipality once they have been through any damaged issue since calling the municipality or visiting their website are no longer effective. So, to avoid any dangerous result from keeping the major tasks without solution, citizens at Alhasa can help by using a very smart and easy communication reporting channel. A smart application will use the modern smart phone features such as enabling automatic extraction of GPS coordinates of the reported issue area. The submitted issues will be displayed on city's map. In addition, users can add photos through their smart phones camera with additional comments. Moreover, they can suggest solutions for improving the environment of their neighborhoods and to increase the reliability, the system will require citizen's national ID number as a proof of identity. The system is designed to be used by two different sides, one to send the reports and the other to manage these reports efficiently. So, the system will work with two different software systems, web based system for the admin and Android app, both systems will be integrated to serve community well. As a result, the functions that could be achieved from implementing such a system is obviously reflected in the amount of energy saving and accordingly the reduction in the operational cost. Furthermore, the smart systems is not only developed to reduce the cost but also designed to facilitate the maintenance and physical activities adopted in the municipal service. It will involve the community in decision-making which will become powerful technological engine for change in citizens life.

Green Books Network: Online Book Trading system

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ABSTRACT

Reducing papers consumption is recently considered a major problem given the recent efforts to provide a green environment and a paper-free universities and governments. These efforts aim to reduce papers consumption at institutional level, and do not give sufficient attention to individuals and community level. Since papers waste occupies 35% of the total waste, we have to reduce paper consumption, despite the recycling solutions which could help the environment in some extend without saving the existing books. Thus, reusing them is still the optimal solution. On the other hand, a recent international study about reading-rates around the world, showed that the reading of the Arab individual per year is a quarter of a page, while an individual of the United States reads 11 books per year!. So, we need to encourage reading books, especially in the Middle East. Given the difficulty of exchanging books and the reluctance in reading E-books, the idea of having a network for reutilizing and exchanging existing books will have a great value, since it will contribute to the environment protection, facilitate getting books with lower prices, and minimize books productivity cost.

Green Books Network is a website that targets all people, especially those who are interested in reading or have books to share with others. The target users will also comprise, in addition to academic users, bookstores, charity institutions, public places, and environmental communities. Green Books Network helps users to get rid of their unused books by providing an efficient way for users to exchange, lend/borrow, donate or sell/buy books. Registered users could be both donors and beneficiaries at the same time. They also can follow others, especially who have same reading interest. This will help especially undergraduate students to follow student at a higher level to exchange academic books as well. Users can share their preferences and reading activities by rating and commenting on books. They can search , add books they are looking for in an online wishing list , and track their coming In/Out requests. The system will increase users' knowledge by providing a helpful environment for users to read more.

The site will be a mediator between book donors and beneficiaries via *points of exchange* (Libraries, Bookstores, Coffee Shops or Public places registered on the website). Contributing with points of exchange and *points of donation* (Charities, schools or universities... etc.) is the main point that makes Green Books Network differ from other book trading systems. This will make books available everywhere for a large number of people. Users are also able to select point of exchange from the suggested list to share their books.

The system will also provide a Recommendation System to suggest books for registered users based on their preferences by applying Collaborative Filtering (user-based) algorithm. Also, the site will suggest people to follow according to common reading interests using Content Based algorithm. Green Books Network uses Google map to show the proposed nearby places for users to share books. *Geocoding* is a process used to convert the human readable address to longitude and latitude. Then, *Haversine* formula is used to calculate the distance between the user and all the available points, and sort them according to user closeness. These recommendations will provide a social and friendly environment for users regarding books.

As a result, the website reduces user effort, money and time in getting books by eliminating shipping and handling charges and locating all candidate points of exchange or donation. As an organization, supporting green technology can strengthen its relationships with customers and help to build an image of integrity and a commitment to ethics. Thus, books will be used efficiently by minimizing the amount of unused books and maximizing the use of existing books by providing an online Green Books Network.

Vehicle Collision Detection System

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ABSTRACT

In the last two decades, the efforts to build a vehicle safety system by car industries have been evolving. It initially started off with developing features such as headlamps, reflectors, seatbelts, and airbags with an attempt to save lives and mitigate injuries when an accident occurs. This later evolved into more precautionary and protective measures, like enhancing the physical structure of the vehicle to further reduce the possibility of getting into an accident. Today, with the help of the advances in computing and networking technologies, it is highly possible to support vehicles with intelligent systems that help in avoiding accidents, and therefore, contribute to better protection of the vehicles and the carried passengers. In this work, we introduce the Vehicle Collision Detection System (VCDS); a system for obstacle detection and collision avoidance using low-cost IR sensors. In VCDS, IR sensors are used to sense objects on the sides, behind, and in front of the vehicle. Based on the signals received from the IR sensors, audible and visual warning is initiated to warn the driver of being so close to a nearby vehicle or obstacle. The intensity of the warning changes based on the proximity of the detected object. As the obstacle/vehicle gets closer, the warning will be escalated and may lead to automatic braking of the vehicle. That is, if the driver does not respond to the initiated warnings, the VCDS will take action and stop the vehicle completely (and safely, by gradually lowering the vehicle's speed) to avoid an accident. The VCDS also supports several other features including not allowing the vehicle engine to be started unless the driver's seatbelt is fastened, using force sensors to detect how impactful a collision is, using a camera to take useful snapshots in hit-and-run situations, and sending e-mail/SMS messages to the driver to inform him/her of hits to his/her vehicle while in parking. The sent messages convey information about the side of the hit, the location of the accident (using the GPS technology), and the time it happened. The sent messages prove useful when reporting accidents to police and paramedics. The main objective of the VCDS is to control the speed of the vehicle in risky situations and reduce collision rates. A prototype for the VCDS was successfully built using a workstation and a Phidget Interface Kit (together they simulate the operation of an Arduino Uno microcontroller) as well as a testing toy vehicle. Using this prototype, we were able to simulate and test scenarios that represent real-life situations which lead to car collisions. In programming our prototype, we depended on the Visual Basic technology. In order to control the toy vehicle remotely (to send commands to increase/decrease the speed, for example), a tablet, supported with the Team Viewer Application, was mounted on the toy vehicle. The use of Team Viewer was to achieve wireless communication between the workstation and the tablet (the toy vehicle in effect). The prototype proved efficient in detecting obstacles, controlling the speed of the vehicle when needed, and sending informative messages about the accident. The prototype proved that VCDS is a promising system that is ought to decrease collision rates, which in turn leads to decreases in death rates. Such a system has direct societal, environmental, and economic impacts in both local and global contexts.

Front sensors scenario

Unique features example

User Involvement in the Design of a Smarti Smart Table Prototype

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Supervised by
Dr Evi Indriasari Mansor

ABSTRACT

This project presents the findings of the user involvement in the design of a Smarti Smart Table prototype in order to address problems at the restaurant such as menu delays, waiters late respond and the customer get bored during the waiting order period. The Smarti Smart Table prototype is an interactive smart menu ordering system which allow users to order from the menu screen and make the experience of dining out as enjoyable and convenient as possible. Other features includes users will be able to get the estimation time of the order, call the waiter, accessing the social medias and playing games while waiting for their orders, and view live broadcast of the chefs preparing the dishes from the kitchen. The design methodology involved a User-Centered Design (UCD) approach with a simple interaction design lifecycle model (Figure 1). At the early stage of the project, we focused on understanding users and tasks by collecting requirements from the users via the interviews and questionnaires. Based on the requirements, a low fidelity (paper-based) prototype of the Smarti Smart Table Prototype was designed and tested with a group of people (Figure 2a). The feedbacks and suggestions from the evaluation session were used as inputs for the next development level - the high fidelity prototype (Figure 2b). We again tested and observed the use of the prototype with a group of people. All their performances were captured and recorded for data analysis purposes. Our findings show that the participants enjoyed the Smarti Smart Table prototype. With this understanding, we present our experiences and results and used to suggest guidelines for future improvement in designing the smart table. The figure below shows the prototype on an iPad.

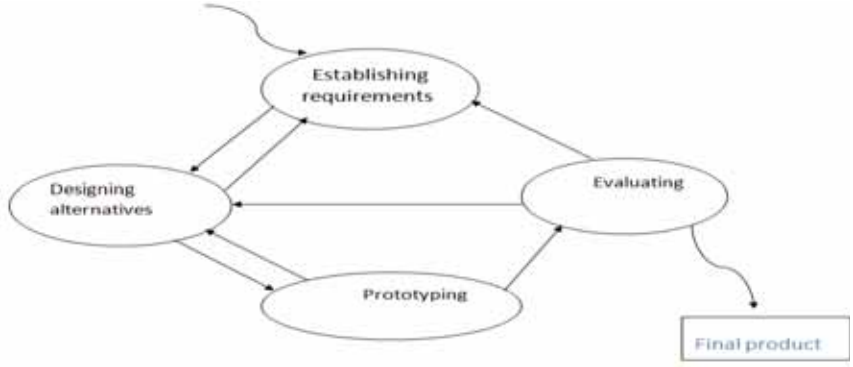

Figure 1: A simple interaction design lifecycle model

(a)

(b)

Figure 2: Smarti prototypes; (a) Low fidelity; (b) High fidelity

A Smart Babysitter Robot

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Supervised by
Prof. Mustahsan Mir

ABSTRACT

Nowadays, due to the frequent absence of parents from their houses, they can't keep an eye on their children. As a result of that, children may be exposed to danger. For instance, they might hurt themselves by causing a fire accidentally. They could have an electric shock. So we decided to come up with a technical solution to minimize if not totally eliminate these problems. A smart babysitter robot has been developed to give the parents the ability to monitor their children when they're out of their sight. Simply, the parents will check on their children at any time and from any place using their cell phones controlling the robot. It is a wheel-based robot which consists of five main parts: Kinect Unit, processing Unit, Kobuki platform Unit (wheels), microcontroller with sensors, and mobile phone, as shown in the following block diagram:

Figure 1: Smart Assistant Robot System

The operation of the robot begins from Kinect unit. Kinect sensor is a motion sensing input device developed by Microsoft for Xbox video game and windows PCs. It consists of IR depth sensor, RGB camera, and microphone array. It obtains the color, depth, and audio data of the environment and send them to the processing unit, which is a Surface Pro tablet.

The Processing Unit purpose is divided into two parts:

1) Taking the data from Kinect and analyzing it. Then based on the processed data it will send commands to Bluetooth module which is connected with Microcontroller unit. Microcontroller unit will decode these commands and move Kobuki platform wheels accordingly.
2) It will receive commands from the phone, and send them to microcontroller unit via Bluetooth module. Microcontroller unit will decode these commands and move Kobuki platform wheels accordingly.

The testing of this system has been done successfully in indoor environments. However, we observed that Kinect sensor wasn't able to detect obstacles at a distance of less than 0.8 meters, and wasn't able to detect glass as an obstacle. So we came up with a solution of interpretation of Ultrasonic Sensors which can detect glass obstacles and covers a distance range of 2 cm to 2 meters.

Agriculture Control System

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ABSTRACT

Throughout history, Palestine was still one of the most important agricultural areas in the Middle East because fertile lands and the diversity of agricultural crops. Agriculture is one of the most important sources of income for all citizens despite changing farming conditions and limited natural resources to get a good income from the agricultural sectors. Nowadays, with the agricultural revolution era and modern techniques, our project aimed to provide agricultural information to farmers in a developed manner and using all technological means and contribute to national guidance and media institutions to stand our farms on the latest scientific achievements in the field of agriculture

Agriculture Control System is an interactive software used to solve the problems of traditional agriculture. This project handles the most important things to take care about like required water amount and time, fertile, chemicals, etc. The greatest feature is to utilize the area of the field to achieve largest amount of plant without any contradictions. The software enables the user to draw the field, choose the required trees, then the system distributes the plants in the drawn field either automatically where the software distributes the trees over the area according to agricultural criteria then the software gives the user hints about the possible crops that can be used to fill the spaces between trees without affecting the trees themselves, or manually to distribute the trees over the field and the software automatically keeps the suitable space between them. After the user confirm the final design of the field the software starts a schedule from the beginning to the end starting from planting trees and plants passing by the best time to use fertile and chemical until you harvest the crop. What is marvelous in this software is whatever the shape of the field; it will be optimized to have largest number of trees and plants, to maximize the users' profit, and to have a better organized field.

Furthermore, our website aimed to reach all the people, giving them all the information they need regarding agriculture and how to take care of their land. Agriculture Control System, in addition to the distribution and scheduling, offer an encyclopedia for all the information farmers and ordinary users might need about agriculture, in addition to videos and images tutorials for the modern techniques for the basic operations farmers might need with the proper way to do it.

As a result, Agriculture Control System is adopted by many farmers and users who like to take maximum care of their home garden. Potential users of the system found it easy to use, and don't need much time to learn it. In the design of the software we took care of the usability standards - like 3 clicks- to help users get the job done with minimal clicks. The drawing area is much like the Paint program in MS Windows so users will find it familiar, the videos and tutorials area is simple with arrow at each side to go to next or previous videos. The system is supposed to be connected to the users smart phone for notifications about the scheduling plan he/she has agreed on.

PH-POC technique in face recognition

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ABSTRACT

Face recognition is one of the most challenging tasks for machine recognition. Although humans seem to recognize faces in muddled scenes with relative ease, machine recognition is much more daunting task.

A facial recognition system is a computer application for automatically identifying or verifying a person from a digital image.

Face recognition System can be used as an attendance system.
It is used to accelerate the operation of taking attendance in the lectures by taking a photo of the class the system take faces from the photo and recognize each of them .
As Entrance system in universities, colleges and companies instead of fingerprint
It is used also for security goals because there is no password to be hacked by hackers there is only the face.

Attendance system contains three stages, create data base, train it, and finally testing.
In Create database stage user must enter 10 photos of him in different cases, the program detect the face from each image, crop it, and save it in the Data Base.

This paper proposes a very simple, highly reliable automatic face recognition technique using mutual combination of bin-based histogram processing and Phase-Only Correlation (POC) - based techniques to obtain effective recognition accuracy.
Separate processing on histogram works fine. But POC gives us the strong verification result that filters out objects other than faces.

Time effective preprocessing by bin-based histogram approach filters out the mismatches and helps in reduction of the overall complexity of POC.
In the proposed system, bin based histogram is used for processing. Frequency of every bin is calculated and mean of consecutive nine frequencies is then computed for every face image that is later on used for testing.
Computed mean vectors are used for calculating the absolute differences among the mean of trained images and the test image. Finally the minimum difference found identifies the matched class with test image.

The proposed system is tested in many cases: we compared a normal face with (face with glasses, Sunglasses, with beard, Mustaches, also with part of the face is covered, very far person with high resolution image, and face with many effects on it).

The total training time for 400 images with big size was found to be 21.962247 seconds. The total testing time was found to be 1.189681 seconds for input image.
but for small size images The total training time for 400 images with big size was found to be 1.625 seconds. The total testing time was found to be 1.189681 seconds for input image.

The empirical results obtained on ORL database shows the recognition accuracy of 99.5 %, which is very promising and is comparable with any other face recognition scheme.

Processed Histogram & Phase-Only Correlation (PH-POC) system is compared with other existing face recognition techniques such Principal Component Analysis (PCA) ,Sub Holistic-Principal Component Analysis (SH-PCA), Low Resolution-Single Neural Network (LRS-NN), Hybrid-Sub Holistic & Holistic-Technique (H-SHHT)with single Holon, Hybrid-Sub Holistic & Holistic-Technique (H-SHH-T) with five Holon.

Mobile-Based Reading Assistant for Blind People

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College of Engineering and Technolgoy,
Palestine Technical University, Tulkarem, Palestine

ABSTRACT

Blind and visually impaired people usually use Braille system for reading. However, it is not easy to learn Braille reading system. Further, these people like to feel as normal people. Therefore, we propose a mobile based reading assistant system that helps blind people read as normal people without using Braille system.
In the proposed system, the blind person uses a smart phone with camera to scan a page from a book. The system then processes the image and recognizes the written text. After that, the system reads the recognized text and the blind person can hear the sound. To make the system more intelligent and more similar to real life, we let the person record his/her voice at the first time so that the played sound can be the same as the person voice. In this way, the blind person feels as if he is reading the book. Furthermore, the blind person can save the played sound so that s/he can use them in future to revise the readings.
Since the blind people can not see the phone screen, we enable the application to be run by voice commands. The user can open the application vocally, start the camera, and start recognition. The user directs the camera to the book, and the system automatically checks the position and tells the user when the camera position is suitable for recognition.
Our research faces different challenges that are image recognition of a book page at different distance and different angles. The image may contain noise due to light or paper quality. We use OpenCV for image processing to enable real time image processing and filtering. The system is developed under android environment which is very popular in exiting smart phones.
The result of the research is a useful application for blind people which helps them read books and feel normal. The system is computationally efficient, robust to noise, and easy to use.

Easy-To-Use PCB CNC Software

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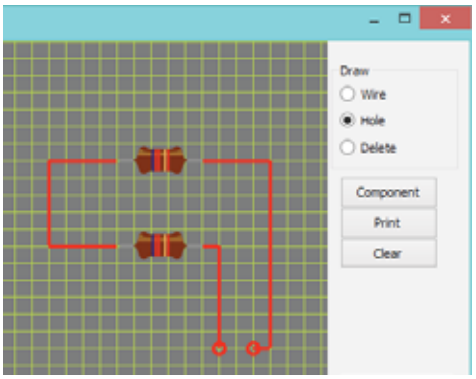
ABSTRACT

Engineers, in Palestine, face difficulties in the construction of electronic circuits, in welding and converting a circuit design on paper to a constructed electronic circuit. We noticed these problems after conducting several questionnaires aimed at university students, engineers and specialized technicians in building electrical circuits. They suffer from several problems: the difficulty of welding small electronic pieces, the lack of accuracy in manually welded circuits, which affects the accuracy of the whole project, the time consuming nature of the welding process which distracts from the project, the difficulty of obtaining printed circuit boards from abroad in terms of cost and time, and, if the machine is available, difficulty in the use of software in terms of needing long training at a high cost of using a reliable software.

Our project, Ease-To-Use PCB CNC Machine, facilitates the process of building electrical and electronic circuit boards in order to get ready for placing of the components easily and correctly. The user is provided with a program which has an easy-to-use and human-friendly interface. The user draws the circuit using the necessary items that the software is provided with; then he clicks the “Print” button to start the process of building the circuit board. The machine then starts drilling on raw board according to the coordinates and data received from the software. The system: the hardware part is the same for all PCB CNC machines in the world. The two main problems face engineers are inability to use the commercial software, that attached with the machine, easily and high costs of the software license .But we wrote our customized software that is friendly and very easy to use so we called our project Easy-To-Use PCB CNC Machine. The Project solves most problems that engineers and students face in terms of costs, time and accuracy.

We have reached an advanced stage in the project; we built the chassis and the stepper motor drivers in the mechanical part. In software Part, we have accomplished the main points in developing the application; drawing the circuit easily and accurately. We have finished the working on the last-look of our program and sending the data from the software to the hardware (interfacing the software to the mechanical part) .Now, we are working on software to choose best algorithm, which selects the suitable route in drilling, to apply on our program.



Despite the local market's demand for this machine, which is evident based on the number of statistics, this product is unavailable in the local market, but is available in the global market with high cost and a difficult to use program. We have provided this product with easy-to-use software at reasonable cost, with the possibility to make Printed Circuit Boards (PCBs) in a short time with high level of precision.

Social Networking site for Palestinian Schools

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ABSTRACT

This system is for the Palestinian schools which include: public, private and others. This system is a website that covers the acadimical, educational and social networking aspects.

The academicals aspect consists of: scheduling, archiving, grades, announcements, student performance assessment and student health.

Educational aspect consists of: e-books, documents, multi-media files and YouTube links. The students are able to request assistance for problem solving via this system. Other students and teachers are able to help via the same system as well.

Social networking allows the communication between students, teachers and parents and the active interaction between them. This means that they are able to message, follow and post. The studies show that students who use the social network to interact with their teachers had better grades than their colleagues used the social networking without interacting with their teachers.

One of the key advantages of choosing e-learning is that it is convenience for Students. They can learn whilst they are at home, in the library or on vacation. Time efficiency, e-Learning is therefore more time efficient as students can manage their own learning experience. Accessibility, Access to online resources, lectures and other study material 24 hours a day and 7 days a week can be seen as another major advantage. This is particularly useful to those students who need to read over the lecture slides again for revision purposes. Dynamic interaction, e-Learning technologies such as Moodle allow online discussions to be generated. A teacher may ask an open question to the students in order to make them think about a certain subject matter, in preparation for a test or seminar. Creativity, There is no doubt that creativity is important in teaching and some argue that e-learning facilitates greater creativity as ideas, resources, knowledge, understanding and skills can be shared easily, regardless of the location.

We used ASP.Net, Html5, Css3, Bottstrap3, JS, and SQL Server Database to develop the website, we used c# with ASP.Net because of its high performance, complemented by a rich toolbox and designer in the Visual Studio integrated development environment, easy to maintain and write, enables TDD Test Driven Development, flexibility and secure.

The system that we have developed has shown great results and in both utilization and usability, and now we are planning to generalize it to schools in other Arabian counties.

Framework for Knowledge Sharing Between Ministries and Universities of Saudi Arabia

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Supervised by
Dr. Vaiyapuri Thavavel

ABSTRACT

The importance of research studies has been increased by the arising number of students who tend to complete their higher education in the Kingdom of Saudi Arabia (KSA). The need for the present research was two-fold: At one end, the students and researchers are facing difficulties in identifying real problem to work on in their research studies and, on other hand the ministries and all the government centers of the KSA have many problems that need to be solved. Therefore, the importance of this research came from the idea of serving the community and raising the economics of KSA by having a repository to hold all problems faced by the ministries and that required to be addressed by the research community compared to what has been done in Europe when Two European commissioners Potocnik and Verheugen (2006) have applied the idea of knowledge transfer between research institutions and third parties like the industries across Europe to enhance innovation, to raise the economic in Europe, and to improve the quality and the quantity of the research studies. The aim of the study was to determine the interest of the students and researchers in solving the problems faced by their community and to determine the view of the ministries in aiding the research community to identify problems prevailing in KSA. The primary setting for the mixed method research study was Universities at Riyadh city. The data was collected by distributing two surveys, One targeting the students and researcher community, and the second targeting the ministries sectors. The resulting data were analyzed using Google Form tools and the hypothesis was formulated. Accordingly, an appropriate software architecture was proposed to address the purpose of this study as well facilitate both students and researchers to work on real data where they have a real case, and to share their research findings to the society for the development of KSA. In future, the sample will include all the universities in Saudi Arabia and cloud based system will be proposed.

Cloud-based Software Testing
The techniques, advantages, and challenges of Testing Software as a Service (SaaS) in the cloud

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ABSTRACT

There is a growing demand to have fast, secure, flexible, and scalable IT infrastructure by all organizations. That is why the trend is moving towards cloud computing. Testing is the activity that needs to be implemented during the whole development process of any software system. This research focuses on the cloud testing that is the testing techniques that uses the cloud to test software. It provides a solution to many drawbacks of the conventional testing. It essentially focuses on the performance of the SaaS, clouds, applications, and quality of functions. SaaS or Software as a Service is a service model defined by NIST as "the capability provided to the consumer to use the provider's applications running on a cloud". Cloud testing must handle the functional and the non-functional aspects of the solution. Functional testing includes many levels, however, this research focuses on the integration, validation, verification, and the user acceptance testing. Non-functional testing concerns about the performance analysis, scalability evaluation and security testing. To perform the research we have used qualitative research methodology by using archival literature and recent research contributions in the field. We have performed both comparative and analytical analysis. The research addresses some of the advantages of using each of these testing techniques. Later, it stated the main challenges that faces cloud testing. Last but not least, the research provides a comparison between cloud-based testing and the conventional/web based software testing. This research work classifies cloud-based testing types, clarify the techniques used, identify any drawbacks or open issues that endure. In addition, it presents a comparative assessment of cloud testing and conventional software testing. As per our findings, cloud computing provides several benefits to businesses, provided a suitable testing core is combined with any cloud solution ensures that a safe, integrated solution is delivered in which the needs of the business it is to serve are met. Nonetheless, along with these potential benefits comes a new set of concerns: security, privacy, availability, performance and scalability that is further discussed in this paper.

Automated Pet Feeding

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ABSTRACT

The feeding process of pets is very tedious, because any pet requires special treatments to be taken care of by the pet owner. Not all pets are alike; some pet will eat as long as there's food provided for them. Other pet will just eat a certain type of food. In other words, the pet owner cannot leave the pet on its own. Pets continue to win the hearts and wallets of a growing number of consumers; hence humanization is deepening the human/animal bond (Brown Gibbons Lang & Company, 2014). Pet care is a multi-billion dollar industry; in 2014 Americans spent nearly $73 billion on pet products and services which elevated from $47 billion in the year 2007 thus, making it the second fastest growing retail area across America. Nevertheless, the pet owners as well share a strong bond with their animal companions. According to Packaged Facts' February/March 2013 Pet Owner Survey, 83 percent of pet owners consider their pets to be part of the family as well as 76 percent of the pet owners consider themselves as "pet parents" or "pet partners". This indicates that the relationship between a pet with its owner is deepening due to the humanization trend. Such figures only show that the spending on pets by pet owners will continue to increase for more years to come (Brown Gibbons Lang & Company, 2014).

Despite the fact that most pet owners won't be able to stay home to feed their pet at different times in a day, they still want their pet to have access to food as much needed throughout the day. A problem arises on how to maintain the pet's eating manner. Moreover, some pets might need a special dietary plan due to medical reasons, such as diabetic pet, or an aging pet that needs to eat less for weight control reasons. Hence, the pet owner won't know precisely how much the pet eats a day. Consequently to solve the problem for organizing the feeding processing of pets, an automated system is needed that can automatically feed the pet. Additionally, an automated system that has a different development approach with the progress of technology and Microcontroller's progress with smaller parts of system on a chip (SoC) such systems can be developed with more functionality; hence without the presence of the owner the pet can be fed as the owner predefines the portion of food and the timing before heading out.

How much to feed your pet is the subject of many pet health questions. A suggestion to solve this issue is by building a small computer based system to detect the pets' food needs based on time and quantity. The system controls two dispensers for water and dry food with Udoo which is connected to a keypad to enter the number of meals per day, the quantity in function of the number of pets, and the timing of the meals. An LCD is needed also to show all these information during the setting of the system. Also, a buzzer is needed to create a tone to grab the pet's attention when it is feeding time. Additionally, this system will be able to notify the pet owner when the water and dry food dispensers are running low via an email. For the dry food mechanism the dispenser will be connected to an auger (screw) that is controlled by a servo motor. Hence, this rotation has to be programmed on the arduino's compatible embedded board of the Udoo. To control the rotation the weight of the bowl has to be weighed and for this purpose a load (weight) sensor shall be placed underneath the bowl. For the water dispenser it is simply applying the same physical concept as other existing automatic water dispensers. The bottom of the water dispenser will be punched a pencil-sized hole about one inch. Then it shall be filled with water and sealed after that it will be placed in a dish greater than one inch high. The purpose here is that water won't spill and won't be wasted as the water flows out; the air pressure in the dispenser decreases till some air is sucked in for equalization. Therefore, whenever the pet drinks from the dish the water level gets down so the dispenser can again equalize the air pressure and let more water out. Only a water sensor will be inside the main dispenser for detecting the level of the water inside the dispenser and whenever the dispenser is running low the pet owner will be notified through an email. The idea of this project is to help pet owners in the process of feeding their pets in an organized way where the eating pattern is controlled of the pet and no food or water is being wasted.

Solar Updraft Tower

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ABSTRACT

Solar Updraft Tower project works on a simple well-known principle: Hot air rises. To make use of this simple physical fact for power generation, air is heated by the sun under a large translucent roof (greenhouse effect). The heated air is then sucked in by a central vertical cylindrical tube (chimney effect). The updraft wind, thus created, drives turbines/generators and so generates electricity. Figure 1 shows two modules that we've built in his project, such that we could compare and show which system would have higher efficiency and generated electricity.

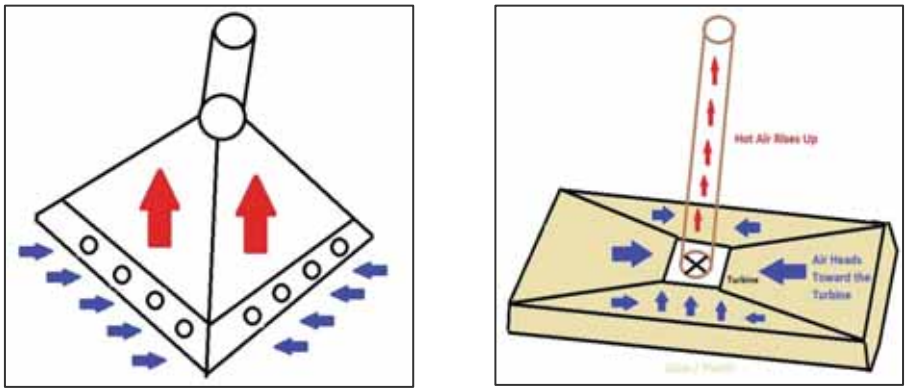

Figure 1: *Solar Updraft Tower Schematic Model. 2 Modules has been built in this project to show the efficiency difference.*

To design an efficient system, the power output depends primarily on two factors: the collector area and chimney height. A larger area collects and warms a greater volume of air to flow up the chimney. A larger chimney height increases the pressure difference via the stack effect. Heat can be stored inside the collector area.

The ground beneath the solar collector, water in bags or tubes, or a saltwater thermal sink in the collector could add thermal capacity and inertia to the collector. Humidity of the updraft and condensation in the chimney could increase the energy flux of the system. Turbines with a horizontal axis can be installed in a ring around the base of the tower.

An important side effect of placing a large transparent membrane over an area of land is the capture of evaporated ground water and its return back to the topsoil. This localized increase in land moisture can make the soil underneath the collector suitable for agricultural uses, through the effective creation of a partial greenhouse.
Electricity from Solar Updraft Towers is the most cost-effective when compared with other solar power plants. Moreover, Solar Updraft Towers are characterized by a number of additional advantages:

- Due to the soil under the collector working as a natural heat storage system, Solar Updraft Towers can operate 24/7 on pure solar energy.
- No cooling water is needed as for many other solar thermal power plants.
- Solar updraft towers are particularly reliable. Turbines and generators -subject to a steady flow of air -are the plant's only moving parts.

A small-scale solar updraft tower may be an attractive option for remote regions in developing countries. The relatively low-tech approach could allow local resources and labourer to be used for construction and maintenance.

Mobile Based Robotic Wireless Path Controller

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ABSTRACT

For the past decades robotic systems have been successfully used in various environments to perform specific tasks with various degrees of intelligence. Robots popularity stems from their ability to perform tasks define as the "DDD" (dull, dangerous and dirty), that humans don't like to perform; can't perform it as well as robots; or don't have the time to perform them.

Nowadays, commercial robotics solutions are focusing less on industrial robotics, and more on personal robotics. Personal service robots are special type of robots designed with mobility and manipulation capabilities allowing them to operate in wide range of environments providing a service to humans. This kind of service can range from health care services, educational services, domestic chore services, entertainment services, rehabilitation services and more.

These personal robots have to perform various tasks and duties in challenging indoor environments that are usually of an unstructured and unpredictable nature. The presence of humans in these environments adds more challenge to these robots due to safety and comfort concerns (robots have to stay within a safe proximity of humans; interact with humans in natural yet safe manner; and perform the service in an efficient manner). Technologies needed to realize such systems already exist, but the challenge lies in: the complexity of integrating robotic systems and components; the ability to develop a modular system that can perform well in various environments; and how easy they can be adjusted to perform different various tasks and skills.

In this project, we present a robot that would move in different paths depending on what the user specifies. We've designed an Android Smart Phone Application, which the user would use as a controlling device of that robot. The commands that the users instruct through the smart phone is sent wirelessly to the robot. Figure 1 shows the system block diagram.

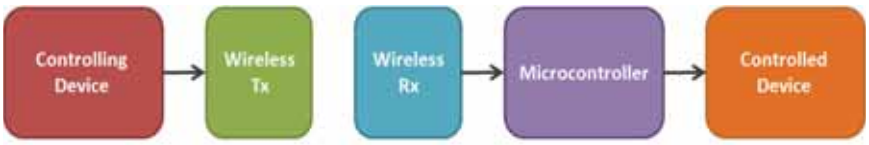

Figure 1: *System Block Diagram*

In this App the user has the option to make the robot move in a path that is defined by him/her, and the robot will act according to what is defined. The user would have the ability control the robot in the different four directions, and the robot will respond according to the moving command. Each path the user design will be saved automatically, such that the user would be able to recall it later on using the recall option. Another feature is that, users would be able to return the robot to its original position (starting point) from any point it's standing in.

The second option is for the users to choose from an already built in paths, they would be able to move the robot according to a shown path that has already been programmed in the robot, whenever the user chooses a specific path the robot will move according to that chosen path with no complication. In case that the user liked to contact the developers of the application, the "Contact Us" is designed exactly for that, where users can reach us through different social media websites, or directly call us

Figure 2, Figure 3 and Figure 4 show the designed Android application.

Figure 2: *Main Page of the App.*

The application of this project varies to reach out many sectors, for example, the transportation sector, where the mobile application can be used to control robotics in the way the user desires. Army sectors can also get benefit of this project, where it can be used for security proposes and surveillance for 24/7. Another application is in the foot ball fields, where a white color can be attached to the robot, and depending on the user's direction the robot would be able to make the field's white borders, and many other sectors, as the Oil Gas Industry, and the Automobiles Sectors.

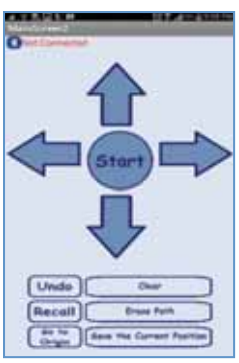

Figure 3: *Design Paths.*

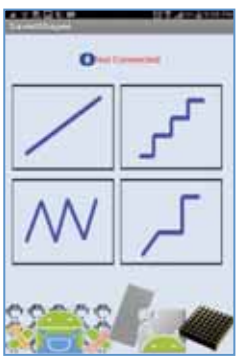

Figure 4: *Built in Paths (saved paths).*

Park It Application

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Supervised by
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ABSTRACT

The development and progress start by making the right applications, the kind of applications that can take us to another level of experience and modernity. Most of people in Jeddah face problems when it comes to finding available parking spots without the hassle so, traffic greatly affects people's lives. It even became an influencing factor in making everyday decisions. Almost 30% of all traffic in the average city center is searching for an available parking spot.

Smart cities enable and encourage the citizen to become a more active and participating member of the community. It provides technologies that make attractive locations to live, work and visit. Here are some smart city applications that proved their ability to improve the society: virtual city tour, virtual city marketplace, application or social media-based emergency alert and crisis response systems, smart climate control systems and smart parking systems.

We are currently developing a system that basically guides drivers to an available parking spot using Google maps. The current ongoing project consists mainly of two parts. The first part is a server side application that collects signals from a set of sensors that detect the occupancy of the parking spots in different city garages. While the second part is the mobile application called "Park it" that guide drivers to an available parking spot.

The parking information detection system consists of many sensors, a certain number of routers and one data collector. Parking lot occupation information is sensed by sensors, and transmitted through routers to data collector. Usually the collector connects to IP networks and the parking data is finally transmitted to a server, which will deal with all the information and provides service like parking guidance and reporting to people by smart phone, PC and display screen as shown in the figure below.

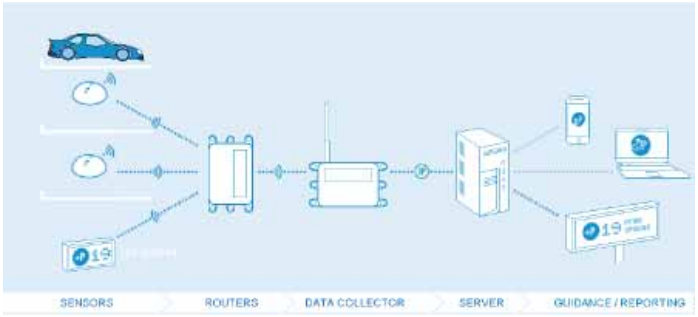

Figure 1 Network structure

The proposed features are as follows:
1. The application can guide the driver to the nearest available parking inside the parking lot
2. The application can show all available parking spaces inside the parking lot
3. The application can guide the driver to a special needs parking
4. The application allow the driver to save the vehicle's location and guide him/her back to the vehicle
5. The manager can monitor and control the parking lot

The word technology is innovative and we really hope to successfully deliver the project. Finally, Park it application is intended to ease your daily parking activities, save you the trouble of circling aimlessly, and help you take decisions effectively.

Real-Time Sound Morphing for Security and Entertainment Applications

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ABSTRACT

The project introduces an algorithm to change the voice by controlling the frequency of the baseband audio signal while maintain the same time duration. This feature allows for changing the voice in real time using TMS320C6713 DSP kit. Two programs are used to develop the algorithm. The first one is Matlab and its simulation tool Simulink. The second program is Code Composer Studio. Firstly, the algorithm was developed in Matlab. After that it was converted into Simulink to be able to generate a C code. The Code Composer is used to upload the generated C file on the DSP kit. The main challenges are to keep the time constant because expansion in frequency will result in compressing in time and vice versa and some functions are not supported by Simulink embedded coder.

The algorithm is done in the time domain. The idea of the program is to divide a sound file into frames. The length of each frame is 240. Then, two frames will be passed at a time to be processed. The first one is the current frame and the second is the next frame. Firstly, the user should determine the value of pitch change. The range of pitch change values is from -5 to 5 semitones. Then, the next frame is picked and interpolated. After that, a cross correlation is applied between current frame and from the middle of the current frame to the middle of the next frame. Fifty percent overlapping between two frames is applied. The cross correlation is used to find the maximum and minimum which will enable us to know the exact stitch center. It is very important to know the stitch center because if the stitch place is incorrect, clicks will be noticeable in the morphed sound. Finally, another next frame is picked and the same process will be done until all frames get processed.

Two algorithms have been developed. The first one changes the pitch without reserving the vocal tracts which will result in non natural speech. The second algorithm will result in natural sound by reserving the vocal tracts by using Autoregressive analysis. The difference between the two algorithms is that in the second algorithm IIR filter is applied before the process of changing the pitch then FIR filter is applied after finishing the process.

This project has several interesting applications. For example, security applications can benefit from changing the voice of an important person so that his identity remains unknown. Another application would be animations and entertainment where a female voice can be produced using a male voice signal, or vice versa. The proposed algorithm was implemented on a DSP kit, and successfully tested showing high quality result. The developed hardware will be displayed during the URC2015 oral presentation.

LAN Chat and File Sharing System

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ABSTRACT

The concept of chatting became one of the most effective means of communication nowadays, where people get closer to each other although they are not close physically especially in large organizations with huge population.

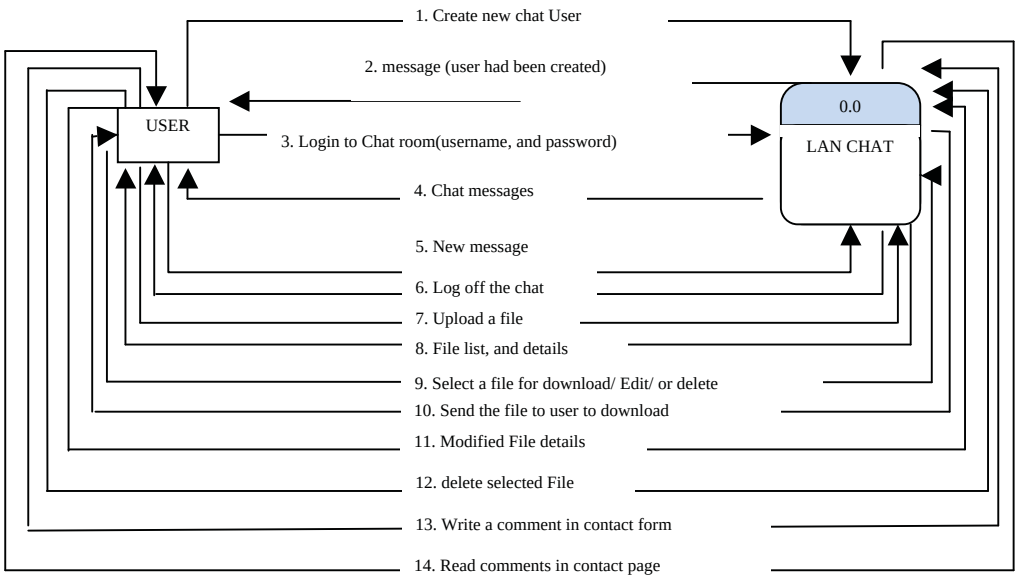
The proposed system aims to develop a LAN chat software that runs on a local server without using internet connection, which can help companies that has a large number of employees with different physical locations to communicate effectively throughout the server and get immediate answers to inquiries from colleagues on the spot. In addition, the proposed software will offer file sharing facility through LAN connection.

The user can navigate to chat page and create a new user or login with existing user credentials. They can access into any of the available chat rooms and read older and offline messages that had been sent before. User can write, send and navigate messages through the same panel. The proposed software assigns different color codes to users so each chat participant can be distinguished easily through his color.

A prototype of the proposed system has been implemented and tested successfully, four users have been registered in the prototype version to make the coding & testing processes easier and also to overcome the time constraints which may occur.

However, the implemented prototype is lacking any security technique. This will be considered in the future work to assure the Integrity & confidentiality of submitted information. The prototype may be improved by enabling access to chat using the PC log in credentials as the user can be recognized automatically through inputting his employee user name and password without the need to register with separate user and password, as well as some improvements to the user interface and graphics may be considered in future.

Context Diagram



Fun Video Games for Teaching Information Security

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Dr. Mario Guimaraes
Kennesaw State University (KSU), Atlanta GA, USA

ABSTRACT

Information Technology (IT) students in have difficulties in understanding the importance of Information Security, such as securing a network. Traditional security classes are often professor-centered lectures where students learn basic threats and defense mechanisms, without applying this knowledge. In the field of Information Security and Assurance, there is less opportunity for hands on learning than other areas of Information Technology such as System Analysis and Databases. A professor cannot inject viruses on a network for students to practice removing them. Applying security concepts could result in threats to the university network and/or illegal action. Simulation tools such as virtual networks running in an isolated environment try to address this issue and are successful to some extent.
Video games may be simulations that bridge the gap between theory and practice in Information Security, creating a scenario where the user has to react to a series of events and verify the results within a limited time frame. Furthermore, video games offer an interesting and motivating scenario that is student centered. This project proposed creative methods for teaching security to students in Information security courses. The proposed project introduces important concepts and broadens further knowledge in the field. The main objectives of the project are:

a) Motivate and enhance learning strategies.
b) Strengthen the knowledge in the Area of Information Security.
c) Make education more entertaining.
d) Consume less time when introducing new topics.

The security games were developed using Unity 3D Gaming software and C# computer language. Moreover, for the designing part varieties of online websites were used. The first game scenario introduces password concepts. This game focuses on identifying strong passwords in a creative and entertaining manner. The game has four levels; in each level user should identify the strong password from a pool of passwords. For each level, users will have a specific number of passwords that they need to recognize to pass to the next level. To make the game more challenging, a timer and additional points were given to players who finished faster.
To make the game more fun, a timer was added to record the amount of time spends to finish the game. The second security game addresses several security concepts, such as identifying spam emails and finding network vulnerabilities. The project can be enhanced in the future by:

a) Add more game scenarios for Information Security topics.
b) Integrate all security games as one interactive product
c) Develop similar video games for mobile platforms

AL DAR University e-Books Online system

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School of Information Technology
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ABSTRACT

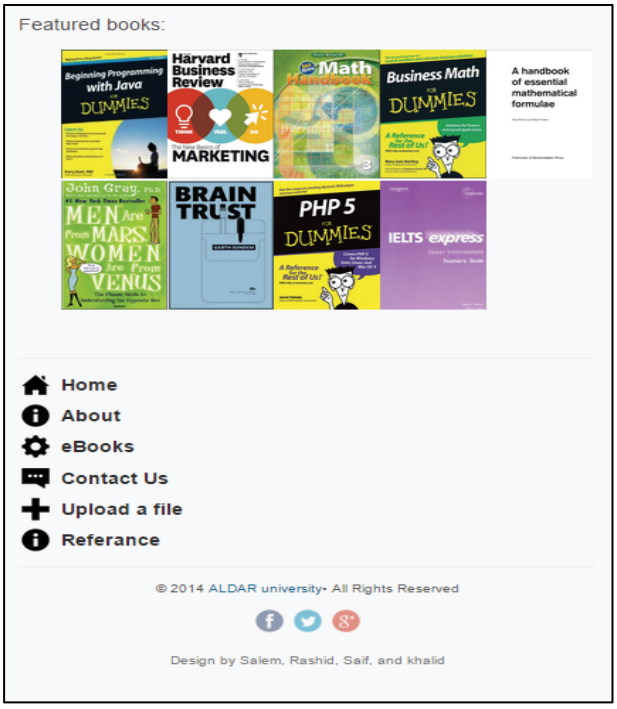
To study at any university, it is not enough to read the books provided by the college itself. There should be additional books to read and to gain wider information from.

The Main idea of the proposed system is to generate an online system that facilitates the users' access to a wide range of E-books which can be uploaded/ updated by the administrations. Those E-books are related to the main courses at ADUC-Dubai, and serve IT, Business and general studies students. All students can access the system from their devices (mobiles, tablets or PCs) through the internet. They can read, download, and share the available books from their devices, and can study anywhere anytime in a day, which makes learning easier as their books will be handy 24/7 to invest time.

The proposed system is a robust combination of a number of diverse technologies (HTML, php, java, and Android) to construct an internet activated portal to anywhere appliances to assist users who are studding in universities or colleges to access their study materials.
The system is consisting of three parts; the user device (PC, Mobile, Tablet… etc.), the software running on the device, and the internet. The software interface has a search button, a Gallery-button, and e-book website button. So, the user will use this interface to remotely access the e-books through her/his device.

The aim of the project had been achieved by uploading and implementing the site on the web, and is available for ALDAR E-books readers. The system provides access for as many books as the administrators may upload.

Until now, the size of the E-books storage is limited to 200 MB. This project is done for a temporary period of one year and can be tested and evaluated online to have corrective actions later on for the website and the hosting plan.



Haddith
News Social Network Using Text Classification and GPS

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ABSTRACT

Having access to current events and up-to-date news have a value in the modern world because of the constantly changing nature of the world. Without regular access to news, most people would be unaware of the various events and their places, either locally or around the world, and this may have an impact on their lives.

The news in the social media are not classified, which makes it difficult for users to find and follow all news of the categories that interest them, as well as recognizing the most important news or the news that have more interaction. Also, it is not possible to find all the news of one location in the existing social media, which is not helpful, because users are generally interested in the events that happened in the nearby places. Another problem is that same news are published in different social media and can be published multiple times, which result in the interaction of different groups of users with the same news in different places. This is very confusing for the users and makes it hard for them to keep up with all updates of the news.

As a solution, we present an android mobile application that acts as a news social network to make the user aware immediately about the news and events that happen in his city, country and even the global world. Also, the application will be able to classify all the uploaded news into different predefined categories based only on the news's text.
The user will start with a globe map with all the recent news that are shown by categories and/or by locations. The user then can read specific news, comment on them or rate them. He also can post news, support them with photos or videos, and specify their locations using Google Maps and GPS. After posting, the text will be processed in order to classify the news into predefined categories according to its type (social, political, sport, etc). Each user has his own account where he can manage the news posted by him, the followers, and the people he's following. He can also manage places and categories of news he's interested in. An overview of the application architecture is shown in figure 1.

Figure 1: Application Architecture

The software technologies needed to implement the application are Android operating system, Google Maps, SQL database, and Java programming language.

Automatic Detection of Omani License Plates from Still Images

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ABSTRACT

The number of vehicles on the roads in Oman is increasing rapidly; this is due to the increase of the population accompanied with an improvement of its purchasing power. This situation creates a variety of problems and risks such as traffic congestion and road accidents. Hence, a more proactive role should be played by all related authorities in an effort to control and monitor the flow of vehicles on the road.

Currently, Royal Oman Police (Sultanate of Oman) performs the task of road monitoring in a manual and time consuming manner; images taken by the radars are downloaded, viewed by an officer to read the license plate number of the fined car and entered manually into the traffic fine system.

Intelligent systems, based on Image Processing and Pattern Recognition techniques for traffic monitoring are becoming common nowadays and our project aims at adapting such techniques to help in the automation of the monitoring task performed by ROP. Such work will result in tremendous gain in time and efficiency. Several methods have been proposed in literature to deal with the problem of automatic License Plate Recognition (LPR). They usually undergo four major processing stages: image acquisition, license plate extraction/detection, license plate segmentation and character recognition. This paper describes a method we have designed and implemented for performing the second stage: localization of license plates from still images. The input to the prototype is an image of a car with Omani car plate and its output is the image of the localized license plate. The image should contain a frontal or posterior view of the car taken during day time and its view angle can be slightly tilted (+/-10^{o}).

Our method is inspired by the work of Naikur Bharatkumar Gohil B.E (2010) to which we introduced several modifications in order to deal with the specificities of Omani car plates. The following algorithm lists the major processes that make up the proposed method

1. Convert the color image into a grayscale image.
2. Apply morphological dilation to the grayscale image in order to reduce the noise and sharpen the edges.
3. Calculate image gradient based on differentiation of grayscale values of pixels located at adjacent columns.
4. Perform horizontal projection of strong gradient values (i.e. those greater than a predefined threshold) into a histogram.
5. Smooth and filter the histogram so that rows in the original image with high gradient values are identified. They represent the possible vertical positions of the license plate.
6. Calculate image gradient based on differentiation of grayscale values of pixels located at adjacent rows.
7. For each contiguous rows identified as potentially containing the license plate

    7.1. Perform vertical projection of strong gradient values (i.e. those greater than a predefined threshold) into a histogram.

    7.2. Smooth and filter the histogram so that columns in the original image with high gradient values are identified. They represent the possible horizontal positions of the license plate.
8. Several license plate candidates are then identified. The one with the largest normalized gradient contents and satisfying a predefined height to width ratio, specific to Omani car license plates, is selected.

We have tested our method on a dataset of 130 car images. The experimental results showed a very good performance of 90% correct localization.

Current performance can be further improved by including features other than edges in the detection process. Color feature is a natural candidate since the characters and background of Omani car plates are of predefined colors.

Learning Through Science Fiction

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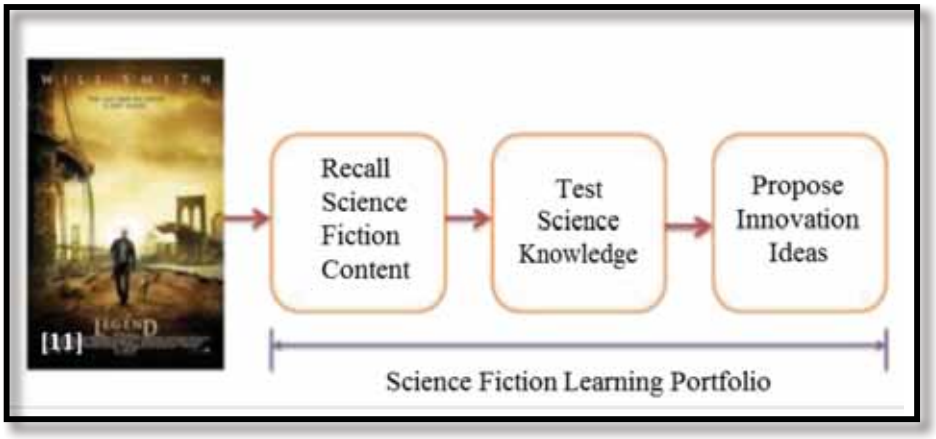
ABSTRACT

Science fiction is defined by Oxford English Dictionary as “Fiction based on imagined future scientific or technological advances and major social or environmental changes”. In this paper the impacts of science fiction in learning science is discussed. While people argue about "The use of science fiction in learning" there are two different views of its impact in learning science.

The first view is that it can enhance and capture imagination, make science concepts easier to understand by illustrating them in attractive ways and open student’s minds to innovations that were introduced in sci-fi.

On the other hand, fictional science can deliver false statements. It might give people distorted information, misconceptions about real science or even scientists. These can be corrected with the help of educators, who will need to check first if misunderstandings exist about science in their students’ minds and then give learners the right information with proofs to make it more acceptable.

The methodology used by this research paper is based on online-resources. The data were collected from websites, books, articles and research papers retrieved mostly from Prince Sultan University Digital Library.



The outcome of this research shows that science fiction helps people learn basic knowledge, arouse their interest about science, enhance creative thinking and inspire learners to explore and search for solutions. Further more, fictional science prototyping is a great helpful approach to science learners in a way that makes them achieve a realistic vision of what the science future might look like and how it would affect the future. It is also used to know the social and cultural implications of the inventions. In addition, it creates the real and true version of the imagined future.

Personalized Healthcare Provisioning based on Social Media

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Supervised by
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ABSTRACT

Human beings go through various stages of life and recently researchers have realized the importance of social media in healthcare. Social media enables users to know more about themselves including their health conditions. The main challenge lies that how different sources of social media can be effectively used for personalized healthcare provisioning. The proposed system monitors health conditions, emotions and interests of patients from patients' tweets. We extract keywords, concepts and sentiments from patient's tweets data. Twitter allows users to post a short text upto 140 characters into one tweet, so due to space limitation people use abbreviations, slangs and URL's. Our proposed approach process this information using natural language processing techniques with machine learning algorithms. As a result, entities and sentiments of user are returned for specific health condition to be used as knowledge for clinicians. The architecture of the proposed system is shown in Figure 1.

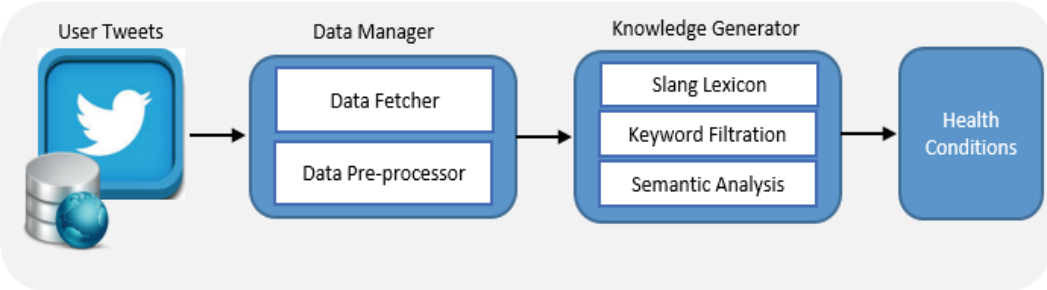

Figure 1: Architecture of the Proposed System

Our proposed system fetches the tweets from the social network and apply the preprocessing step in order to remove the unnecessary tags and make it understandable so knowledge could be extracted from the tweet contents. The extracted streams of tweets data are in XML format so we parse it through Document Object Model (DOM). User tweets may contain emoticons, abbreviated words and slangs that makes data hard to manipulate `and sometime causes noise. We apply the slang lexicon for the replacement of slangs and abbreviations into appropriate words. We used the Alchemy API to process the plain text and stores the extracted keywords into social media repository. Alchemy API is a cloud-based text mining platform rich in extracting entities and keyword from plain texts up to 28 major types (e.g., health condition, person, drug). Contextual information and emotional state of the users are identified based on entities and keywords extracted by sentimental analysis and tagging. Finally, the extracted health conditions are provided to the caregiver of the user for necessary action.

Building a healthcare system with effective utilization of social media is a challenging issue. Our proposed system identify user's habit and preferences for the domain of healthcare. We have applied annonymization technique to ensure security and privacy concerns of users'. The proposed system envisioned facilitating the practitioners for effective and accurate decision making. Hence, the impact of the proposed system is to overcome the barrier of adopting the benefits of patient's social media knowledge for health related issues.

ACRS: Arabic Character Recognition System

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ABSTRACT

ACRS- Arabic character recognition system is the optical character recognition system (OCRS) which deals with Arabic text. In general, OCRS is the system that reads scanned documents or images of printed text and converts them into computer-readable text by three stages: Pre-processing, segmentation and recognition. Many researchers have been achieved in these three stages for many languages. A lot of these researches gave an excellent to perfect results in some cases like Latin languages especially in English. However, because there are many challenges facing researchers in Arabic script or any other cursive script, the ACRS which can give a perfect result could not be achieved until now.

As was mentioned above there is a lot of challenges in Arabic text facing any researcher, for example: Arabic script is written from right to left, each alphabet has at least two shapes up to four shapes, Arabic characters are connected on an imaginary line called baseline in contrast with Latin languages like English which has separated characters, and many others.

Actually, there are ACR systems either as a part of OCRS supporting multiple languages like: Readiris Corporate 11 Middle East or as OCR system for Arabic and other cursive languages like: Sakhr. All of these systems could not give a perfect results; for example: Sakhr gives 99.8% accuracy for high-quality documents and 96% accuracy for low-quality documents.

So this field of research was chosen trying to create algorithms which can give a perfect result. Therefore a three stages of ACR system was proposed as following:
1- Pre-processing: In this stage grey scale, image filtering, smoothing and sharpening, setting the dpi up to 300, image rotation, converting image to binary image and image skeltonization were applied.
2-Segmentation: This stage contains three sub-stages: segmentation of the script into lines by using horizontal projection, Segmentation of the line into words or sub-words by using vertical projection and segmentation of the word or sub-word into characters. For the last stage, a new algorithm was proposed in this research which is a hybrid algorithm of: 1-Segmentation algorithm based on changing in curvature above the baseline, 2-Segmentation method based on vertical projection (The potential segmentation point is the middle point of a segment of the baseline with no black pixels above or under it) and 3- Segmentation of Urdu characters using structural feature. As known, every segmentation algorithm has drawbacks either of over-segmentation or/and under-segmentation. However, each one of these three algorithms has a part that can solve the drawbacks of the other. So, it became possible to get a perfect result of segmentation of high-quality document.
3-Recognition: In this stage a new algorithm called matrix summation was created. Its basic idea comes from the idea of both horizontal and vertical projection (Y- projection & X- projection) and the Freeman chain code algorithms. In this algorithm we counted the black horizontal and vertical pixels (the 1's in the binary representation of the segment) and compare these vectors of sums with the ones in the database to recognize the character. Unfortunately, this algorithm didn't give the expected result from it. After testing it on few documents, 85% was the highest accuracy has been got.

To get the perfect result for this system especially for the high-quality documents, those recommendations should be done: First, solving the problem of segmenting two overlapping lines when the characters which cause this problem come above each others. This problem made the result of segmentation to lines 99.9%. Second, working on recognition algorithm by focusing more on enhancing the existed recognition algorithm or applying another one.

An Approach for Detecting and Analyzing Traffic Flow

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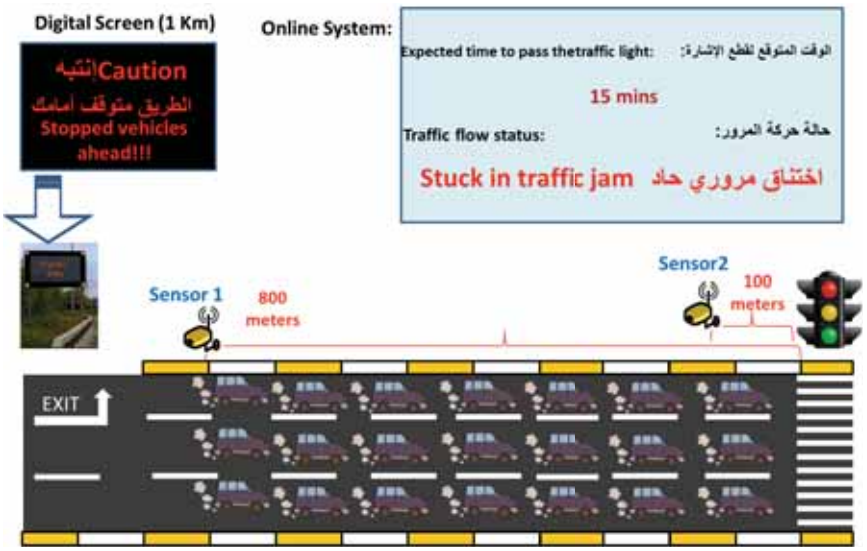
ABSTRACT

At the beginning of 21st century, the technology developed very fast in all life sectors. Those new technologies focus on how to make life faster and easier. One of the most popular public health issues is road traffic accidents (RTAs). In this study, we aim to develop a wireless sensor unit to track individual vehicles robustly against traffic jams, traffic violations, and accidents which usually occur at intersections. This information will allow us to create an online system for drivers in real time to avoid congested routes. An Approach for Detecting and Analyzing Traffic Flow system also aims to provide statistical information about the traffic flow (number of passing vehicles and their length).

The purposed system consists of two sensors that detect passing vehicles. The first sensor (about 800 meters far away from the intersection) will count the incoming vehicles on road, while the second sensor will count the passing intersection vehicles. A digital screen will be located at about 1km from the intersection and before an exit. The screen is to show the status of the traffic jam at the coming intersection. (See Figure: (1)).

Giving information about traffic status on an intersections is important, since it will warn drivers about the road which will help in reduces collisions ratios .One of the future developing ideas is to link the real system to end users by centralized mobile application that give information to drivers before reaching traffic jam.

Developing such systems helps provide accurate information for many governmental sectors. The following are examples of the potential sectors that may the proposed system provide relevant information: National Center of Statistics and Information, Ministry of Transport and Communication and the Police. This information and the acquired knowledge from the literature review help us propose a equipment specifications for that might work sufficiently at collect real traffic flow in real time.



Figure(1): The Interface of the Proposed System

Behavioral Communities Based Diffusion Analysis in Social Networks

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Supervised by
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ABSTRACT

To identify the behavioral communities based individuals' daily life activities could help to understand the phenomenon of information diffusion more effectively within different social network. The fundamental purpose of each diffusion process is to differentiate a set of the individuals on the basis of their social ability for information manipulation and propagation. However, it's not realistic to consider different individuals of social network have same behavior for information manipulation in their day to day life activities. In the proposed system, we aim to improve the understanding of diffusion process in real social networks based on individuals' preferences and behaviors. The main architecture of the proposed system is shown in Figure 1. Representing the individuals' actions by means of ordered sequence of activities facilitates our understanding of the significant behavior patterns in daily lifestyles. In order to measure the actual relationships between users, we identify the significant behavior patterns of each individual based on his daily life activities. One intuitive way for behavior pattern generation is to apply a sequential pattern mining technique. Let $D = \{a_1, a_2, \ldots, a_m\}$ is a set of m activities performed in a particular day in a temporal manner T. Let each sequence be $S = \{D_1, D_2, \ldots, D_n\}$, where D_i is a set of performed sequences of activities on different days.

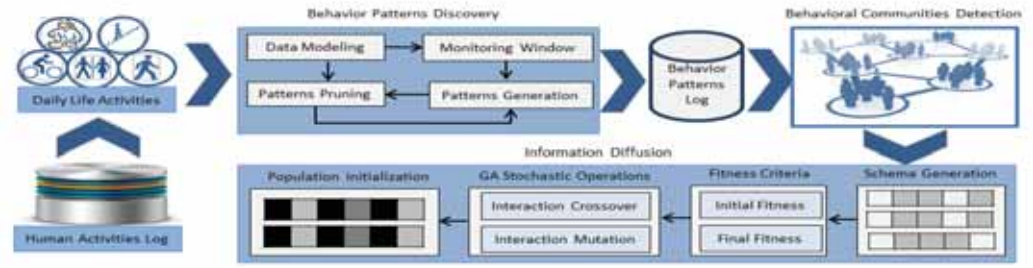

Figure 1: Proposed System for behavioral Communities based Diffusion Analysis

Once the behavioral patterns are identified, the proposed system identifies the communities of individuals based on their behaviors. We used multi-model community technique that exploits the multiple information data features to produce communities. We obtain the significant behavior patterns and sessionize them using behavior relevancy. This data is used to construct a vector-space model of individual's profiles, first by creating models of both the behavior patterns from day to day life and the user interactions within a social network, and then combining them to generate the user profiles.

Our proposed system can measure characteristics of a diffusion process from various perspectives of behavioral communities, and thus avoid the risk to be suitable for a certain kind of information spread. The number of individuals balanced by behavioral communities is able to keep the diffusion process dynamic, avoiding giving importance to a single value social network property. The proposed diffusion model reveals network analysis from different angles, which help to discover complex and comprehensive information diffusion trends in social networks. Our proposed design of Genetic Algorithm (GA) for modeling the individuals as chromosomes and information as genes in each chromosome is not a trivial task. Because the design of GA components directly determines the desired output in terms of algorithm performance.

As a result, our proposed system solved two most important challenges that involved human behavior in diffusion process. First, we analyzed significant behavior from the daily life activities and then we identify the communities based on behavioral similarities. Second, we proposed a GA to model the diffusion process for behavioral communities. The results show that a few individuals in the network always obtain a high information rank irrespective of the start of the diffusion process.

CCWP: Course Coordination Web Portal

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Supervised by
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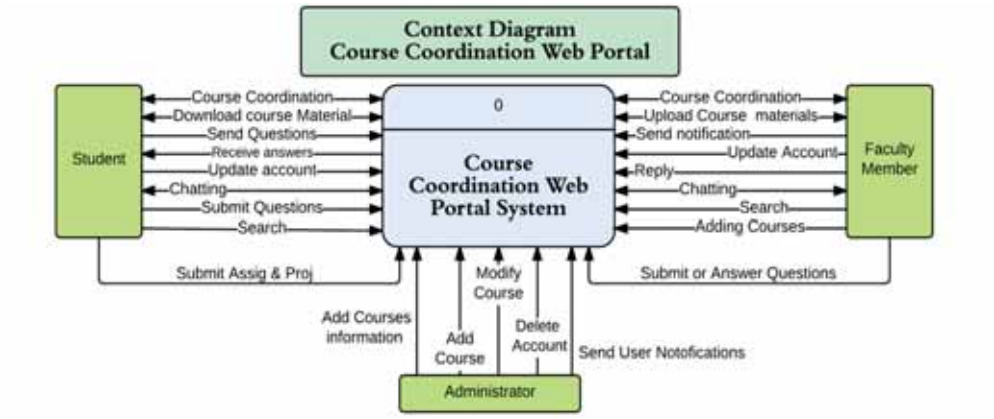
ABSTRACT

Most of the female students in Saudi Arabia universities face problems when a male instructor teaches them in terms of the day to day teaching operations; the students cannot easily get information about course objectives, schedule, grading policy, important course announcements, expectations of academic integrity, and accessing the instructor during office hours. Many a times the faculty teaching the theoretical sections and the lab sections are different and there may be a possibility of variation in the course material covered by different instructor within the same university, a proper coordination is required among them to achieve the course objective and to follow the teaching plan. Further, the difficulty also arises when the similar courses is taught by different instructors to different sections, where a proper coordination is required between the faculty members.

To address these issues, we developed a CCWP (Course Coordination Web Portal) that bridges the communication gap between students and all the faculty members teaching a particular course to different sections. CCWP is a web-based system that aids to build scholastic society dedicated to education, which will allow both undergraduate, postgraduate students and faculty across Saudi Arabian universities to be part of it and learn from each other. CCWP is designed using ASP.Net for web interface and SQL Server for database design using the approach of incremental development. The main functionalities of the system are shown in the context diagram.



CCWP permits students to enquire, retort, and make queries by having one to one interaction with instructor. An email notification from CCWP notifies the students about newly made changes. It also helps students to work on their weak areas by getting the benefit from recommended topics relevant to their enrolled course material. CCWP locates pre-requisite material with a rating history and generate recommendations using likelihood. So the students may focus within their core area of study or opt for more diverse knowledge.

Hence, the proposed system eliminates the issues of the student's coordination with the instructors and among the different instructors teaching the similar course. It opens a communications channel where students and instructors share their experiences and they could come up with new policies, tools, and training to enhance the way a course should be taught.

Bridging Educational Gap in GCC Countries

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ABSTRACT

Higher education is rapidly progressing in Saudi Arabia; however initial education standards are not sufficiently matching with the requirements to prepare students for university level education. Even, preparatory year curricula lack the level that could change students' attitude towards university programs. Students are not well aware about research at undergraduate and graduate levels. According to the 3rd annual undergraduate research conference held at Zayed University in 2011, 16,328 patents only from South Korea were registered in United States between 1980 and 1999, while 370 from Arab world in the same time span. Then in 2008, 367 from Turkey alone compared to Arab countries contributing 73 patents in the same year. In order to figure out the reasons behind these statistics there is a need of a system that can track and analyse student activities, both curricular and co-curricular.

In this research, we propose a web application based tracking system using students' portfolio filled by the students and their academic advisors for colleges and universities. The collected data in central database analyses for cumulative recommendations for improvement in academic curricula. Our proposed system helps in understanding the processes underlying the data, discovering the important patterns and then communicating the results to have the possible impact. The system is designed using ASP.Net for designing the web interfaces and SQL Server for the database. In order to analyse the semantics of the collected data, we decided to map the concepts and relations of data on domain ontology. The main concepts of our designed domain ontology are shown in Figure 1. For ontology design we have used Protégé 4.3.x/OWL DL. For inferring the concrete and validated knowledge, we used Pellet Reasoner and SPARQL is used to query the semantic knowledge. The results of data analysis facilitate the Ministry of Higher Education (MHE) in accessing student academic results in the form of statistics and graphs. This helps MHE to recognize weak areas in education system at different levels including research and professional deficiencies and supports to take remedial actions accordingly.

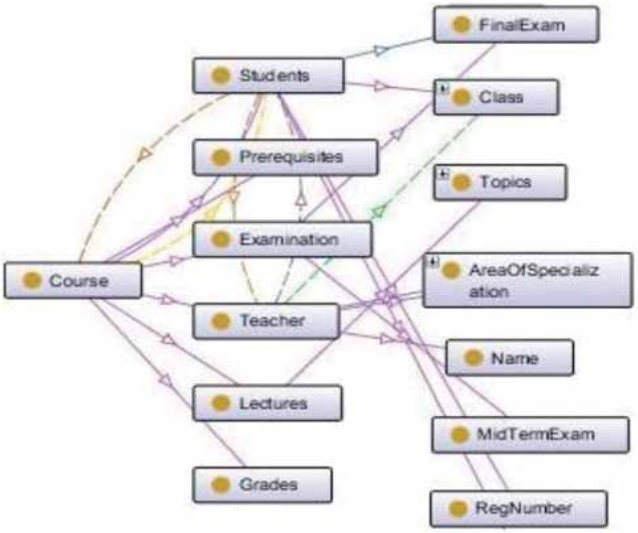

Figure 1: System Ontology

In result, developing this system solves major educational problems. Our proposed system helps in pointing out the exact departments that need improvement and why major strength of students has poor skills in certain fields. Once the domain of the problems is identified, MHE and academic management of our educational institutes could work on a solution and take actions accordingly. It also helps to find the answer that why students are unable to meet the standards of research carried out in educational institutes in other parts of the world. Currently, we are done with the design and development of the system and have intensions to deploy the prototype in Saudi Arabia. However, our proposed system is applicable to all GCC countries where education systems are almost similar in order to bridge the huge gap in school/colleges and higher education curricula.

Multi-regional Satellite Image Analysis Tool

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ABSTRACT

During the past three decades the United Arab Emirates has evolved drastically as a country. It has introduced numerous new projects such as airport expansions, residence developments and man-made islands. Being able to understand and evaluate the status and the development of the many projects occurring within the country is crucial, especially for government institutes such as the Emirates Institution for Advanced Science and Technology (EIAST). In this project, a computer-based tool is being developed to process satellite images and monitor environmental and urban changes in the UAE and the gulf region. The tool is specifically aimed to deal with DubaiSat-2 images of the gulf region. Current methods analyzing satellite images have been found to be inaccurate to apply on the gulf region in particular for vegetation detection, as they have been developed based on data related to terrains which are mostly tropical. In addition, they have been found to give unreliable vegetation statistics and change detection results. By developing such a tool we would be customizing vegetation detection to the specifications of the climate and environmental characteristics of the gulf. The challenge lies in having to apply elaborate techniques in order to find the ideal parameters for this region. In addition, we face the challenge of creating a tool which can process the large size of DubaiSat-2 satellite images.

As the DubaiSat-2 orbits the earth it sends information to the ground stations in the UAE providing information of that particular region. These images then go through a sequence of pre-processing stages that include band registration, geo- referencing and sub-setting. The multispectral images are then uploaded into our multi-analysis tool in order to extract information related to the vegetation conditions of that region. (Figure 1)

In the research part of this project we investigate different vegetation detection methods and elaborated a methodology for setting the optimal values to obtain the best vegetation detection accuracy. Initially, to focus on one region we started off by developing the simple functionality of specifying the region of interest from a satellite image. Accordingly, we applied the NDVI vegetation detection method which uses one specified threshold to determine the vegetation statistics. In order to improve the accuracy of our results we looked into the theory behind sensitivity, specificity, and accuracy. The formulas of each will help determine the regions which are TP (True Positive) and are almost 100% vegetation. By specifying a specific threshold each time and observing when the highest rate of accuracy is obtained, the ideal threshold value for DubaiSat-2 images can be determined.

Our tool can be exploited by many environmental agencies and authorities in the UAE, such as the Environment Agency – Abu Dhabi (EAD) and the Ministry of Agriculture and Environment.

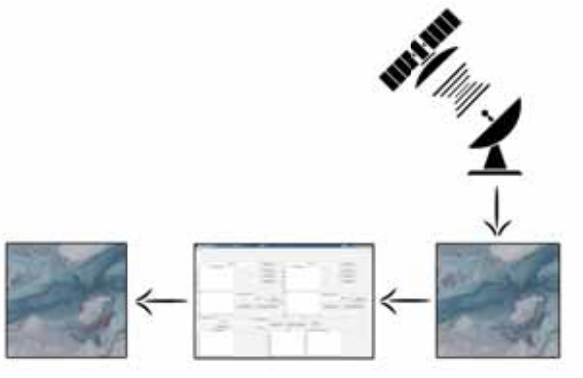

Figure 1: System Architecture Model

Innovative Tracking System for Indoor Navigation

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Supervised by
Prof. Mustahsan Mir

ABSTRACT

In the age of automation, the ability to navigate people and devices in indoor environments has become increasingly important for a number of applications such as rescue missions in emergency, aiding visually impaired people, indoor navigation in large buildings, and location-based services. Accordingly, considerable research and development work has been carried out over the past decade concerning indoor positioning systems. One particular application with ongoing research is development of an efficient indoor tracking system for locating firefighters working inside high-rise buildings on fire.

A major cause of firefighters' injuries is related to the blocking of radio signals by building walls. In case of GPS failure, firemen often run into danger; unable to track their way out and transmit their whereabouts to the base. In addition to inertial sensors, the other existing indoor tracking methods used are Bluetooth, Radio Frequency Identification tags (RFID), Ultra-Wide Band (UWB), Wi-Fi, Ultrasound based systems and Simultaneous Localization And Mapping (SLAM). Commercially available motion detecting IMU (Inertial Measurement Unit) sensors may provide up to 90% accuracy in locating the firefighters but they are very expensive. All these systems had one main drawback in common, they depend on the use of additional hardware for the purpose of transmitting or receiving. The system reported in this paper has overcome this limitation by developing a smartphone-based system.

The aim of the developed system is to provide wireless on-site communication to transmit real-time position information of a firefighter in danger, i.e., to track and trace the firefighter's incident path. The inertial sensors in mobile phone mounted on his body will convey the tracked motion he takes since the beginning of his venture to his current position. This data is transmitted to the base station using a 3G mobile network or a low frequency network and is displayed as a tracked motion in a map. The inertial sensors by themselves are not of any use until the necessary processing is done to achieve localization. Figure 1 depicts a high level architectural diagram of the proposed solution.

Figure 1

The sensor data was successfully transferred to the processing computer over a private network through MATLAB mobile application. This allowed real-time realization of sensor data. Steps taken by the user were detected from the accelerometer sensor and thereby calculated the distance. Figure 2 shows the distance-time graph acquired by double integrating the obtained accelerometer data of a person walking 10 meters. By applying the moving average and Savitzky-Golay filtering techniques on the accelerometer data, the distance calculated was shown to be more accurate than the existing solutions. Future work includes implementation of sensor fusion by Kalman filtering technique, employing heading and 3D plotting.

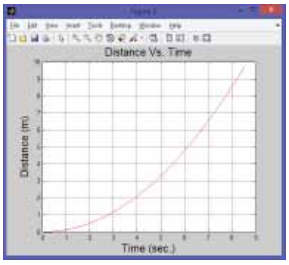

Figure 2

Traffic Signs Recognition System for Improving Roads Safety

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ABSTRACT

Traffic signs are designed to reduce traffic accidents and improve safety on roads. However, drivers sometimes do not follow traffic signs because they can not see them due to obstacles, or they do not pay attention to them. Nowadays, automotive suppliers integrate Traffic Sign Recognition with vehicular technologies to increase driving safety. Although existing technologies and studies have proposed several traffic sign recognition systems, these systems are limited to the recognition of speed signs, children signs, and turn ahead signs.

In our research we aim to generalize traffic sign recognition so that it would be able to recognize any sign on the road. Our methodology borrows the Connected Components Labeling algorithm and the Image Histogram Analysis algorithm. We start by classifying traffic signs into three categories based on the shape (circle, triangle, and rectangle). We also classify signs based on colors into two categories (blue, red, and yellow. We firstly search for colors red, blue or yellow and convert other colors to white. We utilize the Connected Components Labeling algorithm to identify the region of interest i.e. the shape. The object inside the shape is then transferred to the recognition phase in which we use the Image Histogram Analysis algorithm to recognize the internal object and compare it with others from the same category in the database. The proposed algorithm results in high accuracy. Some of the results are shown in the figure.

Figure 1. Identifying point of interest (traffic sign) in a photo take by smart phone camera

Based on the proposed traffic sign recognition, we also develop a smart phone application that warns drivers prior to arriving at sign locations. The output of the recognition algorithm is fed to a smart phone application that notifies drivers via a sound and helps them pay more attentions on roads. The proposed algorithm is also useful to auto-driving cars since it increases the number of signs recognized by cars computers. Our future work will include extending the recognition to dynamic signs that are set on highways and change continuously to warn drivers (changeable message signs). To enhance the accuracy of sign recognition and reduce computational complexity, we will employ a novel machine learning approach based on Deep Belief Network which is Restricted Boltzmann Machines (RBMs).

The Development And Recognition Of Mobile Commerce In Saudi Arabia

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ABSTRACT

In the last decade, the revolution of ecommerce has had a great impact on the marketplace. It has redefined and shaped what people view today as modern commerce. This paper conducts a research on the level of activity and acceptance of mobile commerce. It will provide an insight on how m-commerce developed rapidly in a short period of time and how big an impact it has had on the market. The objective of the study is to shed light on how much Mobile Commerce is being utilized in Saudi Arabia and how relevant it is today.

Mobile commerce is the next great retail opportunity to revolutionize trade globally. With more than 30 million apps consumers download and use through their phones or gadgets everyday, smart phones are becoming the window to the world and the only computing device a consumer may need. This research also addresses the impact social media has on the market and how it's the main communication gateway that allows consumers to share and interact on a global scale. In the last decade social media has reformed the modern commerce concept.

The focus of this research is on the adoption factors that will provide the guidance for answering the research question "what's the level of m-commerce recognition in Saudi Arabia?" The elevation of technology indicates that in the near future you would only need a phone to operate your daily activities. The pivotal role technology has on a region where more than 51% of the population has never known a world with no Internet is extremely significant. The research introduces innovative ways to downsize consumer's concerns on mobile commerce by targeting the age group that's mostly adaptive to technology.

Foldable Solar Mat

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ABSTRACT

In the mobile industry, there is a growing need for rapid charging as mobile devices are consuming more power due to the increase in their performance. Unfortunately, many of the chargers that are currently available in the market do not charge batteries fast enough or may damage them during the process. Their availability is another issue as finding a charging socket for your charger is quite a tedious job. We propose a solar powered, foldable, smart and portable charger that optimizes the charging process of a mobile battery while minimizing the risk of damaging it. The charger uses a microcontroller that varies the current depending on the temperature and current rating of the battery and provides it with the optimum charging conditions that decreases the charging time while maintaining its lifespan.

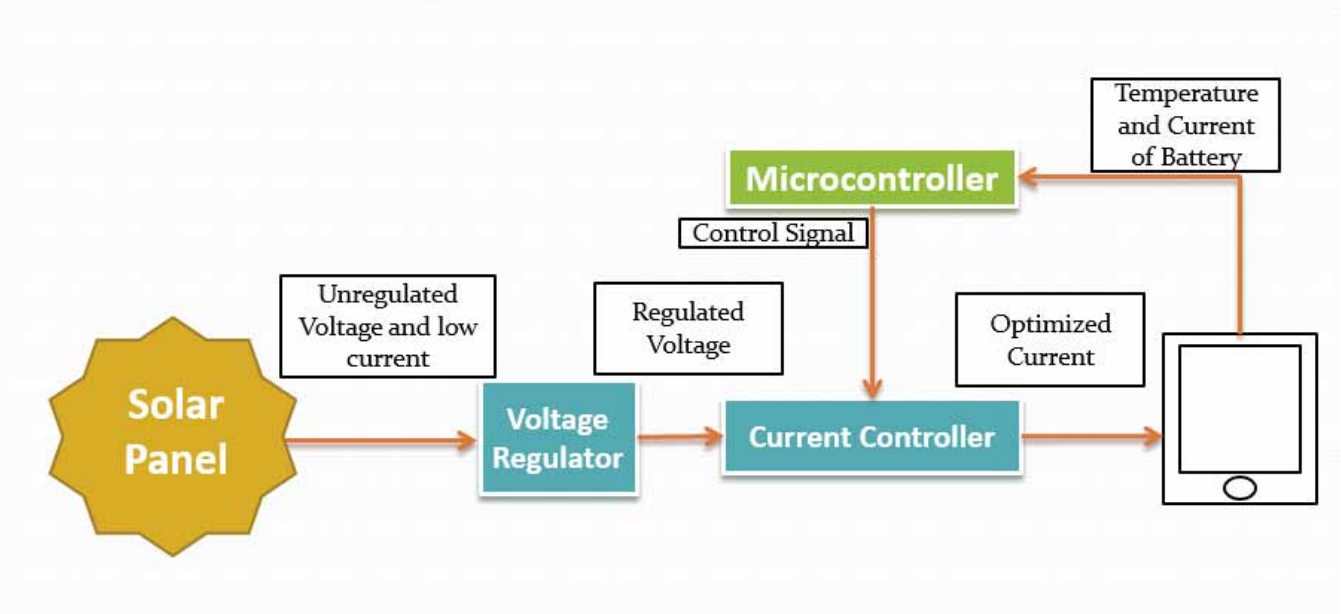

Figure 1: Displays the system model.

Keywords: smart, solar, portable, optimized charging

Live Islam Hybrid Application

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Supervised by
T.Nuha AlShugairan

ABSTRACT

Statistics have shown that number of Muslims all round the world has reached 1.6 billion Muslims And because of that the need for authentic Islamic references has increased. However need of these people in not being fulfilled as the media lacks the sources of Islamic studies and there is an increasing amount of false information that is presented to the people as well as the fact that the monitoring of what is put on the media is very poor.

The Live Islam Hybrid Application project aims to help a large portion of society and people seeking for trusted source with a complete learning environment of Islamic knowledge. It is an application developed to serve many users by supporting more than one platform in short time by using Hybrid Mobile Technology.

Live Islam Hybrid application which used web API to exchange data form Liveislam.net database in JSON format was created by using Phone-Gap that uses HTML5, CSS3, and JavaScript based on Hybrid Mobile Application.

The result shows this application enable the users to display all lectures and lessons with their places and date, also listening to the archived lectures, saving them and share them via social media. What gives this application a strong privilege is that it can be run on cross platforms, those are iOS, Android and Windows phone.

Software Design Models for Student Community System

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ABSTRACT

The need for communication in every life aspect has been increased in the last few years. Especially, the communication with the other students in the academic community becomes very important and there is an increased demand for it. This necessitates the need for a communication system that will provide a flexible and faithful environment for student to share their opinion and knowledge with their peer groups such as exchange of course materials, providing academic advising, career guidance etc. Hence this paper presents a case study highlighting the best practices for designing the above mentioned communication system for PSU Women College compared to other student community systems that are used by many universities in the Arab countries by using UML (Unified Model Language). Use Case, Class, Sequence, and Component Diagrams offered by UML are adopted for designing the system. The application of object-oriented modeling techniques for designing the system provides room for new functions to be added as well eases maintenance task. Added to, based on literature study and requirements collected from the PSU student community, a more appropriate mobile architecture is proposed that boosts the performance of the system by making it responsive in short range of times as the technology nowadays allows, and to make it user-friendly and easy to use by all the students. The quality of software design was addressed applying the known design patterns especially in improving the reusability and maintainability of the system. In the future; we will also collect information from student communities of other universities which can benefit the scalability and extendibility of our solution.

Low Cost Volumetric Display

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ABSTRACT

Three dimensional viewing of objects has become quite popular recently. Current solutions are still cumbersome as they require a person to wear visual aids and view objects through a planar "window" of a flat screen. Volumetric displays are displays that create the effect of an object occupying a space and volume which is a departure from traditional displays. Existing volumetric displays do not provide adequate fidelity to be useful and are still expensive as they require specialized hardware which hinders their large scale adoption. We propose a solution using highly integrated commodity hardware and miniaturized components to bridge the gap in the current state of volumetric display technology and thereby aid widespread adoption while maintaining a level of fidelity that allows it to be useful for consumer and non-critical professional level applications. Our system consists of a portable and inexpensive display which will show the user static 3D objects auto-stereoscopically using the principle of persistence of vision. The user can adopt their smartphone as this display, which will rotate at high speed presenting image slices of the outer surface of the object that will create the illusion of a 3-D volume occupying, rendered object.

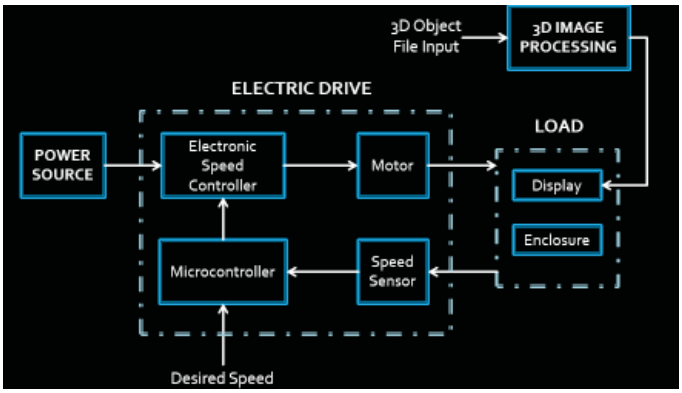

Figure 1 - Block Diagram of Proposed System

Figure 1 shows the block diagram of the proposed system. The system consists of three main components: image processing, a display device and enclosure that forms a load for the mechanical system and an electric drive and synchronization system. Images from a 3d object file are processed and stored in the display device's local memory. There is an enclosure and mount that stabilizes the device during rotation which is also equipped with a sensing system to provide feedback about rotation speed. The motor is driven by an electronic speed controller that is given commands with a microcontroller, using triggers from the sensor maintain a given speed. The system is powered by a high discharge rate lithium polymer battery.

Figure 2 - Initial Test of Prototype Displaying an Object

Figure 2 displays an initial test of the system that has not been fully implemented yet, but shows that the fundamental principle upon which the system operates applies to our implementation.

Selling Internet Data Using Hotspot Technology

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Supervised by
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ABSTRACT

Nowadays, people try to efficiently utilize all their belongings, like renting their houses when they are in vacations or renting their cars when they don't use it. From this perspective came the idea of our project; to sell your Internet data when you are not using it.

People have Internet connection in their smartphones, at home and work, they pay for the Internet connections in their smartphones through communication companies. In many cases this results in an excess amount of internet data that is not used and wasted by the end of each month. On the other hand, there are people who might be in an urgent need to get connected to the Internet, for example to send or receive an important email. Those with excess (unused) data can help those in need by selling their Internet data to them, via Hotspot, with a reasonable charge. In this case, both provider and consumer get advantages. The provider can sell his/her excess Internet data, and the consumer pays a small fee for a service he/she needs.

To address the problem described above, we are proposing to develop a mobile application using Hotspot via Wi-Fi technology. The application has to be installed on the service provider smartphone and the consumer smartphone. In the provider side, different amounts of data are specified, i.e. 500 kb for a predefined charge of 5 Riyals. When a consumer is in need of a connection, he/she opens the application on his/her mobile device, scans for nearby available providers, requests a connection, pays the charge, and gets the connection. The application calculates the amount of Internet data consumed, alerts the consumer when he/she is close to reach the limit and turn off the connection when the amount of purchased data is reached. An overview of the application architecture is illustrated in figure 1.

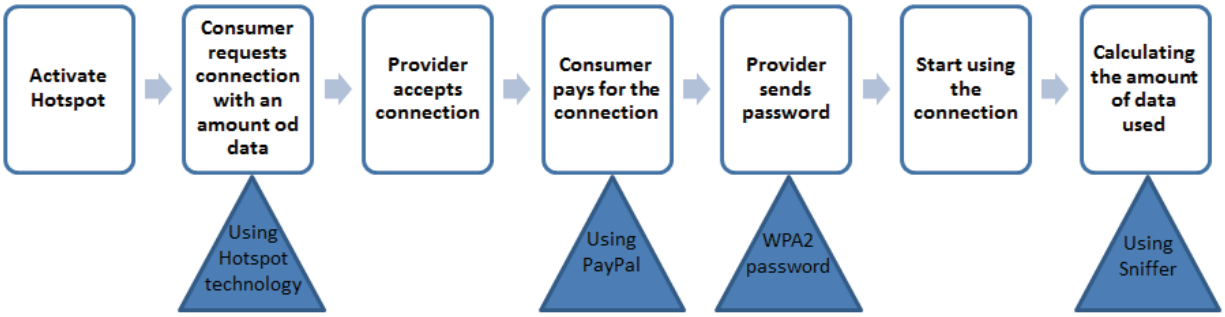

Figure 1: Application Architecture

The software technologies used to implement the proposed solution include Hotspot, JAVA, sniffer to calculate the amount of data used,WPA2 Password to protect the connection, and Android as operating system. The application will be considered successful when the provider can use its data efficiently and make some profit, and the consumer get the urgent Internet connection he/she needs.

iPlant: The Intelligent Farming System

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ABSTRACT

iPlant is a smart system that is dedicated to serve the agricultural sector in Kuwait. The system has the capability to take care of its own garden, greenhouse, by interacting with the environment around it. iPlant is a robotic system employer that is easy to use, effortless, and saves time. It has the ability to monitor and broadcast plants' state, water, nutrients and care will be dispensed on an as-needed basis. Therefore, iPlant will provide a great reduction in both the financial and physical resources.

The motivation behind developing such system is that Kuwait has a continental climate characterized by its dry and extremely hot weather led to weak agricultural production. In addition, the current methods that are used nowadays involve a long process that requires a huge amount of manual effort. Therefore, there is a need to provide a modern system that is faster, easy to use, and saves time and effort.

The main goals of iPlant project are to provide a suitable and agricultural environment, reduce the manual effort, increase the quality of the agricultural products, and to facilitate the maintenance of the greenhouse. These goals were put into actions by achieving the objectives of the project which are; constructing a smart greenhouse, designing an autonomous gardening system, implementing sensors that monitor the plants and control the surrounding environment, and finally developing a notification system.

The developed iPlant system is designed to be used in green-houses to help in providing suitable and safe agricultural environments. It is divided into two main parts as shown in figure 1. The first part is the environment controlling system that is implemented using Arduino Uno microcontroller. This system has the ability to control the environment of the green-house including the temperature/humidity by using a humidity and temperature sensor and light by using a light sensor. Moreover, it has a security system that detects smoke and sends sms to the owner. In addition, a daily report about the conditions of the green-house including the temperature and humidity status is sent to the owner. This system is developed using a GSM shield attached to the Arduino board. The second part is a line moving robot implemented using the first Kuwaiti microcontroller E-Robot. The robot is capable of performing two main tasks, which are planting and watering the soil. It is equipped with a specifically designed tool that capable to plow, seeds placement, and excavation of soil. Moreover, it is provided a specially designed sensor to checks the soil moisture, which is attached to its DC water pump in order to water plants.

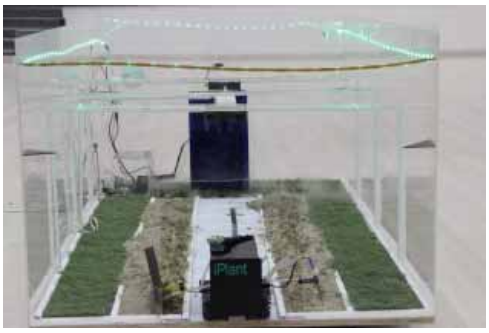

Figure (1) iPlant System

At the end, the purpose of this paper is to introduce iPlant which is a modern mechanism that is dedicated specifically to serve the agricultural sector and solve its main issues. The greenhouse was smartly designed so that it automatically rebalances the atmosphere, securing the environment and maintains an almost perfect environment. The moving robot on the other hand, can effectively sense the soil moisture level and water the plants correspondingly and the custom made planting tool helped in reducing the planting time and enhanced its performance.

Offering Home Subscriber Server as a Virtualized Service

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ABSTRACT

Home Subscriber Server (HSS) is the main database in the telecommunication networks. It contains subscriber-related information, such as the authentication information and the list of services each user is subscribed to. As the number of subscribers increase, the used HSS needs to be extended, which may be too costly. It may necessitate acquiring, installing, and managing new HSS nodes. The new nodes should also be integrated with the existing ones.

The objective of this work is to provide HSS as a virtualized service. In computing, virtualization is a broad concept that refers to the abstraction of computer resources. Offering HSS as a virtualized service will bring several advantages including deployment and management costs reduction. The network operator can easily instantiate a new HSS or extend the one he has without having to acquire new hardware. The management of such instance can also be delegated to the virtual HSS provider. Other examples of advantages are: increasing elasticity, efficient use of resources, and reducing cost through paying for resources used only.

Figure 1 shows our virtualization architecture. The layer in the middle provides an infrastructure (with the necessary tools and interfaces) that will allow the creation of the needed virtual-HSS instances, with the required characteristics (e.g. disc space and processing power). The actual physical resources that are used by each virtual HSS instance are hidden from the Virtual HSS user. A given instance can rely on one or more physical data stores, and may share the same or part of the data stores with another instance.

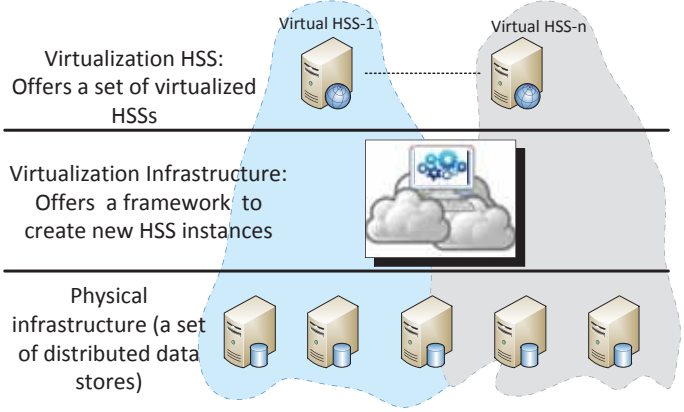

Figure 1: Our virtualization architecture

To implement this architecture, the Denodo platform was used. Denodo platform is a data virtualization platform that enables the integration of data of different types, presented in any format, and located anywhere, inside the organization or outside in the Web/Cloud. The Denodo platform is used as basis for the implementation of the virtualization layer. It currently communicates with a MySQL server in the physical layer, and our objective is to extend the implementation to a number of database servers that will be installed in different machines. The platform receives instantiation requests and creates new database instances in MySQL server. It also hides the created databases from the users and offers a unified access to the stored data.

Analyzing and Managing Infantile Syndrome Data

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ABSTRACT

The context of our project is analyzing and managing Infantile Syndrome Data. Children who suffer from down syndromes have been subjected to a genetic disorder during fetus development stages and these disorders have a huge effect on the child's health and mentality. In fact, it was found that 3.17% is the rate of children with down syndromes in UAE which is considered a one of the highest rates in the world. Moreover, clinical genetic expertise is rare in UAE which make early detection of down syndromes difficult. Therefore, this project is a contribution towards an easy, simple and cheap process for detecting infantile syndrome.

The project takes into account many aspects in which it provides an end to end service starting off by the forms that parents fill out till results reach the parent again. In the first step parent will be asked to register on our website to get an account for logging in which this will provide a first line of security for our system. Then, when parent log in they will be allowed to insert data and personal information about themselves and their children in which those info will be directly stored on our server once they click the finish button. On the server side, the each patient will be given a unique ID that encrypts his/her information. Our server is based on server- client architecture in which we used XAMPP database along with PHP language to formulate it.

Furthermore, this project focus on using 3D scans rather than 2D as they give accurate results and allow identifying face from range of viewing angles. When a new scan of patient is taken the system will perform an automated process (in which system was trained to perform it using MatLab) of selecting landmarks and compare them with the existing model image for giving the final result (i.e. whether the child is having/developing a down syndrome or not). In addition to that, saliva test result will be made by one of the server provider in which it will genetically assure or deny the presence of that syndrome. Moreover, the software uses "gedcom" to connects family members together creating a family tree structure. The created relationships will help in diagnosing the patient when several members in his family were previously diagnosed with the same genetic disorder.

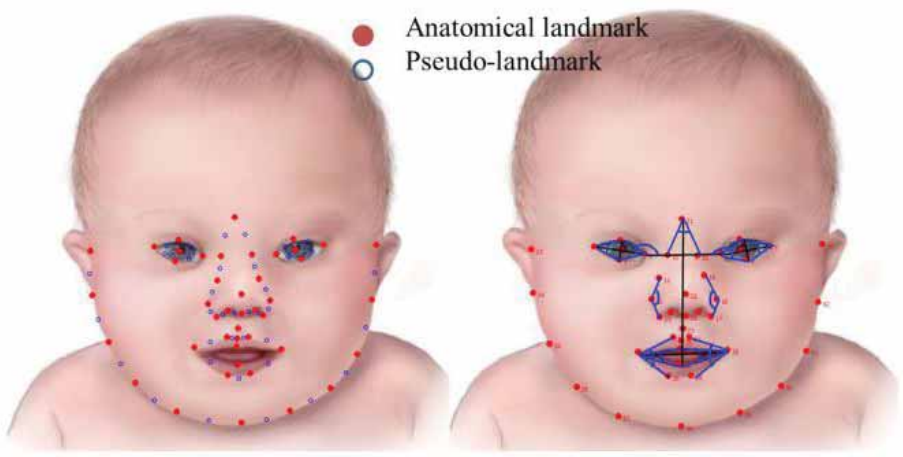

Figure 1: Illustration of facial landmarks

Alzheimer Interactive Care Application

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Supervised by
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ABSTRACT

Alzheimer is disease that has disseminated dramatically in recent years. Alzheimer's patients are an important segment of society that need special care and concern. In line with the applications development and emerged services that have the ability to solve and deal with many of the social problems; we decided to develop a mobile application that serves Alzheimer's patients and their caregivers specifically to help in limiting the development of disease's symptoms and to offer necessary help to both patients and caregivers. Through the research, surveys, and questionnaires that targeted patients with Alzheimer disease and their caregivers, it showed that these patients and their caregivers face many problems, such as tracking the patients' locations, and dealing with daily patients' activities such as appointments, medications and entertainment. In addition, caregivers have large burdens that they carry without any help, such as dealing with the patient during difficult situations and managing emergency cases.

From this point, we were able to extract the features and functions that are needed in order to accurately meet the needs of this segment of society. The application contains two interfaces: patient interface and caregiver interface As shown in figures from A to D, and each of them has specific functions. The caregiver interface will provide to the caregivers the ability to communicate with each other in a special network in an easy way through the applications features that aim to facilitate getting adequate help when needed. This function got a high percentage as much as 97% by the caregivers.
This network will be accessed from the caregiver interface that will enable all caregivers to register for this application by providing specific information such as the current location and the patient's stage of disease to help the registered caregiver to communicate. In this network each caregiver can post a new comment or question so that all caregivers who have the same case of patient's stage of disease can get benefit from that. The application will also allow caregivers to post any event such as a conference, symposium. Recommender algorithm will be used to give the users good suggested advices or results for raised questions and will help the users in setting up their preferences with peer with whom they will communicate.

In addition, the caregiver interface will allow caregivers to trace the patient in case they leave the house or get lost by determine the safe zone and some of safe points. The implementing of this function is a solution to the loss of patient problem that got 57% of the problems that burden the caregiver. In the result of the researches, this solution got 78% by the caregivers.The application will utilize the current location of the patient which obtained from GPS and the fixed center of the geo-fence of safe zone to calculate the distance. For calculating this distance we use the Create Circle Algorithm .If the patient out the safe zone, the application will trigger the caregiver and suggest the nearest safe point (home of patient's son /hospital) in order to enable the caregiver to make call and to find the patient.

The caregivers also can organize a day-to-day scheduling that allow to record the important appointments or the arrangement of a daily tasks for the patient to remember the caregiver by it. This function got 56% by the caregivers. The results of survey also shows that, the old memories will help the patient to revive and refresh his memory by 62%, especially show images by 52%. According to these results, the patient interface will contain some easy games that help the patient in refreshing and energizing the memory. The patient interface also will contain some old images and videos that help in reviving the memory

Figure A: caregiver interface

Figure B: Social network interface

Figure C: tracking interface

Figure D: Patient interface

Automatic Electric Meter Reading System Based on Image Processing

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Supervised by
DR. Lamiaa Elrefaei

ABSTRACT

In Saudi Arabia, electric meter reading is done manually by the electricity company employee who writes down the meter reading on paper forms or types them into the meter reader device, then he gives the paper forms or the device to the company where the billing system users type the readings into the billing system. This existing mechanism has a lot of disadvantages for both the employee and the billing system users. It's tedious, time consuming, wastes manpower and prone to a lot of errors. This leads some of the employees to assume the reading rather than actually check the meter reading, and thus provide unreliable consumption cost calculation. For the billing system users, the users receive huge number of papers every day containing the meter readings for all the consumers' meters, and entering these data manually into the billing system is really tiring, and could lead to a lot of errors on the consumers' bills. Also, the meter reader device is heavy, needs to be charged, and needs a long training period.

This work aims to facilitate the electric meter reading mechanism for electricity company's employees. We introduce a methodology based on image processing to obtain efficiently and accurately reading of the electricity meter. The proposed solution is to develop a mobile application that uses an image of the electricity meter reading acquired by the electricity company employees with their phone cameras. The employee enters the subscription number assigned for the meter he wants to read then he takes a photo of the meter reading, the application then applies a sequence of image processing functions to automatically extract the digits of the meter reading image. This image goes through three main stages as shown in figure 1. The first stage is the preprocessing which includes: filtering the image to remove the noise, converting the RGB image to a grayscale image, convert the grayscale image to a binary image, and cropping the numeric area. The second stage is the detection of the individual digits using vertical edge detection algorithm, which segments the cropped numeric area image to distinguish the beginning and the end of each character. The third stage is the recognition of the digits by comparing each segment with the digits templates then recognizing the digit of each segment. After that, the meter reading is sent automatically to the company server along with the subscription number. The application is tested using clear and unclear photos of the meter reading. When the photo is unclear the application asks the employee to retake the photo, otherwise it extracts the digits successfully. Also, this application provides additional features which help the employee to do his work easier. It allows the employee to report a problem of a specific meter, search about any meter, and save the meter location.

As a result, this application will produce an efficient and reliable meter reading, reduce the effort on the electricity company employees and the billing system users, reduce the errors could happen in the existing manual meter reading method, and shorten meter read time. In addition, it will prevent the employee from entering any assumed number for the meter reading without actually checking the meter, and this could be achieved by accepting only images of the meter reading taken at the time and not uploaded from the phone database

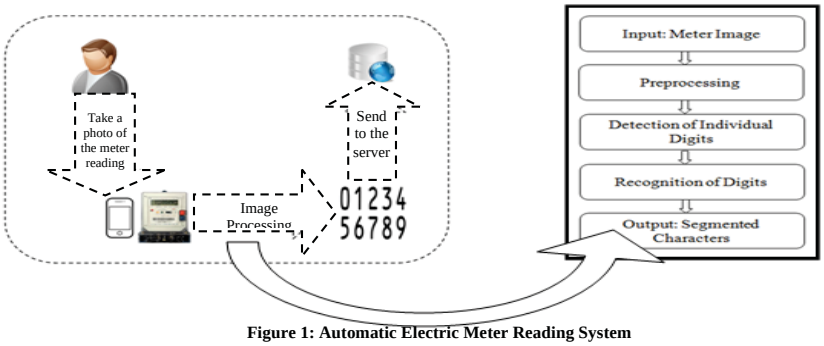

Figure 1: Automatic Electric Meter Reading System

Fault Tolerant Control Laws for a Combat Aircraft

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ABSTRACT

High reliable and safe control systems are strongly required in industrial activities and especially in aviation. These systems are complex because they involve many parts and take into account lots of different mechanical, electrical and control aspects. One of the main functionality of those control systems is to automatically react in case of faults and keep the system stable as much as possible. Generally, a fault is an undesirable deviation of at least one characteristic, property or parameter of the system from the acceptable, usual or standard condition. A fault in aviation such as blocking of an actuator or sensor damage may lead to the loss of several functions at different levels that may cause critical damages. The fault tolerant control laws for a combat aircraft project is designed with 6 degrees of freedom to maintain desirable performance and stability in the event of fault. It aims to study academic innovative concept of non-linear flight control laws, considering the possibility of failure/damage occurring on some of the sub-systems supporting the flight control function like actuators and sensors. The aircraft designed (delta-wing model) exhibits most of the main characteristics of a modern combat aircraft such as bounded actuators, instabilities and deficiencies in control effectiveness.

As this study is a preliminarily focus on the longitudinal movement of the aircraft, the number of aerodynamic control surfaces is limited to two pairs of elevons (internal/external right and internal/external left) as shown in **Figure 1**. The objectives of this work are to design, test, and implement an algorithm which is able to detect the fault when it happens, identify this fault, and adjust the control law to keep the airplane flying with acceptable performance despite the presence of that fault. In addition, the parameters of the control scheme are to be tuned to match the control requirements, taking into consideration the eventuality of a failure and the maximum deflection rate and position limits for both pairs of elevons. Also, tuning the controller parameters affects the angle of attack α which is defined as the orientation of the air velocity vector with respect to the aircraft frame and is widely affecting the motion of the aircraft (the greater the angle of attack, the greater is the lift, up to a certain limit). The study is done on faults that happen in five flight points shown in **Figure 2** at different heights (in feet) and speeds (in Mach) for each pair of elevons. **Figure 3** shows the significant difference of the behavior of the aircraft when the fault compensation is disabled (in red) and when it is enabled (in green) compared to the fault free case (in blue). A first work has focused on developing the technique for one flight point using the Matlab/Simulink R2013b software. Then the performance of the airplane in the presence of faults has been analyzed for the other flight points shown in **Figure 2**. This work is done in the framework of a research project funded by the French aircrafts manufacturer Dassault-Aviation.

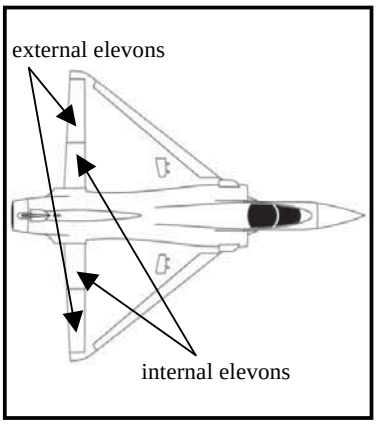

Figure 1: External and internal elevons of the combat aircraft

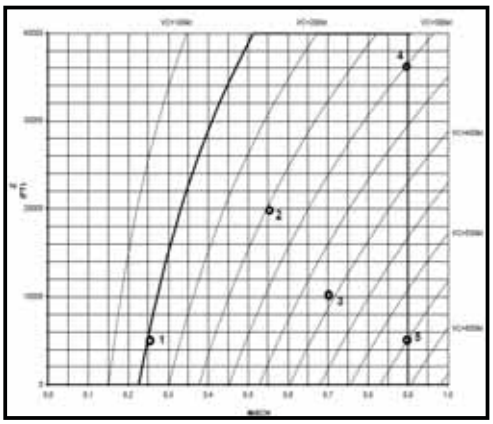

Figure 2: Flight points of the aircraft

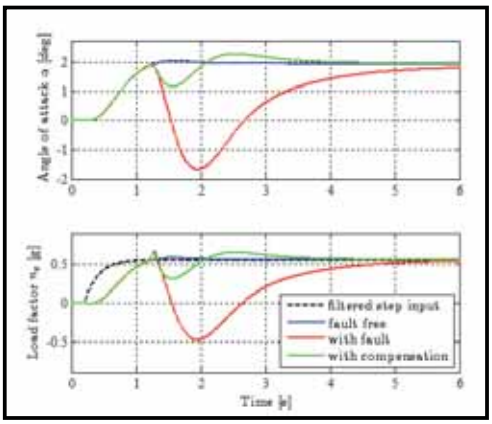

Figure 3: Behavior of the aircraft with and without the fault compensation

Evaluating the effectiveness of using Brainwaves for User Authentication

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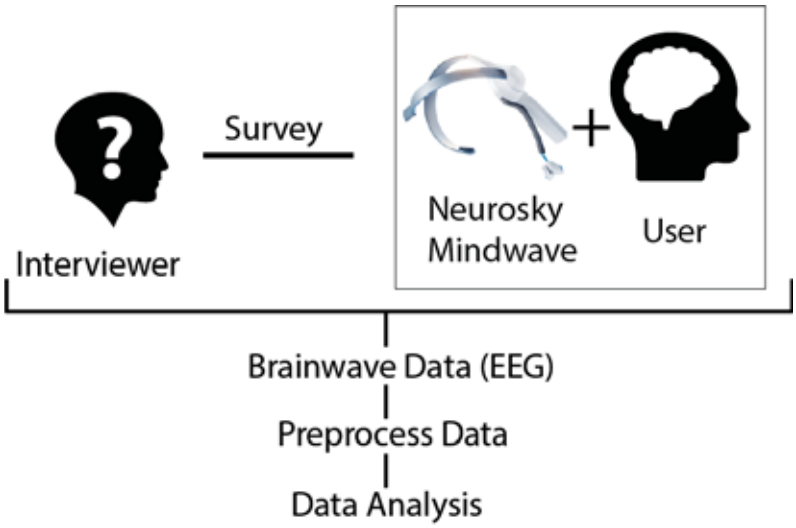
Supervised by
Dr. Mohammed Misbhauddin

ABSTRACT

Identity and Access Management (IAM) is an area under the umbrella of security that ensures appropriate access to resources by the right individuals. This is an important area of concern for any enterprise. The recent exposure of the Heartbleed vulnerability raises a major concern over the existing identity and access management initiatives in place. Despite the obvious issued raised in the past, the most common choice for user authentication is still text passwords as they are easy to implement, cost-effective and have high familiarity with all types of users. Numerous alternate methods of user authentication have been proposed in literature. All these methods can be generally classified into three basic categories: (1) Knowledge-based approaches (something you know), (2) Ownership-based approaches (something you have) and (3) Inherence-based approaches (something you are). The main idea behind knowledge-based approaches is that there is a secret and the knowledge and recall of this secret authenticates the user. Ownership-based approaches rely on authenticating a user based on an object/thing that the user must have on them. Finally, inherence-based approaches are based on features or traits that are intrinsic to the user themselves. Furthermore, biometrics data can be either behavioral or physical. With the recent highlight of the Heartbleed vulnerability, it has become crucial to re-evaluate our authentication approaches and to propose a secure and usable method. Brain-Computer Interface is a type of human-computer interaction that uses electroencephalograph (EEG) signals to help communicate with the outside world. In this research paper, we study the performance effectiveness of using brainwaves for user authentication which is a multi-modal authentication approach using both inherence and knowledge based approach together.



Keeping in mind the trend for wearable computing and need for low-cost EEG sensors, we used a consumer grade EEG headset (MindWave Mobile from NeuroSky) to capture and study brainwave signals from our test subjects. Ten student subjects from our college were selected to participate in the study. A set of five mental tasks were prepared including movement simulation, recitation, audio task, counting task and pass-thought task. Each subject repeated the tasks five times in two sessions. A total of 500 samples were collected and analyzed as part of the experiment. This research builds on the research of a group of HCI researchers based in UC Berkeley. In our work, we initially evaluated the accuracy of authentication in a subject pool much wider than those published using both single and multi-channel EEG signals. Although the authentication accuracy level has been a little lower than the reported ones, we have identified interesting open issues that will help us develop customized set of tasks for improving the overall accuracy. We believe that using mental tasks based on the domain of application will improve the recall ability of the users and hence, result in improved accuracy. We also evaluated the robustness of using brainwaves for authentication by simulating impersonation attacks.

Intelligent E-Supermarket System (IEMS)

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ABSTRACT

In Recent years, marketing environment, including supermarkets, seeks to apply new technologies for marketing actions as a target to facilitate the shopping process for each of the staffs and consumers. Such new technology will enhance the shopping mechanism and facilitate the customers' needs in an effective way. This implies the attitude of the consuming societies toward the daily shopping needs to change. Such changes could be implemented by adopting an intelligent system which is actually useful to support marketing actions. The idea of adopting an intelligent system for the e-shopping system is a useful to automate the process of marketing actions with the goal of avoiding the problems of the current version of shopping processes. In this vein, the present paper tries to find good solutions to the traditional retail shop by proposing a new intelligence system titled Intelligent e-Supermarket System (IEMS).

An Intelligent e-Supermarket System (IEMS) is a system for providing different options of supermarkets available in Oman in a website, so they can exhibit their products and let customers to shop online. The purpose of this system is to simplify the shopping process as much as possible and save customer's money, efforts, and time. IEMS also aims to enable the customers to choose any supermarket to shop from, view, search or buy products, and decide freely the way of getting the order. Moreover, it keeps tracking of each supermarket as well as responds to any updates. Google Erath service will be connected to IEMS, so customers can simply look for an adjacent supermarket to shop from. They can also able to search about products and compare prices of any products with all similar products available in other supermarkets.

In addition, IEMS will provide intelligent services as a tool in the IEMS website which will be a useful for both customers and companies. Such intelligent services will extract the hidden information and predict the customers' future behavior and their requirements. Nevertheless, to reach a degree of automatic processing by the suggested intelligent tools, Data clustering technique will be adopted in the infrastructure of our suggested tool. The benefits of the suggested tool are to answer business questions which were expensive process as in the traditional retail shop. And by using such tools will improve shopping efficiency and on the same time such system will have an effective and rapid response to customer needs. Also, the provision of such tools will aid to increase the supermarkets profit through establishing a good relationship with permanent customers by studying their requirements. This will highly raise up the supermarkets profits since they can treat those ideas with their suitable solutions. The suggested tool will adopt a new technique to clustering customers' data titled Scatter-K-mean. Scatter-K-mean is a new technique which combine one of the Evolutionary Algorithm which is Scatter Search Algorithm with K-Mean.

IEMS will be developed with one database which is built within web applications by employing XAMPP.

Keywords: Data Mining, E-commerce, Web Application.

Adaptive Location-Aware Robot Navigation with Obstacle Detection

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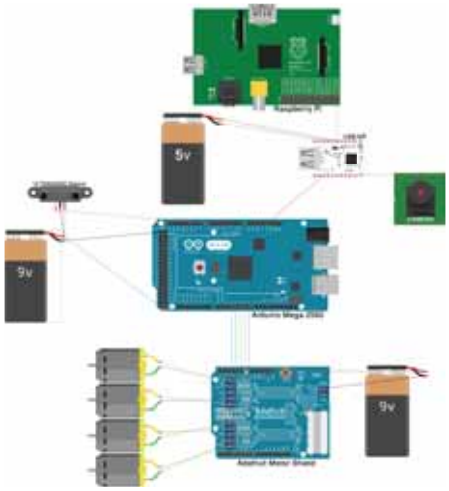
Supervised by
Dr. Mohammed Misbhauddin

ABSTRACT

Perceptual capability is a key factor that differentiates human navigation from robotic navigation. Humans can detect, classify, and identify environmental conditions and use it to their advantage for localization and navigation. Although, significant research is being done to improve robotic navigational performance through use of emerging technologies, search for a low risk and cost-effective solution is still underway.



When it comes to navigation of robots, there are numerous challenges that are faced by practitioners. In robotics, positioning and localization of a robot is an important issue. Continuous research is hence conducted in developing techniques and approaches for object identification and object localization. Object localization is where the object is on the map or how to get information about the position of the object. In the last couple of years, a term called “Internet of Things” (IOT) has come to rise which simply implies various devices communicating with each other to accomplish tasks. According to a recent research conducted by ABI Research, more than 30 billion devices will wirelessly connect to the Internet of Things by the year 2020.

One technology that is getting popularity with regards to enabling IOT is Bluetooth Low Energy (BLE) also known as Bluetooth Smart. BLE is an extension of the classic Bluetooth technology that broadcast and receive tiny bursts of information within short distances. BLE is a new class of low-powered, low-cost transmitters that can notify nearby BLE-equipped devices of their presence. In this research paper, we propose the use of location-aware and sensor technology for autonomous robot navigation. Our proposed approach makes use of BLE beacons strategically placed at different locations broadcasting their position information via the Bluetooth Smart protocol. The robot equipped with a Bluetooth receiver detects these beacons and performs some action based on the proximity with the beacons. In order to complete our approach, we integrated sensor technology within our robot so that it can navigate by detecting and avoiding obstacles in its path. Obstacles can be classified as stationary or moving. In our proposed approach, we use ultrasonic sensors mounted on the robot to detect stationary obstacles. Moving obstacles are detected and avoided by making use of an overhead camera mounted on top of the robot. The main component, the robot, is constructed using a Microcontroller Arduino Mega 2560 along with a Microcomputer Raspberry Pi. Sensors (BLE, Ultrasound) and camera mounted on the microcontroller communicate the obstacle and position information back to the microcomputer which then processes this information based on our proposed navigation algorithm. The navigation decision is then transmitted back to the microcontroller for controlling the robot. The performance of this proposed method was tested in different environment setup with different level and forms of obstacles. It was evident from the results that the robot can navigate from any beacon to another if not directly then by using another beacon that is in between. The only issue that was identified with navigation was when the robot could not detect the signal of a beacon placed too far from its range.

BioMed e-Learn: Smart Tutor for Biomedical Courses

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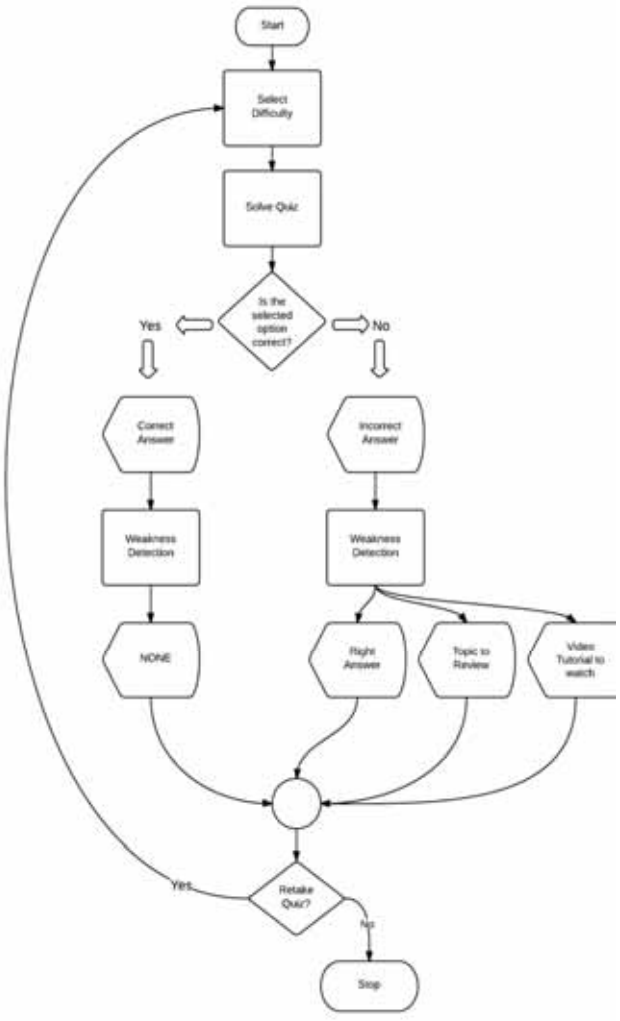
ABSTRACT

Biomedical Engineering (BME) is a relatively new science. An introductory human anatomy and human physiology courses are given in the first and second year of the study at the BME colleges. Majority of the students enrolled in BME program have taken pre-engineering subjects in their high-schools and therefore they have limited knowledge in anatomy and physiology; which are the fundamental courses in BME discipline, hence they struggle throughout the course in acquiring the concepts.

Contemporary solutions consists of traditional teaching approaches which consists of instructor-led methods like classrooms and existing laboratories. These conventional approaches are insufficient to address the problems mentioned above. Analyzing student's weaknesses and misconceptions based on students surveys and feedback, we came to a conclusion that the solution to the stated problems is the adoption and implementation of e-learning techniques both by the educators and the pupils. E-learning technologies offer learners control over content, learning sequence, pace of learning, time and often media, allowing them to tailor their experiences to meet their personal learning objectives.

BioMed e-Learn (BMeL) is an e-learning smart software solution designed and developed specifically for BME courses which provides learning experiences to their in-class analogues and can enable learning without most of the overhead inherent in traditional teaching methodologies. BMeL will aid the students to grasp the core concepts in anatomy and physiology and lay strong foundation in BME. Aids the instructors to alter the course and the teaching methodology based on the student assessment through BMeL. Some of the key features of BMeL are:

- Presentations – created using Microsoft PowerPoint. Covering vast number of topics from human anatomy and human physiology in a lucid English to build the core concepts. These presentations allows the students/users the flexibility and ease of learning.
- Video tutorials – connected to YouTube database. The comprehensive list of tutorials covers all topics covered in presentations of different tutors and experts currently teaching the biomedical courses.
- Experiments – based on Multisim and Proteus. These are designed to facilitate the students enrolled in courses like medical electronics, electro physiology and biomedical design. These experiments will bridge the gap between their theoretical knowledge and practical skills on simulation programs.
- Smart Quizzes – created using Visual C# - windows form application. These quizzes are designed to detect the students/users weaknesses in specific topics, monitors their progress and provides additional support in the form of video tutorials and presentations to master the relevant concepts in human anatomy and human physiology.



BMeL is a one-stop solution for the students/ users. A website has also been developed which integrates with BMeL to provide online assistance to students/users with their queries and doubts. It provides a platform to interact with other pupil and a forum to have discussions and expert opinions.

Microcontroller Based Wireless Two Dimensional Sun Tracker

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ABSTRACT

In the present work, a wireless two dimensional microcontroller based sun tracker is designed and implemented. Controlling and recording features are fully obtained in the present system using an efficient programming environment. Design equations, which are implemented, allow the usage of the system anywhere anytime without extra hardware tracking circuits. The sun tracker continuously calculates the photovoltaic module's tilt and azimuth angles by using accurate sun movement equations. The system generates the motors controlling signals to allocate the photovoltaic module to receive the maximize amount of solar energy on its surface from sunrise to sunset. For monitoring purpose the output of the photovoltaic module is wirelessly transmitted to the local monitoring system where the data can be accurately recorded and analyzed. The components of our suggested system are shown in Fig..1, the flowchart of the controlling program is shown in Fig.2, the monitoring and controlling front panel is shown in fig.3, and the overall implemented final system is shown in fig.4.

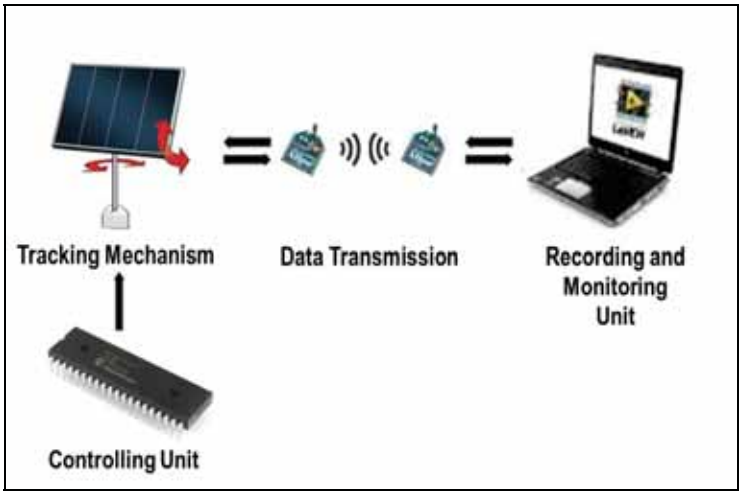

Fig.1 System Block diagram

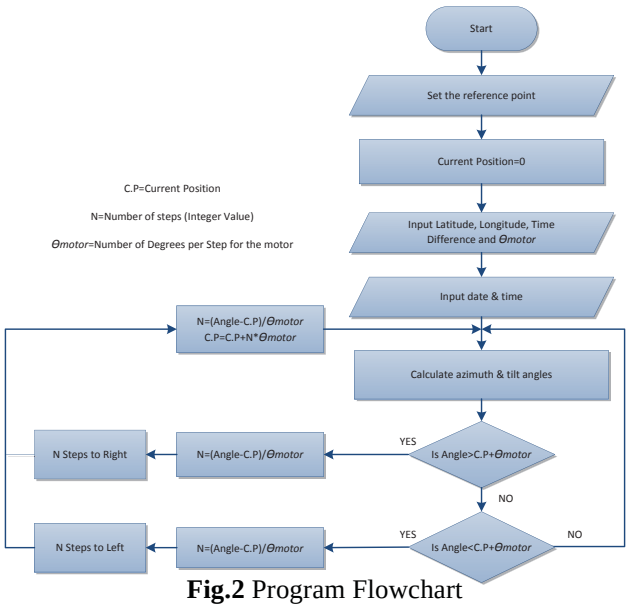

Fig.2 Program Flowchart

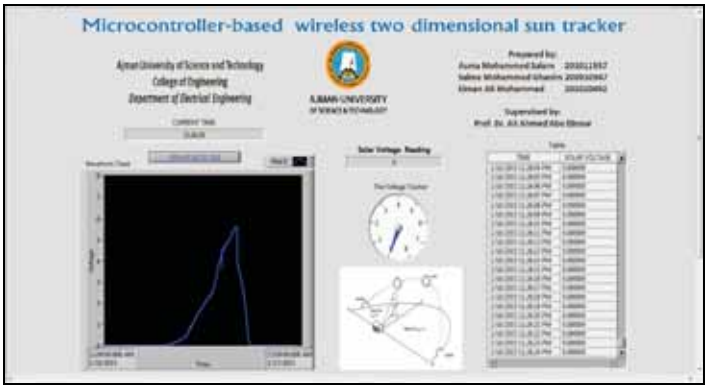

Fig.1 System Front Panel

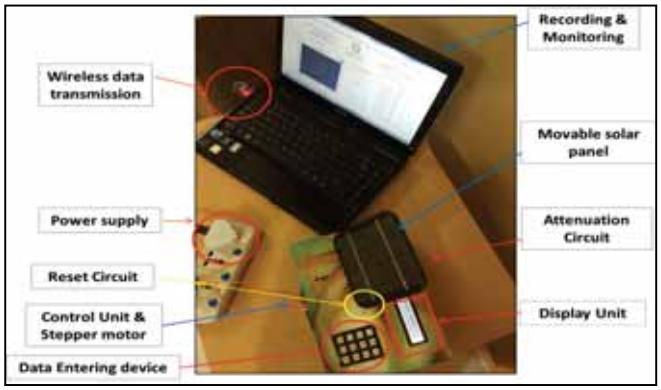

Fig.4 Final System

The present system is successfully implemented and tested under realistic to approve the tracking accuracy and ability to work over long time periods. The mechanical system implemented in the present work fulfils the requirement of small to medium module sizes. For larger system, the system has the flexibility to be modified to generate the design motor controlling signals according to the user's requirements

Automated Crowd Monitoring System in Public Places

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ABSTRACT

Due to the rapid growth in the world's population and the increase in the number of places where crowds exist and the security threats related to this increase, researchers are investing more time and effort in studying the crowd phenomenon from social, psychological and computational perspective. In this work, we focus on the image processing and computer vision techniques employed for crowd monitoring and analysis. Specifically, we are interested in studying the video recordings of security cameras monitoring crowded public places where the chances for stochastic actions are high due to human interactions and behaviors. Other challenges arise when there is occlusion, noise, soothing crowds and the monitoring cameras cannot capture a complete and clear pose of the scene currently happening. Thus we have parts of human faces, bodies moving but not appearing completely in the video sequence. So, working in this field is very challenging. Moreover, there is a wide range of problems on which researchers can focus. Examples include looking for any suspected/wanted people, detection of violence, traffic accidents, people running fast, etc. Our work looks for anomalies in the social model forming the general view of the scene. To be more precise, we are interested in studying any unusual sudden massive movement. This can be detected with the help of the so-called "optical flow estimation" of N consecutive frames. This work aims to provide a set of optimizations and improvements to the performance and accuracy levels of optical flow computed for small dynamic objects under the conditions of low quality recordings and bad illumination, the results are compared to subsequent approaches and tests. To get an idea of the challenges we face, consider the below figure. It contains two frames taken from a video recording of a bus and a man walking towards it. Apparently, the video is of low frame rate (12frames/second). This (in addition to the cloudy weather) causes objects in the video to appear blurry with the pixels containing random noise due to the lighting conditions and digital camera noise. Such conditions make our work more challenging.

Figure 1: Example of noisy frames used in testing

SAMA: A Sign Language Learning Application

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ABSTRACT

There are 360 millions of people with hearing disability in the world, majority of whom are deaf from birth and others have become deaf due to extenuating factors or before learning to speak (N°300, March 2015). Hearing impairment, as it is commonly known, results in delayed learning and lack of proper communication skills. The effects are daunting as it affects all facets of their lives. Researchers and educators alike strongly suggest that communication is a key tool of survival for those persons with hearing impairment (Zapien, July 15, 1998). The problem, however, is many-folds. Even if they understand sign language, majority of people in the world lack the skill to properly communicate with the hearing impaired. This usually leads to segregation of the persons with the hearing disability from the society (Andrew J. Oxenham, 2008 Fall). Most schools lack adequate curriculum to educate children with hearing disability, and most teachers and students lack appropriate skills to communicate with these students.

Over the decades, technological advancement has made it possible to create applications that have begun to help in bridging the gap between the hearing impaired and the world around them. Cochlear implants, hearing aids and such are some examples of technology that has helped enhance the quality of life for the hearing impaired. However, most of the existing technology, and assistive technology tend to refer to hardware devices with supporting software (kevin cullen, 2012). Furthermore, most existing assistive technologies are meant specifically for the hearing impaired or for persons involved in educating hearing impaired (Benedict, n.d.). Research suggests that there exists a gap between the hearing impaired and the greater society. There is a need for such a technology that is dynamic and will evolve and help both hearing impaired and others in learning sign languages in order to better integrate people with hearing disability into the society, workplaces and schools.

The team proposes to develop just such an application, called SAMA which is proposed to be a dynamic learning system that is designed to help in learning sign language. The system aims to support educational needs of both hearing and non-hearing impaired people. The system is dynamic and interactive, which will allow teachers or schools and even organizations the freedom to create their own curriculum for teaching sign language and tailor it to their audience. The system has adopted the use of Microsoft Kinect sensor for recording user gestures. SAMA is developed using C# in Microsoft Visual Studio.Net 2013 environment to develop a user interface while the Database is designed using MySQL. The architecture of the system is depicted as a model in the figure 1.

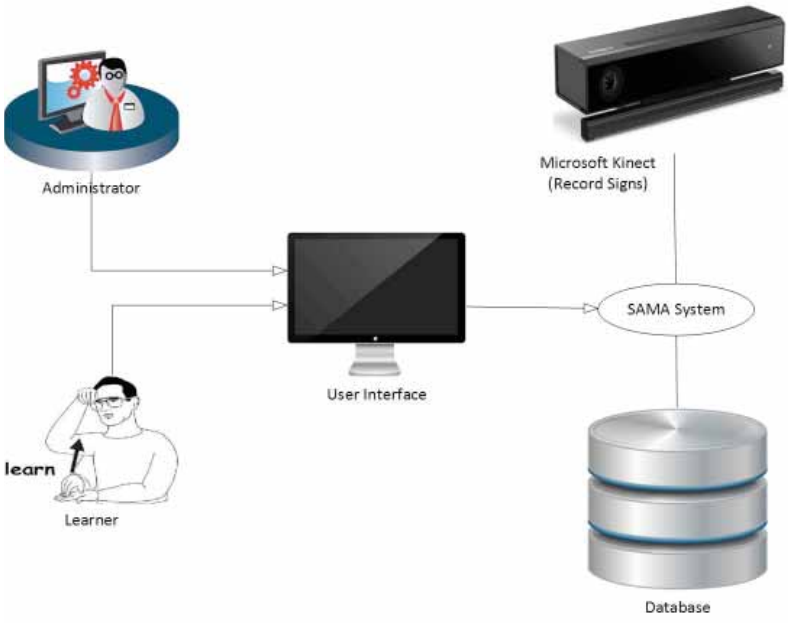

Figure 1: System Architecture

The aim of the system is to create a seamless learning experience for the people of all ages and enable proper communication between them and the hearing impaired. It also aims to reduce the segregation faced by the hearing impaired by giving them opportunities to learn and work in an environment where most people understand their first language (sign language).

Mining Tweets to develop a Disease Outbreak Notification System

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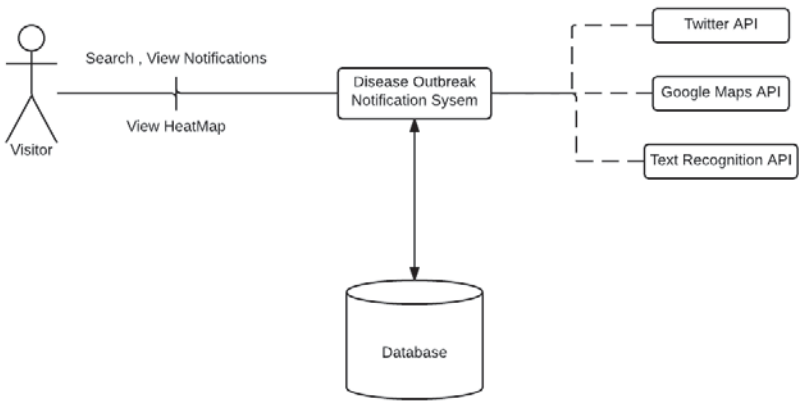
Supervised by
Dr. Mohammed Misbhauddin

ABSTRACT

Disease outbreaks are becoming a primary concern for many countries due to the recent cases of SARS, MERS, and Ebola to name a few. Preventive measures can be taken into account when proper information about an outbreak is disseminated among the masses. Social media has been playing a crucial role, as a primary channel of communication, during disease outbreaks. With the recent advancement in physical computing and Internet of Things, social media can be thought of as an organic sensor network reporting activities and events around them. In this study, we used Twitter to mine and extract disease outbreak information. A number of studies have been conducted in the past five years analyzing twitter feeds to extract meaningful information for public health applications. According to a recent survey, Saudi Arabia topped worldwide in terms of twitter usage. Taking into consideration the popularity of twitter in Saudi Arabia and the recent outbreaks of multiple infectious diseases in the Kingdom in the past year, we decided to study the effectiveness of mining and using twitter feeds for identification and notification of disease outbreaks. In order to establish a proper scope for our work, we analyzed a number of tweets restricting our search to the recent crisis of disease outbreaks in the Kingdom. Our initial experiment helped us in identifying a number of issues related to mining twitter for disease information. Major concerns include, filtering noisy information from the tweets, establishing a robust dictionary of terms to be used to identify disease outbreaks, sentiment analysis to understand the tone of the tweets, and establishing authenticity using frequency analysis. Based on the outcomes of the preliminary study we developed a framework for mining and extracting information from twitter. Our proposed approach uses the Twitter Search and Streaming API. The Search API allows the user to query against the indices of recent or popular tweets and behaves similarly to, but not exactly like the Search feature available in Twitter mobile or web clients. In our work, we used the Search API to identify keywords from past diseases as this information depends on past events and do not require querying the Streaming API. The streaming API on the other hand give developers low latency access to twitter's global stream of Tweet data. The proposed approach uses a combination of an online and offline method to provide the disease outbreak information to the users. In the offline mode, the system sends terms of a known disease to the Twitter API. The returned set of tweets are analyzed and common terms are identified. These common terms are used later in the online mode to identify and classify new and unknown diseases. In the online mode, streaming tweets are mined using the keywords identified earlier and analyzed. Sentiment analysis is used to filter tweets and valid tweets are used to notify the users. Our proposed approach renders the disease notification intensity on a heatmap over the map of the region selected by the user.



Towards a Centralized Approach for Smart Government Services

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Higher Colleges of Technology, Abu Dhabi, UAE

ABSTRACT

With new trends toward smart services, governments are competing in initiating innovative solutions for public. Hundreds of governmental services Apps are available today in Apps stores. One of the main goals for smart government services is to make government available and accessible to the public 24/7 and 365 days a year. Last two years witnessed a rapid development in smart government services in UAE. Most federal and local government entities in UAE stepped into smart government initiative. Pubic today can access different government services using their smart phones. This trend led to the development of many Apps from different entities. Public who are using smart Apps to access governmental services need to use different Apps for each entity, and in some cases more than one App for the same entity. Apps users will deal with different approach in each App to request a service from smart government. Also they need to remember different accounts for each App. Today there is no unified approach for smart government services. Smart Counter is a solution proposed by the authors to establish a centralized approach for smart government services.

Smart Counter is an App that allows government customers to follow their applications with different government entities via smartphones. The App is intended to create a unified platform for government agencies to serve customers on the clock. This platform offers services that enable customers to follow up with their applications without the need for frequent visits to service centers. Smart Counter solution is proposing process re-engineering for the current process in requesting government service. In this proposal a unique code will be added to the application wither it's a paper, electronic or smart application. This code will store important information about the application like: application number, entity, department, application type, and other information. The customer will use Smart Counter App to scan application unique code and add it to his applications list. Smart Counter will provide the following services to the customer:

- User Profile: where each customer can manage his/her own account
- SmartBox: private cloud storage for customers to upload official documents like: passport copy, photo, driving license, etc. This will serve as a central repository for sharing documents with government entities, instead of keeping multiple and out dated copies with each entity.
- Follow up: Smart Counter will allow users to complete their application, by allowing them to attach required official documents to their application. Documents will be attached from user's Smart Box. Also the application will allow the user to follow the status of his/her application without the need to visit the service center. Smart Counter will provide notifications about application status.
- Ask: Smart Counter will allow users to live/voice chat with the service center
- Rate: customer can rate the service received for his application using the App

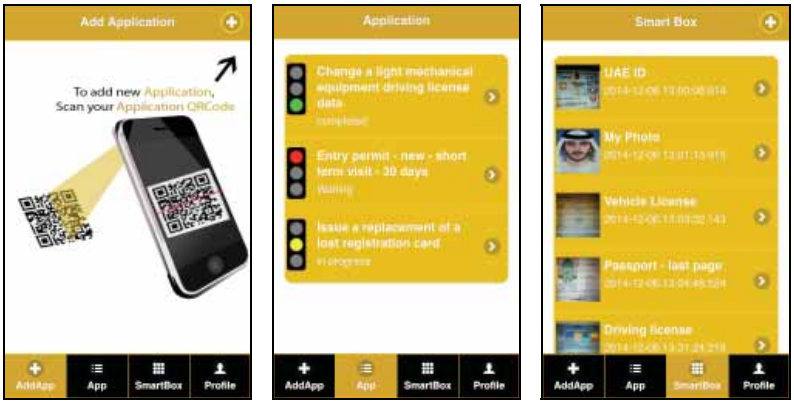

Figure 1 Proposed Solution - Sample Screens

Voice Control of Smart Home with Smart Phone for Elderly and Disabled People

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ABSTRACT

The home automation industry is one of the most growing industries which are changing and shaping the life style of many people. Although home automation industry was initially more targeting people who are looking for luxury and sophisticated requirements, it is now shifting to more fundamental and essential needs. Nowadays, automation plays an important role in today's human life and people's life is gradually changing with smart living due to rapid development in modern technology in general and in smart devices in particular. The continuous growth of smart mobile devices in recognition capabilities and enhanced functionality have led to achievements in fulfilling the optimal demand to have an advanced ubiquitous mobile applications in people's daily lives. Smart devices are now having a broad range of sophisticated education, healthcare, energy management, monitoring, control, entertainment, and smart home applications. Smart homes aim to provide enhanced convenience and comfort, energy efficiency, security and surveillance. It is claimed by market researchers that majority of homes will be outfitted with home automation systems in the very near future. Various smart home systems have been proposed where the control is via Bluetooth, internet, short message service based while some researchers have proposed voice controlled smart home system based on Microsoft speech recognition and microcontroller based voice activation. From the economical point of view, smart home controlling is one of the pioneering industries in the world. It allows people to remotely switch on/off electrical appliances, HVAC (heating, ventilation and air conditioning), security locks, etc. based on their desire. It may be implemented by several ways depending on the design of the house and the surrounding environment. Socially, smart houses are targeting elderly and disabled people which make their life much easier.

The aim of the present work is to design and implement a smart home voice control system using smart phone for elderly and disabled people. With the growing mobile software and app technology, the present system has the advantages to be low cost, easy to configure and upgrade, and easy to run. Although there have been several commercial and research projects on smart homes and voice recognition systems, the present system is considered as an integrated platform for home security, monitoring and automation. Speech recognition is the translation of spoken words into text. It is also known as automatic speech recognition, computer speech recognition, or just speech to text. Some speech recognition systems use speaker independent speech recognition while others use training where an individual speaker reads sections of text into the speech recognition system. These systems analyze the person's specific voice and use it to fine-tune the recognition of that person's speech, resulting in more accurate transcription. Systems that do not use training are called speaker-independent systems while systems that use training are called speaker-dependent systems. In our project we are using speaker-independent speech recognition to translate the speech input into written phrases which chooses an action to happen based on the programming. With a user friendly app (fig.1), the voice commands are captured and analyzed using smart device and the specific command passed wirelessly to the specified appliance. Consequently, appliances' operation are controlled based on the controlling characters (sentences) received.

Fig.1 Screen shots of the developed app to control smart home using voice commands and smart devices

The initial testes of the system confirm its ability to control any desired appliances and additional tests will be carried on to examine the system's performance limits. The present system facilitates elderly and disabled people with an easy-to-use home automation system that can be fully operated based on speech commands. The developed app is constructed in a way to allow easy installation, configuration, operation, and maintenance of the system.

Emirates Career Guide Mobile Application

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Ajman University of Science & Technology
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ABSTRACT

The fast spread of information and guidance technologies has significantly contributed in widespread use of new forms of career guidance techniques such as e-career guidance applications. While face-to-face career guidance by groups and organizations has its own advantages, their access to students is constricted to time and space. Alternative guidance solutions are needed to provide students an opportunity to know the academic field they will excel in. This paper presents Emirates Career Guidance (ECG), a mobile application that acts as a smart guidance for high school students. Its main objective is to discover an academic stream for graduated high school students based on their interests, hobbies, skills and passions. It provides an alternative support solution for current career guidance programs in order to help students in determining a suitable academic discipline and recommendation of local and international universities based on the result provided by the application.

Emirates Career Guidance (ECG) is a user-friendly interactive application. The application initially asks the user to input personal details such as Name, Country, Email Address and Location which is then saved in an excel file. The user is then navigated to main screen that comprises of a set of 10 questions covering all the aspects of a students' life. These questions provide key factors to the application such as a students' interests and hobbies in the following 5 academic streams; Arts, Engineering, Business, Law and Health Sciences. Once the smart algorithm determines the students' main stream it further pops up 5 questions that helps in the selection of sub stream. An example would be that the sub streams for Engineering are Biomedical Engineering, Electrical Engineering, Mechanical Engineering and Computer Engineering. Students then face the option of choosing "Local University" or "International University". The option "Local University" provides the user with the names of all the universities offering the stream determined by the application algorithm, starting from the ones nearest to the user's location to furthest ones based on the user's location inserted in the login screen. The option "International University" will initially ask the user to choose a country and then provide the information of all the universities offering that discipline. Survey has also being provided to students which should be taken by the end of the university selection as to get their feedback and comments on the application for future improvement. Proposed Methodology for ECG application is shown in Figure 1.

This application is designed by using Android Studio supporting numerous devices. A website has been also developed using weebly and a forum to provide online assistance to students with their questions, doubts and suggestions regarding their interested discipline on wordpress. The interesting and interactive application makes it likable by not only students but also professionals. Users have expressed gratitude and satisfaction upon using this application as it has been a beacon of light through their journey from high school to university. The application is tested on 45 students from multinational backgrounds from a variety of different schools. Summary of the result of 6 students is shown in Figure 2.

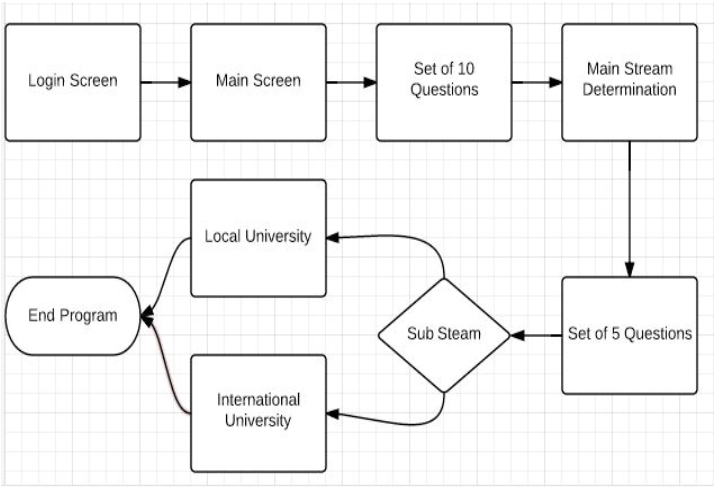

Fig. 1: Proposed Methodology

Student No	Main Stream	Sub Stream	University
1	Health Sciences	Doctor of Dental Surgery	Gulf Medical University
2	Engineering	Bachelor of Biomedical Engineering	Ajman University of Science and Technology
3	Health Sciences	Bachelor of Pharmacy	Ajman University of Science and Technology
4	Business	Bachelors of Business Administration - Marketing	Al-Ain University of Science and Technology
5	Arts	Bachelors of Architecture	American University of Sharjah
6	Engineering	Bachelors of Computer Engineering	Ajman University of Science and Technology

Fig. 2: Results

A Prototype of a Mind-Controlled Unmanned Ground Vehicles through the Cloud

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Supervised by
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ABSTRACT

Due to their practicality and low cost, unmanned vehicles have gained a lot of popularity recently. They are especially appealing for tasks requiring exploring, inspecting, or monitoring of areas that are either too expensive to monitor or are not "human-friendly." Due to the nature of such tasks, fully autonomous systems might not be suitable. Instead, researchers propose to build systems where semi-autonomous vehicles equipped with cameras as well as other sensors are controlled by humans residing in safe locations far away from the vehicles. In this work, we build different prototypes of unmanned ground vehicles (UGVs). The vehicles are equipped with Arduino boards. We use two different boards: Arduino Uno and Arduino Mega. We also make use of several other parts such as breadboards, H-bridges, relays, regulators, etc., which are connected to the Arduino board. Most importantly, the Arduino board is connected to the proper "shields'" for the wireless communications such as the Adafruit HUZZAH CC3000 WiFi Shield. As for the sensors, we only use wireless IP cameras and temperature sensors to demonstrate our vehicles' monitoring and surveillance capabilities.

What makes our work stand out is the various control methods provided to the user. The user can simply use a laptop/PC and connect directly to the Arduino board (e.g., using WiFi) to control the prototype vehicles. Many existing projets uses this approach. A more recent trend is to take advantage of the widespread use of smart phone and design a smart phone application to control the vehicle. We implement both approaches. Additionally, we make use of two cutting edge technologies to provide the users with more flexibility and ease of use. The first one is Emotiv's neuroheadset, which is a WiFi enabled headset equipped with sensors capable of reading the brain's EEG signals and map them into actions/gestures. After taking some time to get used to it, this neuroheadset makes a wonderful control device that can allow people to control our vehicles even if they suffer from severe handicaps. The second technology is the use of the Berg Cloud system as an intermediate step between any device connected to the Internet and the Arduino board of our prototype vehicles. The control program was written in the JavaScript Object Notation (JSON) language.

One of the benefits of this work is to provide a cost-efficient way to monitor large rural or hostile areas with minimal human effort and low risk. By allowing humans to use smart phones to control the UGVs, the monitoring process will have minimal risk on human life. Moreover, the operation cost associated with training humans to control the devices and paying their salaries will be drastically decreased. Finally, the use of smart phone applications means that there will no longer be a need for a centralized specially-equipped control station.

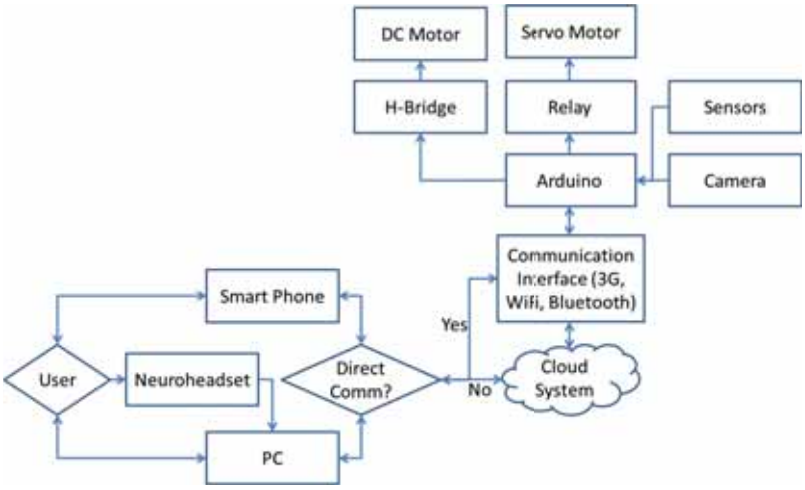

Figure 1 Block diagram of the prototype vehicles.

An Ultimate Guide to A's

Budoor AlMannai
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ABSTRACT

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The main problem faced by the students are that they can't maintain focus and concentration towards studies. Nowadays cellphone is a major obstacle towards academic development. It gradually declines the interest rate of students which may prove harmful to them in long run of career. Another serious issue for high school and university students is the utilization of their time effectively and productively. This paper will be covering these two problems, first the regain of the concentration level of the students followed by the utilization of time efficiently.

A mobile application using android studio has been designed for this purpose. The login screen asks the user to input the details regarding the user and the course they want to study along with the duration. This activates the "Study" mode and simultaneously the timer gets activated. User's cellphone is locked during this period and "Emergency Calls" can only be accessed. On the first attempt to access the cellphone, selected motivational videos are played on real player. On the second attempt to access the cellphone a warning message gets sent to the nearby relatives. Free time mode can only be activated once the study mode is completed. It recommends activities for leisure time based on the user's interests.

The application has been specially designed for students who find studying relatively hard. It is an interactive application with multiple features and push buttons fulfilling the basic needs of a student. Results show that the grades of the students were significantly improved after using this application. In future we would like to add extra features to the application and spread the application to all the students in UAE.

Our Integrity

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Supervised by
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ABSTRACT

Nowadays all nations face many problems with misusing for government support and the national wealth. This misusing leads to corruption which can be found in all fields if they don't try to stop it. The Saudi government " like others" is fighting corruption that is one of the most important things concerns about. Especially it lives the greatest period for development of civil services. So , it establishing Anti- Corruption Commission (ACC) two years ago. ACC has involved people in its mission through using some simple and routine ways such as telegram and fax. But the Saudi people are not interacting because these are lacking for newness and trusty. For these reasons we are thinking about an application has the smooth and modern ways and can be used in smart devices also. Therefor "Our integrity" is an application helps in deciding on the issues of corruption through sending complaints to commission. The communication between citizens and the commission include several ways as:

- Allows the users to send their complaints speedily, clearly with Attachments for the project or the tenders which did not implemented and expired its dates .And to receive location's coordinates for the complaint and shows all the data on the map. Also, it has multi chooses for uploading any pictures or short videos that display all kinds of negligence which make dangerous for our life as the holes in the streets and so on.
- When any one use the application for the first time, he should create an account with his ID and phone number. His registration is important for verification from National Center of Information. Using ID will protect booth the citizens and commission.
- After perform the complaint the system allow for the users to follow up the state of their complaints. They can see if it is end or it has a solution. On the other hand the commission itself can do statistic and demography for the data and display the ratio of corruption in every city of the kingdom .Also, the application Allows to display the news and roles of the commission. We have presented Our integrity to the ACC and we did not get an answer yet .

The Smart Meter Tracker

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ABSTRACT

It is proven that a serious issue of Kuwait is the excessive electricity consumption in comparison with her neighbors and the rest of the world. Nowadays, homeowners have little awareness when it comes to water and electricity conservation. Today there is also a greater awareness of energy efficiency and the need to monitor power and log supply quality. After all, one cannot improve what is not known.

Digital meters are found in the local market, where these serve the Ministry for general purposes. Many clients widely use the products of the industry of digital electrical and water meters in Kuwait. However, the smart meter (digital meter) itself is not very different from the previous mechanical meters it does not conserve energy. Such technology should allow buyers of the smart meters benefit from its digital feature and use it as a tool in which it will help home-owners be more environment-friendly and conservative in many ways throughout a tracker system.

A number of projects have also aimed to raising awareness for energy conservation amongst homeowners. However, the operational model of those projects significantly differs from the Smart Meter Tracker.
The project provides a tool which consists of user-friendly applications rather than focusing to implement on the smart meter itself. Moreover, our application views graphical analysis in which the user can visualize their usage periodically. The main difference between The Smart Meter Tracker and the other similar projects is that it focuses on the communication between home-owners and the Ministry rather than the communication between the devices only.

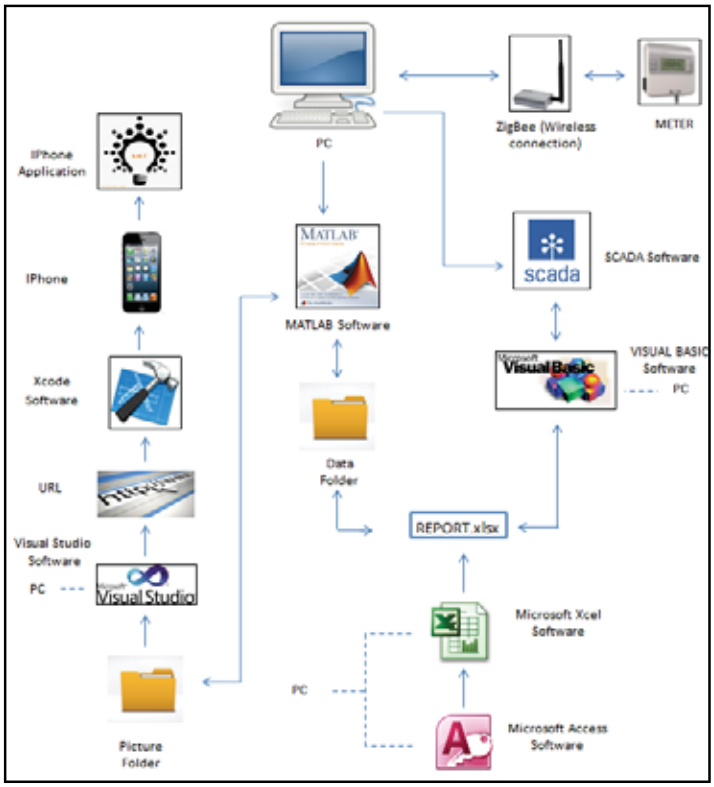

Figure 1: System Implementation Demonstration

The goal of the project is to develop the technology of monitoring the Ministry of Electricity and Water (MEW) meters in a different, user-friendly and organized manner. The project focuses on the implementation of a tool which provides home owners and the Ministry of Electricity and Water (MEW) an easy way to track and communicate with each other upon certain meter readings periodically. The tool will solve the problem of electricity consumption as per usage of the homeowners by hourly, daily, weekly, monthly, or annually tracking the consumption rate with cost identification. However, the system needs to be maintained frequently by reducing the size of the database (deleting very old, unimportant data) in order to transcend the issue of storage and the time it needs to analyze data.

It is a simple way of connecting the Ministry and the client through creating a smart phone application for the clients and a PC application for both, the clients and the Ministry of Electricity and Water (MEW). Both applications interact in a way that previews readings simultaneously. Furthermore, it will detect any failure in the meters or unexpected behavior. The system will be a helpful tool for homeowners as well as the MEW.

Occasion: A mobile-based hall booking system

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Supervised by
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ABSTRACT

With the huge increase in the number of halls in Saudi Arabia, the process of finding the perfect hall that suites their needs and their preferred date and price became hardly possible, the client will have to commute from one hall to another to get the desired information then to make the payment when the process is done. In the past few years many websites that provide information about halls had appeared, despite of that there is no application yet that allows the client to find the perfect hall and make the complete process through it without any need to go to the hall location.

As a solution we introduced a new mobile-based hall booking system named Occasion using the IOS platform and Swift programming language, Occasion connects the halls owners with the clients and provides many rich functionalities. Using Occasion mobile application, halls owners will be able to add their own halls providing all the required information to the system in an easy way such as specifying the hall's location by using a map embedded in the add a new hall page using the Google Maps SDK. On the other side, clients also will be able to perform many functions, such as, searching for the needed hall by specifying the desired date and city. Moreover, the client could easily shrink the search results by excluding the unwanted halls types, halls locations, halls with unsuitable capacity, halls with low ratings or outside the wanted price range. By the moment the client found his preferred hall, he will be able to go through the booking completion process and the payment. After that, the send invitation to guests' emails option will appear to the client, this invitation will lead the event's guests to the hall by the location information imbedded in it.

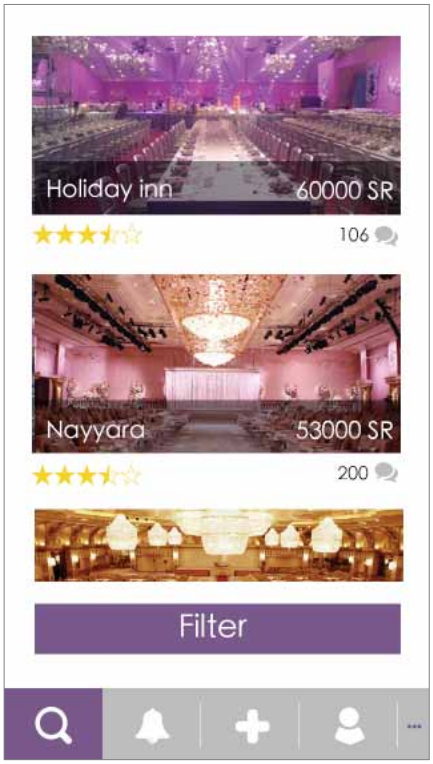

Figure 1: Search result

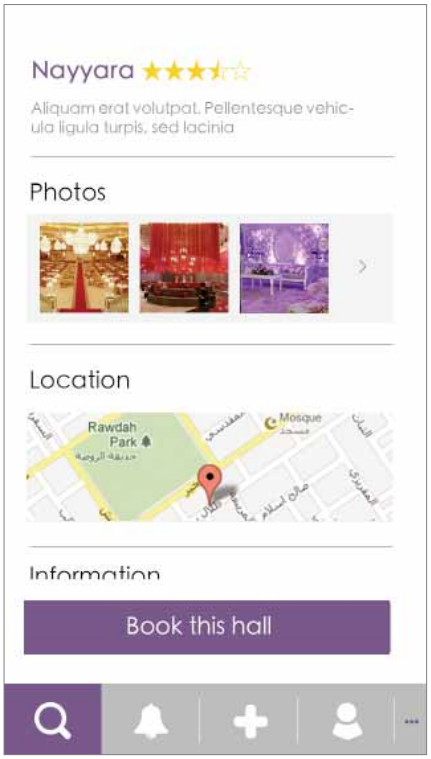

Figure 2: Hall page

SwiftShop Mobile Application Social Network for Shopaholic and Trading Enthusiasts

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Supervised by
Dr. Manar Salamah

ABSTRACT

Trading in various fields plays an important role in our life. The procurement process has evolved from getting the essential needs of life into a hobby and a competition to buy the latest products. Traders are continually increasing, and people are becoming more addicted to shopping every day, especially with the emergence of mobile commerce, "M-Commerce". On one hand, the wide spreading of handled devices such as smartphones and tablets, have led to the emergence of a plethora of mobile applications. Currently, shopping and trading depend on technology, which increases revenue opportunities for traders. On the other hand, people tend to use social network as a basic mean to perform their daily activities of communicating, entertaining, educating, shopping, and trading. Nowadays, people are becoming addicted to the use of social networks such as Twitter, Instagram, and Facebook for the purpose of trading and performing their procurement processing.

Studies and analysis on the interactions on social networks and on users' shopping and trading activities showed that users usually rely on other users' ratings, comments, and sharing, in order to make their own judgments on the viewed products. Traders who use social networks are commonly entrepreneurs who own small businesses and may have no private brands or trademarks, or they could be simply selling homemade products. However, and for the purpose of advertising their products, those entrepreneurs use non-commerce applications for commercial purposes. Consequently, the process of organizing and management of products for both traders and customers become a difficult task due to the lack of specific commercial features in the social networks. Furthermore, the use of social networks for trading purposes, forces traders to using traditional tools such as papers and notes to record orders, track product quantities and so on. In addition, both traders and customers rely on instant messaging applications for communicating and\or bargaining in order to complete a procurement process. From the customers' perspective, users face difficulties finding other people with same interests as their own when searching for products. They need to know the recommended products from people who they trust.

The SwiftShop mobile application is a Social Network for shopaholic and trading enthusiasts, which acts as an interactive, organized, and enjoyable environment of user-generated content which allows users to share their shopping and trading activities. It aims to combine the features of social networking with commerce functionalities in one application and to overcome the limitations of using social networks for trading purposes. In SwiftShop, users can open their own shops, organize their products in categories, receive and manage orders, retrieve order history, and assist their reach to larger numbers of customers. Based on latest studies on interactions in social commerce, it has been realized that consumers trust recommendations of friends and family as well as word of mouth from trusted sources far more than any advertising message. Therefore, we benefit from SwiftShop's social environment to obtain trusted peer recommendation and increase profit opportunities. Customers can easily find their desired products by seeking friend's and follower's help, request the products online, and track their orders. SwiftShop application will facilitate the communication process between all users, customers and sellers, saving their time while choosing products. In addition, the application itself will recommend products to users according to their locations, their favourites, and their previous orders.

The main challenge that may face SwiftShop is how to attract users to use the application for the purpose of commerce in place of or in addition to other social networks. In order to face this challenge and follow best practices, we have explored the use of social networks for commercial purposes. We have also investigated competitor applications such as Wanelo, Modah, etsy.com, fancy.com, and studied their user reviews and experiences. In addition to all the commerce functionalities to be provided in SwiftShop, the application is designed to be attractive in terms of user friendly interfaces, simplicity, and an organized environment for mobile commerce.

Designing the Hydro-Powered Charger for Effective Small Gadgets Power Source

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Supervised by
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ABSTRACT

This project presents an early design of a Hydro-Powered Charger that allows users to charge their small gadget in low-cost and efficient energy consumption. Nowadays, people rely heavily on gadgets such as smartphones and tablets for communication, mobile browsing and daily activities, and always want to be able to use these technologies anytime and anywhere. However, high performances and features that are available on these gadgets lead to the use of high consumption of battery. That leads gadgets to run out of power so fast which is always an issue, therefore, users need to make sure that their gadgets are always full and charged. Currently, people rely on the energy provided from power banks as secondary sources of power to charge the gadgets. However, power banks that are available in the market still contribute to a high-cost energy source. Therefore, we explore the possibility of designing a Hydro-Powered Charger that runs on water and works by using water ions to generate electricity as an alternative solution to charge the gadgets at economical cost. The idea is inspired by the design of a water-powered alarm clock that works by filling small tubes that are built inside the clock with tab water to generate energy, which lasted up to six months before the need to change the water again. The reason a Hydro-power Charger is what consumers need today is because; it can offer features that other energy sources such as power banks do not offer. One of the most important features of a Hydro-Powered Charger is that it do not need any pre-producers to use it, it can be filled anytime with tab water, and no need to charge it or so before using it to charge the gadgets. The Hydro-Powered Charger is to be emptied and refilled at any time the user wishes to. Moreover, in designing this product, we applied the user-centered design approach with a simple interaction design lifecycle model (Figure 1) in designing the initial prototype of this project. During the early stages of the design, we collected the user requirements from a group of users via interviews and questionnaires. Then, we tested the initial design using low and high fidelity prototypes with a group of testers (Figure 2). The evaluation sessions had been recorded for analysis purposes. The results show that our participants appreciate the idea and looking forward to see the product in the market. The findings gathered from the evaluation sessions also suggests guidelines for future improvements in order to design a low-cost and efficient power source that can be less of a damage to the planet and more safe for people to use.

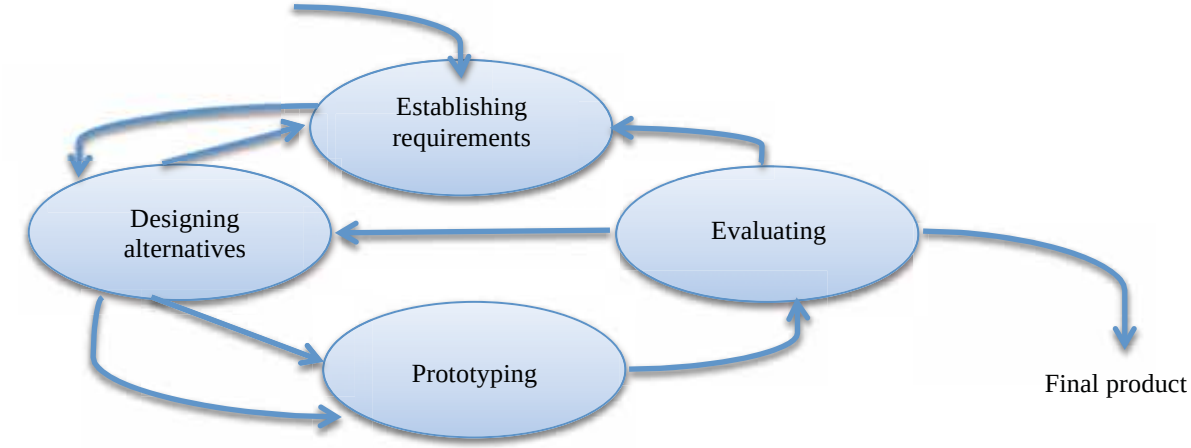

Figure 1: A simple interaction design lifecycle model

(a) (b)

Figure 2: Hydro-powered charger prototypes; (a) Low fidelity; (b) High fidelity

Adoption of Cloud Computing in Saudi Arabia for Enterprise Resource Planning

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ABSTRACT

Many organizations has adopted enterprise resource planning (ERP) as a potential solution to enhance their business productivity. Despite of its appeal, investment in ERP projects has become dominant part of IT investment of many enterprises. Recent development of cloud computing has transformed the computing environment and has offered tremendous opportunity for enterprises to outsource their Information and Communication Technology (ICT). This has paved a way for the emergence of cloud based ERP systems as an alternative to the traditional ERP for companies to plan and manage their resources cost effectively. This research investigates the most relevant issues associated with security, economic, social and technological factors for cloud based ERP Implementation in Saudi Arabia. Accordingly, the primary setting for the mixed method research study was the top cloud based ERP solution vendors and their customers and also the traditional ERP vendors in Saudi Arabia and their customers. The required data was collected by distributing four kinds of surveys and conducting four kinds of interviews; the first and second surveys targeted the ERP cloud based vendors and their customers in both public and private sectors in SA, but the third and fourth surveys targeted the traditional ERP vendors and their customers. The interviews are done to people in many public and private organizations who applied the ERP cloud based solution and their customers and to people in organizations that did not. We formulated the hypothesis based on the analysis of the surveys and interviews using Google form tools. The result was showing that most public and private large organizations in SA have been adopted cloud computing for their ERP systems. At the same time, the small and medium traditional ERP system based organizations are planning to adopt cloud based ERP to expand their business and overcome the limitations with traditional ERP. Based on data analysis and enterprise requirements, we propose service-oriented enterprise model with cloud computing. Consequently, the study aims to explore the potential of proposed model in transforming and automating the business processes of small and medium enterprises in Saudi Arabia. The outcome of this study is expected not only to lay a roadmap for small and medium business in the Middle East to settle many of their concerns. But also to promote adoption of cloud for ERP which will enable our community, service providers, policy makers, regulators, and also research institutions to reap its benefits.

Optimal Scheduling of Home Appliances Using Smart Phones: UAE Energy App

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ABSTRACT

The increasing demand of electricity (energy) is the major requirements which has to be fulfilled to implement the development plans for all countries. Installation of new generating units, especially non-renewable plants, was the traditional solution to meet the ever increasing demand of electricity. However, this steep increase in demand of electricity has posed a serious challenge to electricity distribution systems and most of utility companies have to follow a trend of load shedding. Load shedding is the art of managing the load demand by shedding it in critical situations where demand is increased than total generation to avoid system failure or major breakdown. Common practice is to trip feeders originating from a substation. Integration of renewable energy resources and application of efficient load management schemes will avoid the blackout caused by the conventional load shedding. Load management scheme deals with demand side management operated by utility or energy management system run by consumer.

Recent developments in computer, communication, and control technologies is used to overcome energy management problems. The concept of integrated smart phones in energy management system is expected to help to overcome these problem. Smart phones incorporate requirements and actions of all users to provide reliable, low cost and safe energy management systems. Smart devices can be easily integrated in smart grids which aim to integrate the latest information, communication, control and digital technologies to the current grid system. In the present work and based on dynamic schemes, an energy management system for optimal scheduling of home appliances using smart phones is designed and implements through efficient software programming environment and based upon the appliances network input. The goal of the present work is to optimize the scheduling time of appliances (which can be used any time like heaters, washing machines, dish washer, vacuum cleaner,…etc) to reduce power consumption (fig.1) and electricity bill by shifting load to off time. The present work proposed scheme does not reduce power consumption of user but shifts the load to cheaper times when it is possible using dynamic programming load scheduling.

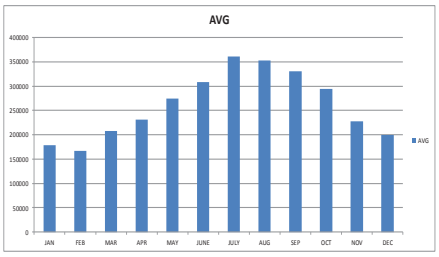

Fig. 1a Monthly average generated power

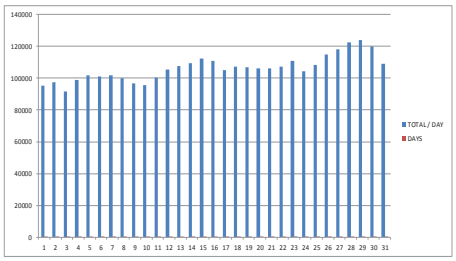

Fig. 1b Daily average generated power (May)

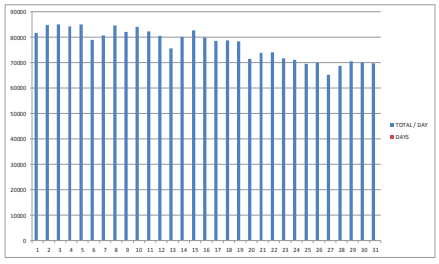

Fig. 1c Daily average generated power (Dec)

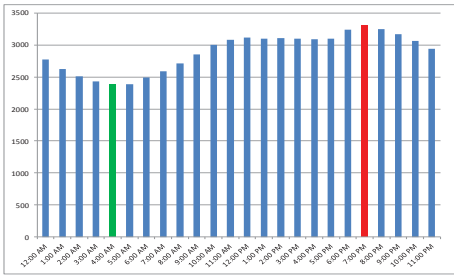

Fig. 1d Hourly average generated power (Jan)

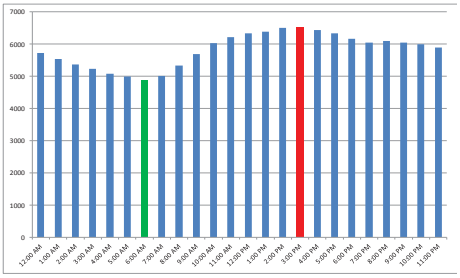

Fig. 1e Hourly average generated power (Jan)

Fig. 2 Suggested cost function

(The data presented in Fig.1 was provided by the Federal Electricity and Water Authority FEWA-Dubai)

The system make use of hourly load practical data in different United Arab Emirates regions in order to manage the operation of appliances to avoid the peak hour load time. The system uses an efficient programming environment which allows monitoring, controlling and analysis of energy consumption based of a suggested cost function (fig.2). The system is designed in a flexible way to allow the extension of its usage to fulfill the requirement of the different users. The implementation of the system will not only help the user to reduce their energy bills but also it will have a positive intact on the energy generation from authorities as it avoids working in the peak hours and consequently makes optimum use of the allowable energy resources.

Wireless System for Water Quality Monitoring and Automatic Water Level Control

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ABSTRACT

Fresh water is one of our most vital resources, and when our water is polluted it is not only devastating to the environment, but also to human health. Dirty water is the world's biggest health risk, and continues to threaten both quality of life and public health. Water quality deterioration in distribution systems, mainly caused by inadequate operation, maintenance and water quality control, has been linked to a significant proportion of the burden of waterborne and water-related illness. Stresses on distribution system caused by rapid urbanization, population growth and aging infrastructure further exacerbate the problems. Water quality is a general term that refers to a general description about the properties of a water body. Commonly, water quality is assessed through the use of many different parameters such as PH, conductivity etc. For each parameter, the quality of the water is generally reported with reference to a specific standard. Often, standards are set by governing organizations, such as the 'WHO' World Health Organization.

The aim of the project is to facilitate the municipal authorities in monitoring and collecting the water quality data in real time environment with a cost effective solution. Our prototype system consists of two parts, the automatic water tank level control system, and the wireless water quality monitoring system. The automatic water level control system (fig.1) uss two magnetic reed level switches. When level is low in the tank the pump will start automatically and stops when level is high.

This cycle will continue automatically until the lifecycle of switches. We can also use low and high level switches to indicate low and high conditions. The supply of the pump and control voltage are design same to reduce the cost of the project. One 12 VDC relay is used to control a small 12 VDC 0.5 A pump by low and high level switches. On the other hand, the water quality monitoring system determines physical and chemical properties of municipal water. PH is an important indicator of water quality. This property can be used to determine the effects on human health and environment. A PH sensor is installed inside the tank to monitor the quality of water. An Ardunio microcontroller with X-Bee Shield is used to receive data from a glass PH sensor and transfer wirelessly. The block diagram of the wireless water quality monitoring system is shown in fig.2. We fix one shield on Ardunio and other with computer having installed Lab View 2011. We open the test window to read the data of Ardunio continuously. We install National instrument Visa software to open serial port for Lab view to read PH values. Now we can show the PH values on the monitoring system front panel according to our requirements (fig.3). The wirelessly collected data can be also recorded to build the assessments that we be needed to make better quality control decisions. Without data, we simply cannot know where pollution problems exist, where we need to focus our quality control energies, or where we've made progress flexibility to users .This data later on can be used by local agencies, Government institutions and other organizations to find better solution for water quality control.

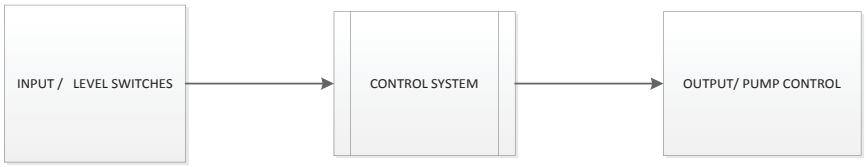

Fig.1: Automatic water tank level control system block diagram

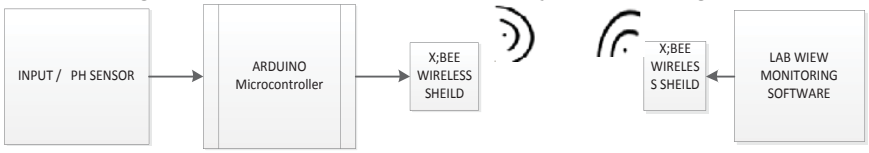

Fig.2: Automatic wirelessly water quality monitoring system

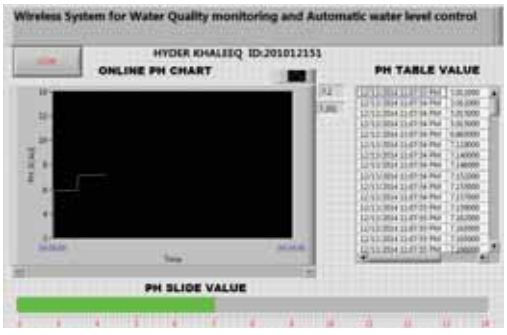

Fig.3: Monitoring System front plate

In the present project we design and inplemented an efficient and low cost solution for automatic control of water tank level and for wilreless monitoring of water quality parameters. The system is proved to be very efficient for muncipal application, recritional activies, power plants and agriclturial aplications with high accuracy and stablity. It has to be mentioned that the present system can be extended to monitor all important water quality paremeters according to the users' requirements and specific applications.

Automated White Box PenTester

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ABSTRACT

The invention of unmanaged high level languages such as C, C++ opened great opportunities to the software development industry.
It allowed programs to take full control of the memory in a relatively convenient way compared to the low level assembly languages. However, As everything comes with a price, those languages have also trigged the non-stopping "Memory war " which broke when hackers started developing attacks that exploits the controlling capabilities offered by these languages , and the lack of formal methods to test the codes for vulnerable instructions .
Attacks such as stack overflow, Heap overflow and integer overflowing imposed great threats on the software world due to their nature and the nature of the targeted platform where the code's size and complexity proved to be great challenges computer security experts faced.
Even though new memory managed languages -such as Java- emerged and made memory based exploitation not possible, those attacks are still dangerous since that there are many systems we use today written in unmanaged code.
One way developed to avoid those attacks is (white box testing) where experts reviews the code during the production phase, checking it for lines that might be vulnerable to memory attacks before releasing it.
As effective as they are, those methods and techniques are time consuming and requires an expert candidate who can spot the lines of code that might be vulnerable to the attack.

In this paper we present a system we called "Automated white box pentester "which automates the white box testing operation for number of specified attacks that exploits C programs hoping that it will reduce time and the level of experts required to perform the such tests .
The system stores the "pattern "which the vulnerable codes are usually written in, including the functions that might be vulnerable, and the most common mitigation technique that can be used .
The patterns are usually represented and stored in the form of trees, rules and regular expressions.
The system can parse the file that contains the code and tries to match each code block with patterns it has.
Once the scanning is done, it produces a report tells the user where the vulnerable lines are, what are they vulnerable to, and offers to fix and rewrite the code in order to make it more secure.
The system also allows the developer to add new attacks to be spotted in terms of rules and regular expressions. This allows the system to adapt new attacks and techniques used by hackers.
Since that parsing a code and trying to figure out a meaning or predict the output is mapped to the "halting problem " which is an undecidable problem , and since the output of some functions is usually determined during the run time the system is not deterministic.
Instead of giving absolute results, the system will look for where the code might be vulnerable to and mention in its final report the level of threat with certain probability.
At the end we used some vulnerable code samples and compare its result with human results to evaluate the system in terms of time required , and number of spotted vulnerabilities .
This system is expected to greatly reduce the time required to perform white box testing .
It's also expected to minimize the need for experts during the testing phase , where expert's role will be limited to trying to spot the attacks that can't be detected by our system .

KETABI: An Application for Jordanian First Grade Mathematics Course

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Supervised by
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ABSTRACT

Smartphones and Tablets are gaining more popularity due to their increasing capabilities and affordable prices. While most of the applications available for such devices are business, social, orentertainment oriented, few applications are developed targeting the educational process. The use of such devices in education is not thoroughly evaluated neither fully practiced.

In this project, we developed an application that can be used in teaching mathematics for first graders. The application is based on the curriculum of the math course prepared by Jordan ministry of education. To follow the curriculum, we organized the application into modules, and divided each module into a number of lessons.

Ketabi application uses images and sound effects and delivers information in an interactive way that attracts the elementary school's first grade students. Our intent is to provide a prototype application that if nationally adopted can have great impact on education. The expected benefits include: (1) improving children learning capabilities, (2) easing communication between teachers and parent, (3) saving the cost of printing and distributing books, and (4) reducing the side effect of heavy books on the children's' backs since they will carry a tablet instead of a heavy back bag.

The application is developed with Android, works offline and can be installed on tablets with different capabilities (i.e., different screen sizes and resolutions, different computation power). Not requiring connectivity reduces the running cost of the application (if any) since students do not need to pay for Internet connection or have a sim card installed on the device.

Ease of use in a vital attribute for children educational application. Ketabi achieves usability by the employment of graphics and sounds, unified interfaces, and an easy flow of control. The application also provides an offline communication mechanism between teachers and parents. Once the application is installed by the school, a password is shared between teachers and parent. Messages interchanged are stored in a local database. This mechanism allows teachers to promptly can easily report information to the parents without any cost.

Ketabi has been experimented in a school in Jordan and we got positive feedback from teachers. Students were excited and did the required lessons and answered the related questions. While our current version of the application targets students in Jordanian schools, the application can be used by students in other countries to learn basic mathematics.

Indoor Position Tracking Based on Wireless Communication Systems and Smart Devices

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ABSTRACT

Navigation of persons and devices in indoor environments has become increasingly important for a rising number of applications. These applications include, but not limited to, location based services in indoor environments, applications at homes include the detection of lost items, Ambient Assistant Living (AAL) systems provide assistance for elderly people in their homes, context detection and situational awareness, medical care, police and firefighters, intelligent transportation, kindergartens, museums, construction sites, underground construction, mapping, and motion capturing. With the advances in satellite communications technology, the performance of outdoor positioning, Global Positioning Systems (GPS), has become excellent. However, and due to the lack of accuracy of GPS in many mass market indoor positioning applications, indoor positioning has become a focus of research and development during the past decade. With the present advances in wireless communication technologies and smart devices' capabilities, the creation of systems for solving the problems of indoor positioning and navigation became more promising task. Efficient indoor position tracking system requires accurate creation of indoor maps, choosing the effective wireless technology, and deploying the appropriate positioning algorithm.
In the present work, a position tracking system based on WiFi technology is designed and implemented. The system is capable of tracking people and objects during their movement inside the building and allowing people to send emergency messages if needed. These messages will include the information about the position and about the selected emergency case. The message will be forwarded to central servers which handle the communication between the person (object) and a map display of the building, and shows the locations of the person (object). All components of the system are integrated to form an efficient indoor position system to accurately track a person (object) and display its location in real time on a map (fig.1).

Fig. 1 Indoor positioning system using Wifi access points (yellow circles)

The system makes use of the telecommunication infrastructure (Wi-fi access points given by yellow, orange, and red points in fig.1) which is always available in buildings and distributed in a manner to cover all areas inside the building. The user (object) has a smart device with which the Wifi signal level received from the different access points can be determined with Received Signal Strength Indicator (RSSI). The access point with the highest RSSI value (red point in fig.1) will indicate the position of the object. In Future work, more accurate information about the object position (dotted red line) will be obtained implementing sophisticated positioning equation in which the obtained highest three RSSI values from different access points (orange and red points) will be used to determine the exact location of the object.

Intelligent Fire Suppression System (IFSS)

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ABSTRACT

Fire accidents around the world cause huge losses in properties and lives. According to Emirates 24/7 news there were 380 fire accidents in Dubai last year only, where firefighters` average response time exceeded eleven minutes. When each second counts, there exists a need for an automated fire suppression system that utilizes the experience of firefighters prior to their arrival. The intelligent system does that by locating the different fires, establishing how critical each is, and then efficiently suppressing them starting with the one nearest to the location with highest configured importance. To accomplish desired functionalities, the system consists of four main blocks. The Monitoring Block, to detect and determine the x,y coordinates of fires. The Configuration Block, to configure areas of importance in the environment. The Discharging station that suppresses the fire, and the Control block that consists of the microcontroller that controls and communicates all components. It has been found that image processing could be used to track fire in a room. This will be utilizing surveillance cameras and heat sensors installed in most environments. The downside of using this technique is that it could cause false positives, detecting a normal object as fire. However, this can be avoided by using heat verification, which can be accomplished by placing heat sensor on the discharging station. The extra level of verification minimizes the chance of any false positives, but could increase the time needed to suppress the fire.

Investigating Material Planning Process in ERP Systems

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Supervised by
Dr. Abdallah Tubaishat

ABSTRACT

Materials planning process is the first point in any business processes that involve production. The purpose of material planning process is to ensure customer satisfaction, continuous material availability and balanced inventory. According to the research review that we conducted, there are several case studies that talk about this process and the activities involved. However, there is no comprehensive scholarly research in this area. The purpose of this exploratory research is to report on our findings based on best practices and published literature on this early process in detail outlining the following areas: Control production planning activities, forecast of manufacturing and inventory volumes, material management process, material buying, and costing, inventory control process regarding inventory level, inventory control process regarding inventory accuracy, bill of material management process

In addition to the above motioned goals, we researched the information technologies that play a major role in designing and implementing material planning process systems and link it with information about manufacturing needs as well as information about inventory levels and plan for future production by using the historical data and sales.

Brain Signals for Smart Offices (BSSO)

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ABSTRACT

Many employees in their work environment are entirely immersed in/ focused on their work especially under work pressure or very busy period of work. Hence, and sometimes they do not pay attention to the temperature or light intensity that might increase their uncomfortable feeling and hence affect their performance. In addition, a more important issue is to consider cases where some of employees have severe movement disabilities to better accommodate this category into the different working environments.

Following this line of thought, this project presents a proposed solution; building Brain Signal based Smart Office (BSSO) system. BSSO allows interacting with employees through reading their brain signals to control their offices such as controlling increase/decrease light brightness and temperature. The proposed solution will save employees' effort and will increase the work efficiency. This interaction tool would turn add some fun and make offices happy zones by acquiring employee's thoughts signals and they will have a flexible working environment.

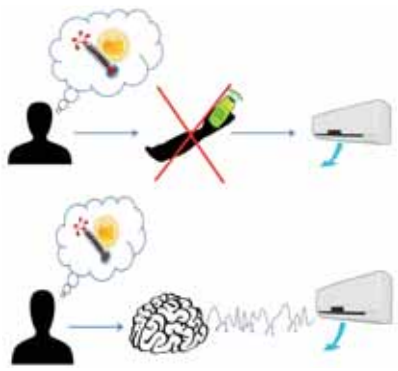
The main challenge of this project was purely the novelty of the field. By combining the inventive technology of Brain Signals and the emerging field Smart Offices, we introduce a whole new concept. Because our project is the first of its kind, it was challenging for us to find existing applications similar to ours. Therefore, we draw our own approach by learning techniques and related technologies of both fields, and incorporated suitable technologies for our project.

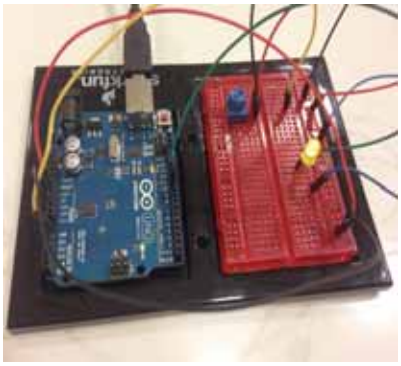
Some of the previous projects offered controlling the light or the temperature but using sensors or voice commands in order to execute the actions, the difference in our project is simplifying the process of changing temperature, light intensity by using the brain signals which give disabled people the chance to do such actions with no countable effort.

The scope of the BSSO project covers the development aspect of proposed solution to include: brain signals reader, feature extraction unit, decision-making unit. The software infrastructure includes: brain signals analysis and recognition, different sensors, a scheduler (for plan execution), two office devices sensors and corresponding controllers. In order to build a smart offices system, a user interface will integrate the brain signals coming from the headset, physical devices sensory data and computing entities.

To conclude, we aim to build an application that is targeting smart offices, changing its lights and air-condition temperature using Arduino sensors connected to BSSO application. It will be considering both admin and users (employees'), the users can register to the application through the admin, then they can login to their account, make training session to be able to close or open the office light and also increasing or decreasing its intensity or temperature of the office air-condition temperature. Also the admin has the ability to edit and delete users in case that employees' left.

"Just think about it, and you will get it"- BSSO team.





AIG: Attention Improvement Game

Mona Saeed, Mayadah Almashi, Eman Alezzi, Duaa Alsahfi ,and Marwa Jowas
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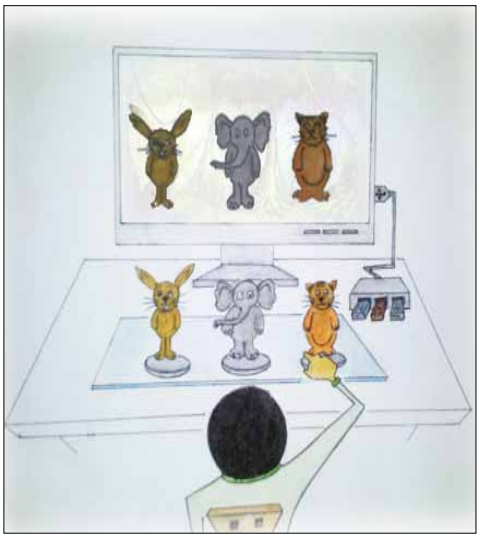
Supervised by
Prof. Lamia Fattouh

ABSTRACT

Attention deficit hyperactivity disorder (ADHD) is one of the most common childhood disorders. It includes difficulty staying focused and paying attention, difficulty controlling behavior, and hyperactivity (over-activity). ADHD usually appears first in childhood. Causes of these disorders remain unknown.



The goal of ADHD treatment is to reduce symptoms and improve the capacities of the child. Medications, counseling, and other treatment interventions. Treatments currently used psychological treatment, education and training.

There are many applications that customized for ADHD but they still have problems at certain points. Most of applications are not attractive for children, do not have trial copy, so you must purchase them in order to use it; on other hand some of these applications are very expensive.

Attention Improvement game will easily help enhancing memory of ADHD sufferer through integration of hands movement with brain thinking. Many researchers and experts advise such kind of integration to increase positive impact. One of those expert is Dr. Huda Saif Al-deen. She is an Associate Professor in psychology. She has membership in Insight Brain Training and Consultation Center. She is interested in our project and help us to choose the suitable idea for our game that can help enhancing child memory. Our product will only be available in training center contributes. At present time, there is no developing for an application like that.

In our game we want child to interact with game by catching physical objects and move it over the surface. The objects shape and movement should be reflected to the game in the screen. We found many ways to implements such reflections but it is complicated and expensive. After searching we found that using multiple mice in our project will be more useful and simpler because mouse already reflect the movement by cursor and about shape of objects we are going to coat mouse with same shape that is displaying on the game for example: if object in the game is elephant the mouse will be coated to look like an elephant see previous figure.

We are going to develop two games :

first game is Guess and Rearrange Animals: In this game system will issuance different animal sounds one by one. Then timer will start counting. After that user need to guess each animal based on its sound and rearrange it in correct order.
second game is Guess Animals Home: This game will display different animals' environment such as: sea, forest, and desert etc. user need to guess each animal home by moving animal and place it in its correct home during a specific period of time.

When a child starts game he need to catch mice by his hands. Then connect each mouse with its similar shape in the game. After that, he begins to implement the instructions required based on selected game. Finally, game will display result and number of scores obtained. This game implemented by Unity Game Developer, 3D Max Maker, multi mice SDK, coordinate surface, wireless mice and USB hub.

FireBot the Autonomous Firefighting Robot

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ABSTRACT

The field of firefighting has always been a dangerous one and there have been multiple and devastating losses because of a lack in technological advancement. Additionally, the existing methods applied in firefighting are insufficient and incompetent relying on humans who are prone to error. A recent trend however is to use robots instead of people to handle fire cases. This is mainly because they can be used in situations that are too dangerous for any person to involve themselves in. This encouraged us to develop a robot that will detect and extinguish fire in a certain environment. The robot will navigate its arena according to its programming and avoid any obstacles it faces. Additionally, a live feed and map representation will be provided.

The robot used was the K-Junior V2 with added sensors and other hardware to achieve the functionality required. The main components were infrared sensors for obstacle avoidance and line detection, a flame sensor, an ultrasonic sensor for wall following and a fan to extinguish a candle which represents a fire. The robot was programmed to follow the walls in the environment until a black line is detected, which indicates the entrance of a room. Once the robot knows it has entered a room, it will start a 360 degree turn to scan the room for fire. If a fire is detected, it turns on the fan and keeps moving closer to the fire until it is extinguished. Once it is done, it will complete the scan and then exit the room and move on through the rest of the environment.

Furthermore, a simple camera was used for the live feed which is essential since there might be obstacles that prevent the robot from accessing certain areas of the arena, and therefore in reality, firemen can be sent to personally check out those sections. The components used for the map representation included a digital compass, an Arduino microcontroller and a Bluetooth controller, whilst the map itself was presented on MATLAB. The digital compass was used to acquire the direction the robot was moving in and the Arduino updates the position on the map shown on MATLAB. A block diagram of the system is shown in Figure 1. The arrows represent the direction which data is sent and the dotted box means that these components are mounted together but do not interact with each other. A photo of the robot with the components is also shown in Figure 2.

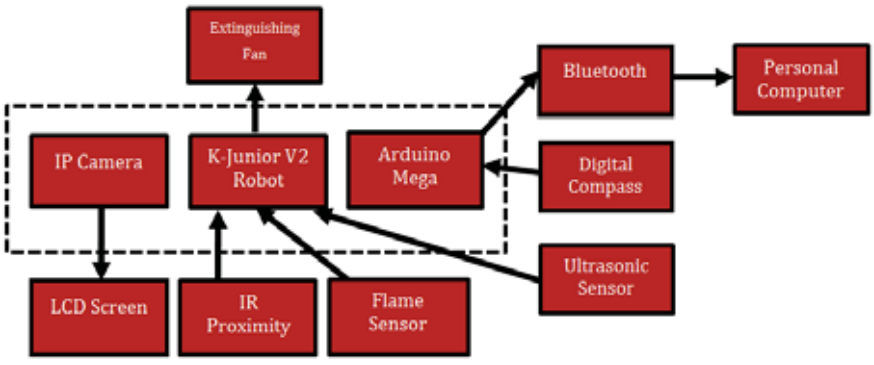

Figure 1 – The Block Diagram of the System

Figure 2 - A Photo of the Robot

As for the future, there is room for a lot of expansion. First, the robot can be mechanically adjusted so that it can navigate through different terrains. Additionally, constructions in general are usually more than one floor, so the robot could be adjusted so that it can go upstairs or slopes and visit different floors. Finally, a great upgrade would be to add human detection through a camera and image processing. This would be a vital improvement to the project so that it can better save lives.

Customer Relationship Management: A Distinction between ERP and CRM

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ABSTRACT

It's critical for companies from all sizes big, medium, or small to understand that if they want to have a successful business; they need to have an efficient interaction with customers, the most valuable asset. The key point is to have an Enterprise Recourse Planning (ERP) system that offer a centralized database which contain all customers data and this will provide the customer service employee with a single view of customer information (Bradford, 2010). On another hand, a bolt-on Customer Relationship Management (CRM) is an important application that manages companies' interaction with their customers by using a specific technology to organize three important aspects: sales, marketing, and customer service. CRM offers the opportunity of engaging the customers to have a more productive business that will increase revenues by acquiring new customers and retaining current customers and increase customer satisfaction and loyalty. This becomes handy when social media is mixed with CRM. This enables enterprises to carefully listen to their customers more than ever before by keeping up with all the feeds and conversations, tracking new leads from a Tweet or Facebook post and moving them into your sales funnel. Furthermore, it has been known that CRM can work successfully in mid-size or large companies that are able to afford the expenses of implementing this software's inside the company. The solution for this problem is that small or new business that cannot pay to have the advantages of these software's can use a cloud CRM.

ERP is an important aspect of business nowadays, it refers to integrating all business possess all over the firm, allow information to be shared and updated in one central database for the entire company. It focuses on the big picture; which is integrating and automating business activates such as planning, marketing and inventory management. While in the other hand, CRM is more directed to the end-to-end processes, customer relationship with the firm that is deals with front desk information, mange sales pipeline and track customer's orders. Integrating these two applications will strengthen the business process and provide better access to critical information.

Although they might seem similar, CRM and ERP work differently. The purpose of this exploratory study is to report on justifications of the use of ERP, CRM or both based on best practices and published literature. The study answers the following questions:

Which of these systems demonstrate how to reduce overhead and cut costs by minimizing the amount of capital spend on the processes?
Which one provides alerts in case of emergencies and can help provides a quick planning based on the real-time data?
Which one is targeting sales in order to expand a profit?
Which one aims to improve customer relations with the brand to gain customer loyalty?
Is there any limitation of using these systems? And how to overcome it.
How can both CRM and ERP be integrated?
What are the challenges with integrating both CRM and ERP?

The Future and Challenges of U-commerce

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Supervised by
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ABSTRACT

The twenty-first century is rapidly becoming ubiquitous and systematic to suit individuals, and intelligent agents. Every thing in our lives keep evolving and developing to make our lives easier and every thing at our fingertips. Commerce journey started as traditional commerce, and then it transformed into electronic commerce, leading to mobile commerce and now it's taking a turn to U-commerce. In 2000 Watson proposed the idea of ubiquitous commerce which is know as U-commerce; where u represents four u-forces: ubiquity, universality, uniqueness and unity. U-commerce can be defined as: "the use of ubiquitous networks to support personalized and uninterrupted communications and transactions between a firm and its various stakeholders to provide a level of value, above, and beyond traditional commerce" (Watson,Pitt, Berthon, & Zinkhan, 2002). To briefly explain the four u construct, starting with ubiquity, that provides the user the ability to access network anytime at anyplace he needs to. Uniqueness gives user to be uniquely identified, in terms of their identity and preferences. Next is universality where mobile devices are universally usable and multifunctional. And lastly unity, that embrace the idea of integrated data across multiple application, where user have a consistent view on their information, irrespective of the device to be used.

Overcoming spatial and temporal boundaries is the core of u-commerce. The principal of ubiquitous computing is the ability to connect and share anytime and anywhere due to the expansion of research and technological advances in wireless and sensor networks, embedded systems, mobile computing, distributed computing, agent technologies, autonomic computing and communication.

The purpose of this exploration study based on best practices and published literature are to report on the challenges and the future of U-Commerce in addition to the benefits and improvements U-Commerce has to offer.

Auto Estimation

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Supervised by
Dr. Fatiha Bousbahi

ABSTRACT

Auto estimation is a mobile application that estimates cars' cost. The estimation process is based on this calculations: calculate the total percentage of lose by adding lose in price plus lose in mileage then estimate car price by subtract original price with total percentage of lose multiply by original price, that will be prepared by our system more rapidly and with less effort. Many factors that may affect the car' value such as model, mileage, and many other factors. Auto estimation provides advanced search that enable the user to search by multiple types for example: by type, by company, by year, and by Price.
Members can view all cars' info including a picture of the car while some of the info won't be visible for visitors. In addition a member can email any offer he/she wants. It also allows the member to rate each offer. Auto Estimation provides the member (seller) repair suggestions that may help him/her to raise the price of their car, it will able the member (seller) to view the location of nearest workshop (Garage) using GPS. Also concern about user's preference by using recommending algorithm that will predict offers similar to what the user desire. Auto estimation application gather data and do the estimation process and provide more services according to these data entered. It will be developed to be an IPhone application using IOS swift programming language. The Apple iOS is the world's most advanced mobile operating system, continually redefining what people can do with a mobile device plus the closed and proprietary nature of it.

Many people around the world are snapping up cars but they are start thinking to dispense it for many reason such as discovers that the car were not suitable for them or emergence of some damages to the car or they are interested to buy modern cars.
Selling a car must go through many stages: First effective advertising, which is hard for the seller to do since there's nowhere he/she can display information about the car. Second estimating a car's price can be so hard for the seller and the buyer, the seller might over estimates his/her old car or don't know the real price of his/her car, it is hard for the seller to give an accurate estimation of his/her car and the buyer may be deceived by the seller. Lastly, the agreement between the buyer and seller might not go well because of the strained relationship between the buyer and the seller.

Auto estimation main goal is to ease the estimation process for either buying or selling a car with all its condition upon specific criteria providing the user main functionalities which make him get best advantages form buying or selling a car.

According to that, we decided to create an application to help car owners and buyers. The application will allow the owner to advertise his/her car by adding his/her car info, the application will also help the owner to price his/her car by applying algorithms that can automatically estimate the cars price according to specific criteria, it will also help the seller to raise the car's price by displaying repair suggestions and able the seller to view the nearest garage that he/she can fix the car at. Our application also provides the buyers the ability to view various cars to choose from by viewing information about the car and its price without any fraud or injustice.

Family Tree

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College of Computer and Information Technology
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Supervised by
Dr. Qusai Q. Abuein

ABSTRACT

Knowing the relatives of any person is very important, especially for researchers who work in sociology and genealogy. So as to retrieve almost a complete list of relatives for anyone consulting the eldest in the family could be the only available way, so that he can know grandfathers or he can refer to books specialized in genealogy if those books or the needed information do really exist.

In this research, we will introduce a system that enables building one's family tree so as to be a complete and fast reference to follow up critical health issues in one's family in addition to the great benefit for sociologists and genealogists.

The system will introduce high security level with logon credentials access, add or modify information belongs to the user who built his family tree or any other recommended by him in a procedural way.

Through our system, anybody can know his or any ones relatives in addition to getting used of the health history in a graphical user interface after applying several procedures to verify the user's privilege to access such information.

By establishing such a system it enables one to build his family tree, adds health history about family members, gets used of the health history by physicians and authorized people, helps sociologists and genealogist to retrieve important information easily and accurately, also people can know relatives of their own or others.

Our project aims to help sociologists, genealogists, physicians and others to get used of the family tree information either related to health or else. The fast, clear and accurate information retrieval is an essential property of our system using graphical user interface.

We are planning to build this system and make it available to public through a web site and then extend this idea to include nearby countries.

EBSAR: Google Glass for Blind People

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ABSTRACT

Blind people are an important and productive part of our society. Because they have been deprived from an essential sense, the sense of seeing, they have some difficulties in performing their day-to-day basic functions such as movement inside buildings . This project aims to help them act with self-confidence and without assistance from another person.

"EBSAR" is an android application that uses Google glass to help blind people to exercise their daily activity independently and smoothly. The application has two main functions; inserting the floor plan of any building and helping blind users in movement by guiding them by voice instruction until they arrive to their requested destination.

First main function of EBSAR is inserting new map (floor plan). The first idea was to make the user insert a floor plan using standard formats used in AutoCAD or similar programs. However, this idea was abandoned when the difficulty of parsing this format became clear. In addition, it might be difficult for the user to obtain floor maps of buildings. Therefore, we decided to make use of the technologies in the mobile device (such as accelerometer to count number of steps and compass for direction) and use vector analysis formulas to decide the path of the user. Then we ask the map inserter (he/she can be non-technical person) to move around the building in a all possible paths to insert the floor plan which will be used later in navigation. We ask the user (map inserter) to start in first point(which is the main entrance of the building) with coordinates (0,0) and move around building to identify point of interest (room, restaurant ,restroom ,office ,…) when he\she reaches them. We generate QR code to identify point of interest and we will repeat this until inserter arrive to start point .QR-code identifiers will help us locate the blind user later (we will describe this in navigation function). We draw an internal map (graph representation) of the building based on the map inserter's path with points of interest markers. Building map will stored as collections of nodes and edges as show in Figure1.

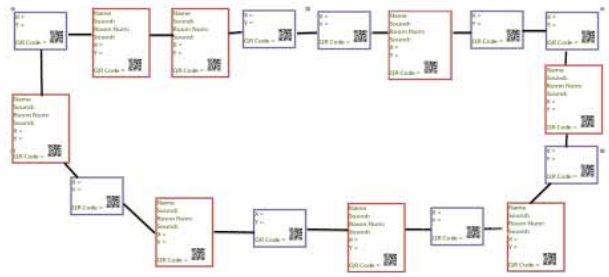

Figure1.Graph corresponding to floor plan.

The second main function of EBSAR is enabling the blind user to navigate around the building listening to directions based on his\her current and desired locations. We use Google Glass to easily scan QR and to read out instructions to the blind user. EBSAR will continually detect any QR code tagged to any of the locations of interest to keep track the user movement. Then, when the user asks for a specific destination, EBSAR will guide him\her through the shortest path determined by using Dijkstra's algorithm on the map graph built by the map inserter.

Finally, we hope EBSAR will take a small part in the overall contribution of technology to make life easier for the people with special needs.

Design and Assessment of an Enhanced Data Encryption Standard

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ABSTRACT

The proposed Enhanced Data Encryption Standard (EDES) is an encryption algorithm derived from the data encryption standard (DES). The Proposed EDES has 192 bit key length which should provide robustness against brute force attacks and an enhanced responds against differential and linear attacks. The existing solutions on enhancing the operation of DES have two major drawbacks which we plan to overcome in this project. The first one is the controversial key length, which is mainly 64 bits. Out of the 64 bits, only 56 bits are used in the encryption process, while the remaining 8 bits are specified for error detection and correction. DES belongs to the past TCP\IP era and no standard error detection and correction was specified when it was invented, each bit of those 8 bits was used as a parity check for the other 7 bytes. Such length of the key will lead the algorithm to become vulnerable for many kinds of attacks including the brute force attacks. The second drawback is the linearity of the algorithm. The DES Substitution S-box suffer from slight linearity, it acts as linear Boolean function which violates one of the main design principles of block ciphers as a pusdorandom permutation. This flaw makes the cipher theoretically subjective to linear cryptanalysis.

The goal of this research is to strengthen the original DES against brute force, linear and differential attacks. This can be achieved through the following improvements, which are illustrated in Fig. 1:

1- Extra keys in the key space which means more strength against brute force.

2- Dynamically key dependent reordering of the S_boxes to provide extra strength against linear and differential cryptanalysis.

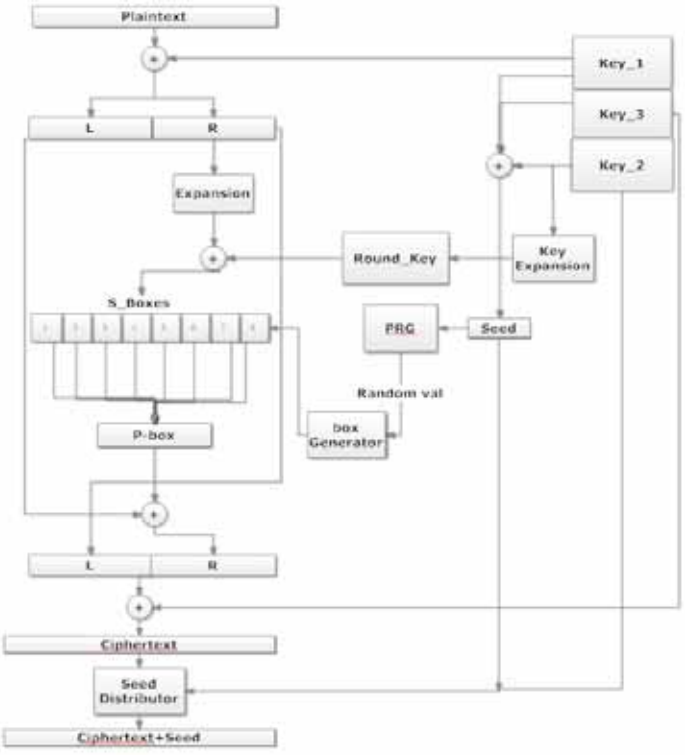

Fig. 1: EDES design specification.

Brute force attacks are handled through the utilization of the three keys in the encryption process. Differential and linear attacks are handled by selecting different S_box permutations for each round of encryption. This is done by XORing the last byte in each of the three keys and using the result that has been generated from the s-boxes for each round. The main idea behind the proposed modification is to use a Pseudorandom Generator (PRG) to generate unique series of different permutations from the s-boxes in each EDES round of the 16 rounds.

In summary, the EDES has the capability of changing the order of the S_boxes each round (16 times). We implemented EDES and compared its performance to the original DES. The findings show that breaking EDES using brute force attacks requires searching through 2^{192} possible key. It also shows that breaking EDES using linear cryptanalysis requires 2^{53} input/output pairs. Furthermore, differential cryptanalysis of EDES requires 2^{51} pairs which overcome the DES performance.

Fazatcom: a UAE Blood Donor System

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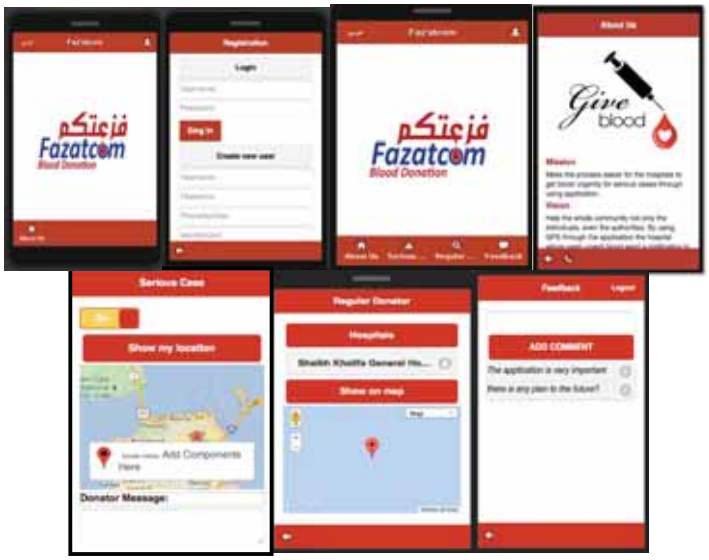
ABSTRACT

The "*Fazatcom*" is a blood donor mobile application that helps blood donors and hospitals to coordinate the blood donation process in case of urgent need of blood, e.g. car accidents and other emergencies. The proposed application will benefit all government hospitals and health sectors in the UAE who will be in need of urgent blood donation. In this manner, the hospitals will have enough stockpiles that will help to make blood available for recipients in hospitals. The people who donate should be less susceptible to circulatory disease such as leukemia. Moreover, the donated blood helps patient to reduce the proportion of iron in the blood since it is considered to be one of the causes of heart disease and arteries clogging. This mobile application focuses on serving people who suffer from heavy bleeding as a result of serious accidents and other medical reasons. The application will also assist the government hospitals in the UAE in producing surplus of blood samples. In this sense, and in serious medical cases the hospital officials can allocate blood donors that are within the hospital geographical area. This way blood samples will be available for residents in hospitals as well as urgent needed patients. In addition, the application does not serve serious cases only, but it also assists people who want to donate blood samples. Furthermore, the application can guide donors to nearby hospitals for donating blood samples.

Features of the Fazatcom application:

- ✓ *The application solves the issue of blood donation for hospitals throughout the UAE. It also supports collecting blood samples from donors who are nearby in case of extreme emergencies.*
- ✓ *Facilitates donors with hospitals names that have non-urgent shortage of blood and encourage users to donate blood.*
- ✓ *Notifies donors about blood donation campaigns and locations.*
- ✓ *One of the app interesting features is that the hospital will send the blood donors a transportation vehicle if they agreed to give out blood samples by sending a text message. This happens during emergency situation such as car accidents.*



Shop for Me: A Novel Mobile Application for Grocery Shopping and Delivery in Riyadh

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ABSTRACT

Shopping for groceries and household supplies is one of the important tasks in everyday life. For working couples and time-starved people, finding a time for weekly supermarket shopping is not always possible. The city of Riyadh, Saudi Arabia, is undergoing huge transportation projects, which make the usual supermarket trip more time consuming than ever. On the other hand, there are some less busy people who have time to do shopping for other, as an extra source of income. Smartphone devices are widely used in Saudi Arabia and provide many features and applications to make our lives easier.

To address this issue, we propose *Shop for Me!* a mobile application that will connect busy people with people who are free and willing to do the shopping. Such an application would help busy people save time as they don't have to drive in busy traffic. In addition, it would help them save money, have many choices for supermarkets, and provide a convenient shopping experience anytime from home or work. The hassle of goods delivery will be avoided, as the application will utilize Google Map to provide delivery location. Figure1 shows the main interface of *Shop for Me!*

Figure 1 Shopper interface of the proposed application

There are many shopping applications provided by local supermarkets in Riyadh. However, each application is restricted to shopping from one local supermarket. In addition, they do not provide a convenient full shopping experience through the mobile application. Supermarket staff carries out shopping and delivery of items. Many people enjoy doing shopping and in their free times would like to help others do their grocery shopping for an extra source of income. Web-based online shopping websites in USA and Canada, such as WeGoShop, provide the opportunity for non-supermarket staff to assist in shopping and delivery. However, participation requires a paid subscription with the company running the website. Although useful, these websites have many limitations. The shoppers cannot be located automatically using GPS. Furthermore, features such as order tracking, cancellation, and customer reviews are not supported.

We propose *Shop for Me!* a novel mobile application for grocery shopping Riyadh, Saudi Arabia. The application will facilitate a convenient full shopping experience by connecting time-starved people with less busy people who can do the shopping for a fee. Many missing features in similar mobile and web-based applications will be provided. The application will allow shoppers to be located automatically using GPS, choose from many local supermarkets, choose an assistant shopper, track and manage orders, and provide reviews. To the best of our knowledge, this is the first application that serves this purpose in Saudi Arabia. Currently, the system is under implementation using technologies including: Android studio, MySQL, and PHP. The mobile application is developed to for smartphones that run the Android platform and will be tested to meet our objectives.

Using the NAO humanoid robot in Kindergarten

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ABSTRACT

Most kindergarten students spend the majority of their day in schools, so it is important to provide them with the tools and techniques that help them develop intellectually and educationally. In this paper we propose a system that facilitates kindergarten educational process by utilizing a Humanoid robot called NAO. NAO robot will be programmed to support leaning by fun (i.e. edutainment) through providing many activities and games. The robot system will provide quizzes to test the student's understanding. All interactions with the students will be through voice and touch. The system will also enable the teacher to contentiously review the student's progress in a graphical form through a webpage's interface accessed from his/her computer.

Figure 1 shows our proposed system, which is composed of two components: (1) NAO robot and (2) Teacher GUI interface.

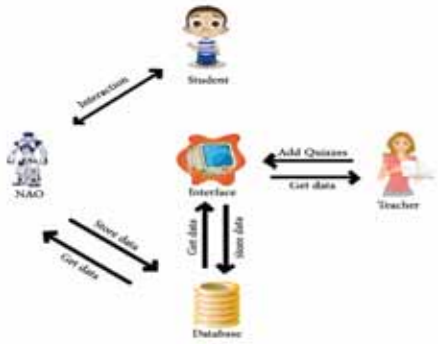

Figure 1. The Proposed System framework

(1) NAO robot: The modality of interaction between the robot and the student will be through voice and touch. The robot will be programmed to perform set of activities. First activity type is the practical quiz such as body parts quiz, where NAO asks the student to touch a specific part of its body. The second activity type is the non-practical quiz which is the quizzes inserted by the teacher through her interface. The third activity type is the colored XO game which is similar to the XO game but with colored balls instead of symbols. The final activity type is knowing the student in which Mr. Saud meets a student for the first time so he expected to recognize him/her and ask him/her about his/her name then link the picture of the student with the acquired information to be used afterward in the future interaction.

(2) Teacher GUI interface: Through the system the teacher will be capable of inserting questions to predefined quizzes topics as multiple choices question in which NAO will asks the students. In addition, she can retrieve each student related information such as his/her profile and the assessment of his/her answered questions in a graphical form. The interface will also retrieve the pictures of the student's captured activity (s) he did in the class.

Rehlati: Arabic social media mobile application

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ABSTRACT

When Arabic people plan to travel to any country for the first time they need to research and collect information about that country such as currency, weather and best places to visit, etc. In addition, travelers may need to spend a lot of time searching online websites that may contain old, incomprehensive data. Writing a report takes a lot of the traveler's time that he would rather share with friends and family. Another problem facing people is that when they finish planning their trip, they save the plan in different places or devices, for example, in several notes in the phone or in different locations on the laptop.

As a solution, we are developing an Arabic social media mobile application called "Rehlati" that aims to exchange travel experiences in an attractive, summarized and helpful way through posting a review of a place to save traveler time and effort. The application will let the user sign up and have a profile. Then, there will be a timeline where the user can find the latest shared places by the followings list. The user can favorite or comment on any posted place. In addition, the user is allowed to post a place review and share it with others by filling out the required fields of a form such as: cleanliness, level of congestion, and the cost of visiting the place. Besides that, the user must add a picture. We designed the form in an organized manner to remind the reviewer of the important information that people interested in visiting the same place would like to know. Also, viewing the posted place is designed in an organized and attractive way so it will be easy to read. Furthermore, the user will be allowed to explore places through previewing the most liked places and searching for a place or user. Moreover, a planner will be provided where the user can plan for his trip by adding tasks, which will consist of task name, time, date and link to the place review that the user plans to visit.

The system architecture for the application is a Client-Server architecture. The mobile application will be developed on the iOS platform. The software technology to be used is XCode, and we chose Objective C Programming Language and the most popular database system MySQL used with php.

Features	Rehlati	Other Arabic travelling applications
Timeline	√	X
Planner	√	X
Organize reviews in forms	√	X
Follow user	√	X
Share review of any place	√	X
Place reservation service	X	√
Special offers	X	√
Explore most popular place	√	√
Search for place	√	√
Favorite a place	√	√

Arabic Traveling applications are rare or badly implemented so we need Arabic traveling applications such as "Rehlati". Also, a lot of Arabic users travel to places that have different culture but by reading other Arabic users experience they can discover the place through the vision of someone who share with them a similar culture.

Hajj Organizer

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ABSTRACT

Hajj is known as one of the pillars of Islam and every Muslims are obliged to perform it at least once in a lifetime for those who can afford it. Many Muslims from all cultures and with different levels of knowledge come to Makah every year to perform Hajj without a complete knowledge of what to do and were to go. Also, many have troubles organizing their time or forgetting to do important things because their minds are crowded with too many things at once. So, we try our best to provide them with a system which will help them organize their time, remind them of their duties from time to time and inform them of what's essential and desirable in all Hajj's rituals.

Today smartphone's are a handy device can work as a small computer. In addition to communication and organizing capability of smartphone, today it has the capability to set location and guide user the way to desired location utilizing Global Positioning System (GPS) hardware to make our life easier.

With the difficulties might Hajj is facing and the advance of smartphone devices, the idea of our project came to provide an important assistant that should be provided to help Hajj pilgrims to overcome some difficulties they might face during the trip and which might cause them to perform their Hajj improperly.

Our project is a system in the Android smartphones which will make performing Al-Hajj easier and will carry many benefits and advantages that guide the pilgrim to the right action and location. This application will make sure that their pilgrimage has been performed at its best. The application will have many features that intent to make sure that Hajj pilgrimage has been performed at its best. These features as follow:

1) An android application that can be downloaded for free from internet using Andriod's "Play Store".
2) The application provide English /Arabic language interface.
3) The application has setting function contain notification of:
4) The limits of Mash'ar , the rituals,Dua'a , Miqat (Reminder of Miqat where they should stop and start Ihram).
5) Allow to finding the location of user in the map.
6) Able to add new location or currant location
7) Able to count Tawaaf and Saây
8) Localization of Qibla direction and prayer times .
9) The application able to display some information about the developers of hajj and the user can listen of them like Dua'a .

Comparative Analysis between Two Drowsiness Detection Techniques

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ABSTRACT

Nowadays, many systems like navigation systems, warning alarm systems etc. are available in the market in order to make the driver's work easy. Driver in-alertness is an important cause for most accident related to the vehicles crashes. These accidents may prove fatal at times and cause death. The National Highway Traffic Safety Administration in USA conservatively estimates that 100,000 police-reported crashes are the direct result of driver fatigue each year. This results in an estimated 1,550 deaths, 71,000 injuries, and $12.5 billion in monetary losses. Traffic accidents due to human errors cause many deaths and injuries around the world. Two drowsiness detection techniques are discussed in this paper. These techniques are classified and then compared using their features. Computer vision based image processing techniques is one of them. This uses various images to detect drowsiness states using his/her eyes states. The other one is by using sensors to detect the electro-oculogram (EOG) signal of the eye, it detects the REM (Rapid Eye Movement) pattern of the eye and vibrate the driver's seat accordingly, in order to regain alertness.

First system for drowsiness detection is by using image processing done in matlab 2014b. In pre-processing phase video of the driver is recorded using a webcam. Video is then converted into frames. Images are converted from RGB (Red Green Blue) to Grey-scaled in order to perform further image processing algorithms. For the enhancement of the images, histogram equalization technique is applied. Edge of the eye is detected by using canny edge detection algorithm. The circular region of the eye is detected by using Circular Hough Transform algorithms. Extract the exact region of interest (ROI) of the eye. Calculate the histogram values of the eye. Compare with threshold values in order to determine drowsiness. If there is drowsiness detected, a signal is sent to the vibrator through interfacing with PIC16F877a microcontroller and the seat vibrates.

Second system is based on electro-oculography. Electro-Oculography is a technology of placing electrodes on user's forehead and around the eyes in order to record eye movements. The electro-oculogram (EOG) is the electrical signal produced by the potential difference between the retina and the cornea of the eye. EOG is a very small electrical potential that can be detected using Ag-AgCl or flexible electrodes placed around the eye. The signal taken is between 0.4-1mv. The EOG circuit include: instrumentation amplifier to amplify the signal, followed by band pass filter to get a certain frequency between 0.1-10 Hz. Finally a notch filter is designed to remove the 50Hz noise from power supply. This circuit is used to amplify and reduce noise in order to get clear signal of eye. Circuit is connected to sensing system in order to monitor the REM pattern. This system was first built on PCB (Printed Circuit Board). The PCB board is directly connected to 16F877a micro-controller which is then interfaced to a vibrator connected to the driver's seat. Most of the commercial devices for drowsiness detection use ECG signals, along with that they are expensive, uncomfortable to wear (with ECG electrodes), hard to maintain and efficiency is calculated from one technique only. Our system uses EOG signals as well as image processing. It's cost-effective and comfortable to wear with the help of flexible electrodes and easy maintenance. Flow charts of our techniques, as discussed in this paper are shown below:

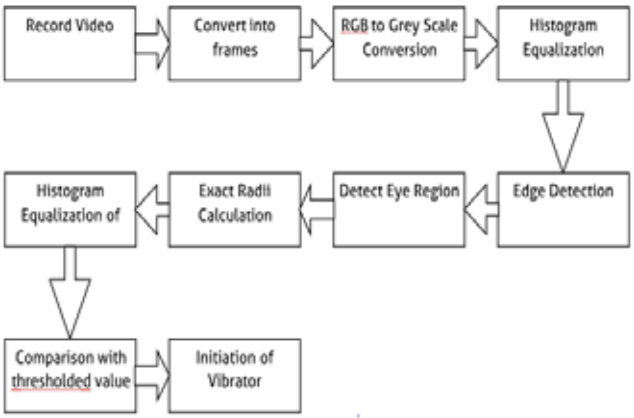

Figure 1: Computer Vision based Image Processing Technique

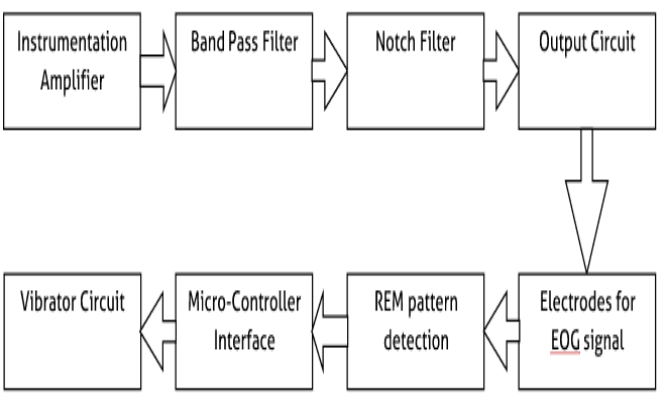

Figure 2: Sensors based EOG detection technique

API: Automatic Plagiarism Inspector system

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ABSTRACT

There are a lot of universities suffering from plagiarism problem one of them our College of Computer and Information Sciences (CCIS) at King Saud University (KSU).

Some students use or closely imitate the previous Graduation Projects (GP) works with the intent of taking them as examples and templates. GP supervisors cannot check the GP documents of their students by using the existing detector system because firstly GP documents of the previous semesters are not published. In addition the databases of these existing systems (for example [1] and [2]) are not accessible to add new documents. Consequently, two major problems take place. The first one is that there is no automatic system that keeps GP documents in CCIS, especially in IT department. The Second problem consists of the absence of plagiarism detector system that allows easy access and update of the database.

To solve these problems, we decide to create a system called Automatic Plagiarism Inspector (API) system dedicated to universities and academic institutions especially IT department at CCIS. The system has two main purposes. First, it will keep all GP documents. This will facilitate all kind of accesses thought search by topic, search by keyword, search by year, and search by supervisor name …etc. Second, API will allow detecting plagiarism for any GP documents using the existence ones. This will save students' rights by preventing any possibility of stealing student efforts. In addition, this system will be used by GP supervisors and examiners before GP evaluation process. They will just have to upload the current document and get a detailed report of plagiarism.

API is a new and perfect Solution for IT department and any other university suffering from the same matter. Contrary of the existing systems, API will be a special purpose system designed to be repository and plagiarism detector system. This ongoing graduation project is about a design of API system based on website. We will use artificial intelligent method to solve plagiarism problem.

This system will serve generally the academic societies and especially IT faculty and students at KSU. The API will support just English language to detect the plagiarism. The two main tasks of the project are database management and plagiarism checker. API system will have several functionalities, for example:

- Provide access to database for supervisors to upload new projects at anytime.
- Provide report of plagiarism that displays the detailed result of an inspected document.
- Allow supervisors to check if her new idea has not been proposed in the previous semesters before presenting it.
- Allow students to take advantage from previous GP by easily downloading them.

References:
[1]: http://www.plagium.com
[2]: http://plagiarisma.net

Air Pollution Monitoring System

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ABSTRACT

Air pollution is one of the most important issues that face humanity today. The problem of air Pollution in Riyadh could be a possible result of natural causes like geographic location and the nature of the earth. “Air Pollution Mentoring System” is an android application that aims to provide users and decision makers with an easy instantaneous estimate of air pollution exposure anytime and anywhere with simple and understandable visualization of data to increase the awareness regarding air pollution. Air pollution data will be collected instantaneously by commercial distributed mobile air sensors. The sensors contributors have only to connect to the Internet then the sensors readings will be sent from sensor server to our web server ,so the android application can retrieve these air pollution readings and present it on the map. Information will be shown on a user-friendly colored map that indicates how is air pollution levels over Riyadh city. Registered users will be provided with updates on the level of air pollution at their favorite locations and notifications if one of the pollutants exceeds the standard acceptable level. Moreover, while the users are moving they will be notified about the nearest major sources of pollution from their current location. The registered users will be able to share and view medical symptoms that occurred during their visit to certain location. These medical symptoms will be displayed on the map above the air pollution level layer .Therefore, the normal users and decision makers could explore some relations between polluted area by specific pollutants and type or number of medical symptoms occurred in these locations. Decision makers and users who are interested in air pollution can search through our application for statistic reports based on (interval , location and pollutant) and the search results will be represented as charts. What under progress is map visualization of air pollution levels and medical symptoms layer, and by the time of conference, application will be ready

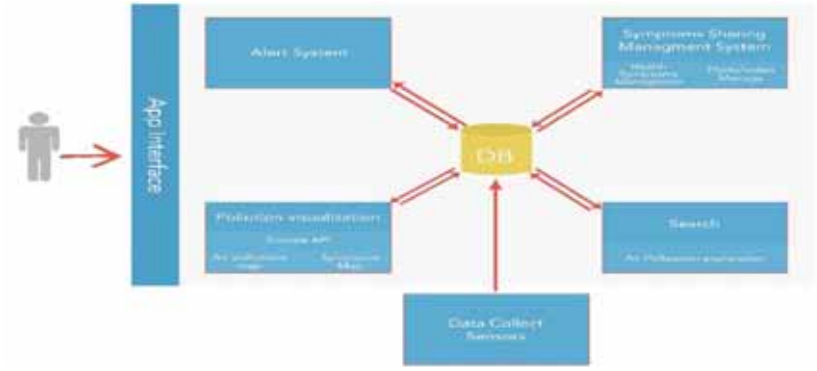

Figure 1: System Architucture diagram

Automated Paper-Based Survey Processing

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ABSTRACT

Surveys are widely used by researchers, psychologists, companies and whoever considers some audience' thoughts as a valuable asset. In education, where measuring improvements and discovering opinions are important elements, surveys are indispensable. Particularly, in King Saud University in the Information Technology department, the Quality Unit distributes a paper-based survey among the students in a regular basis in order to measure the effectiveness and efficiency of the proposed scholastic programs. The process of counting, sorting and assessing is done manually which is time and effort consuming and makes the final assessment vulnerable to human mistakes.

Therefore Automatic Survey Processing system is proposed to facilitate the paper-based survey processing. The system aims to provide the ability to automate the paper-based survey processing including restructuring the Survey's form, scanning of the survey, extracting data, processing data and submitting results.

There are many paper-based survey solutions in the market that offer a good functionality however many of them use specific-characterized scanner and relatively expensive type of paper. Others do not save the resulting final statistics. The proposed system uses regular scanner and printer paper, saves the results and support Arabic and English languages.

The proposed system is a standalone image processing based system. It reads the image of the survey which is in the form of multiple choices questions; extracts data from the image then, analyzes the data to produce statistical reports. The survey contains 42 multiple choice questions distributed in 7 groups. Several predefined marks are used to align the image at the right coordinate, to detect the beginning and ending of the group of questions, and to assign each choice to its corresponding question.

After acquiring the image of the filled form from a scanner device, the data extraction is done through two main stages:

- Pre-processing step which includes binarization, skew detection and correction.
- Processing which includes: detecting locations of circles, defining for the selected (filled) ones and assigning them to the corresponding answer for each circle.

The system will keep a record of the answers thus, count, sort and classify the response. Finally, the system will display the resulted statistical reports in different forms (chart, pie …etc.).

Mobile App for UAE National Service

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Zayed University

Supervised by
Dr. Omar Alfandi, Dr. Abdallah Tubaishat, Dr. Fatna Belqasmi, Dr. Faouzi Kamoun

ABSTRACT

We are reporting on the development and implementation of The National Service App. The App is an innovative application that allow young UAE nationals to register and follow up on their applications for the national service. It is a management mobile application for smartphones that aims to change the way recruits approach the National Service. The App targets several stakeholders: recruits (male and female), National Service Unit, and the Ministry of Interior (MoI) in UAE. The App solves the following business problems related to the National Service:

- To Keep track and manage electronic registration for recruits.
- To assist recruits in locating the nearest camp.
- To Solve the agency's time by allowing agents to review applications online.
- To receive notifications and updates that would let recruits know if they are accepted or not.
- To enable the agency to work effectively by following an easy platform for both parties.
- To provide recruits with news and announcements related to National Service.
- To Track applications effectively and efficiently.

The process of the App works as follows: It begins when the applicant downloads the app and creates an account where it helps recruits to register for the national service effectively and efficiently. The easy to use tool that we created saves time by eliminating the need of going to the registration camps and waiting in queues. Furthermore, the app reduces the National Service Unit's registration effort by shifting the work of entering data to the registrant. It also gives the registrant the ability to update their registration data. Applicants can use the App to access social networks connected to national service allowing users to request more information regarding the national service. A GPS feature is available to assist users in locating the closest camp. The App encourages those who are not able to go to national service camps to register thus avoiding fines associated with lateness. In short, the App makes registration faster and easier, reduces National Service Unit registration efforts, and easing the process for the recruits as well as the National Service Unit.

The benefits of the App are several: Recruits (male and female) benefit from the App as it makes it easier for them to register to the national service and to avoid fines. National Service Unit benefits from the App by reviewing the data, auditing, and approving the recruits to the national service. Ministry of Interior benefits from the App by keeping records of recruits and for providing statistics to other parties.

Keywords: Mobile App, National Service, UAE, Smartphones.

Listen For Me

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ABSTRACT

Sense of hearing is one of the great blessings from God to make the person's life full of interactions with the surrounding environment. If the person finds a difficulty in hearing, s/he will face at the same time a difficulty in dealing and interacting with the others in the way that s/he desires to do. As a result, a lot of different devices and inventions had appeared over the years that help to overcome this difficulty and also play an important role in different aspects such as teaching, learning, etc. According to the huge technology evolution that we live nowadays, finding such solutions has transformed from standalone devices into the utilization of mobile phone applications.

Deaf and hearing-impaired people face many challenges in order to keep up the demands of life. One of the difficulties they confront is communication with others and understanding them without a mediator. Thus they feel alone. Furthermore, they perhaps are unaware of the urgent notifications such as fire alarm, bells and horn; hence they may not make the correct decisions and take the appropriate actions.

The project tries to achieve, as much as possible, some of their dreams and hopes in adapting and engaging with community and surrounding environment. In addition, this project aims to facilitate carrying out the daily tasks in education, career and other different fields. Therefore, they can increase their productivity and feel satisfied on their achievements.

Also some features provided in our project can be used by hearing people as well as special needs.

Our project, "Listen for me" transcripts the speech of the speaker into a written text presented on the mobile or glass screen. It also translates spoken English text into Arabic and vice versa. Our project also allows the user to look at English text in front of him/her, and translates it into Arabic to be displayed on the mobile or glass screen. Finally, it provides services that notify the user in case of serious alerts are around. . "Listen for me" is still in the implementation phase and we expect to be finished one month later. We wish our project contributes to the development of society and increase its productivity.

The project uses Google glass as a tool to help fulfilling the project requirements. Google glass is intelligent wearable device that was developed by google. It has sensors, camera, small screen, microphone and speakers. See Figure 1 for a picture of Google Glass.

Figure 1 Google Glass

Blogs and Blogging: Today's Trend & Tomorrow's Career

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ABSTRACT

The world is changing faster than a blink of an eye, especially when it comes to social media ever developing trends. People keep searching for ways to get their thoughts out there, share, and become very "vocal" about their daily experiences. Today, nations worldwide are turning to the open platform of blogging where no words limit exits and the choices of what goes into a blog post are endless. Globally blogging is not a medium used for sharing only; many turn this hobby or daily activity into a source for profit as well.

Looking internationally 6.7 million people in the USA blog, however, searching locally was not successful as many blogs statistics either are focused on the USA, or posted statistics based on continents as a whole.

Blogging has received a considerable amount of research attention globally, yet little research was done to examine it regionally. This paper will investigate thoroughly recent trends and the concept of blogs and blogging in the UAE region and how to turn it to an income generator using simple strategies. This research is to create awareness and educate UAE residents on the importance of this new trend.

I began this research by conducting an intensive online search for sources of information about blogging to understand the full aspect of it before surfing deeper and further into details, however very little information about bloggers in the UAE came up and no statistics available on their number.

My findings so far include global statistics on number of posts, blogs, and users existing today in the blogosphere community. Good profit methods were also found used in international blogs to generate steady income. I have also got in contact with two bloggers who will be giving their view on blogging today and their advice and strategies to start and maintain a successful blog and how to make a career out of it.

In this context, a thorough quantitative research methodology is used by pursuing the public's outlook on the subject with a comprehensive questionnaire along with a personal experiment of creating my personal blog to understand and live the experience for personal reflection on the issue.

Critical Appraisal on Mobile Applications Android Vs. iOS

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ABSTRACT

A recent study shows that there are around one billion people using smart phone worldwide. Mobile phone users are switching over smartphones which are more affordable and have advance features. Nowadays, when we think of smart phones, very first thing which comes in our mind is carrying a small computer device in our pocket/bag. This smart device enables us to perform many activities such as emailing, web browsing, video camera, Wi-Fi, Bluetooth, touchscreen, speech recognition & mobile navigation. All these useful features can be run once we have installed an operating system in our smart device.

There are number of companies leading the next generation of smart phones in the market, for instance Google (Android), Apple (iOS), Nokia (MeeGo) and Microsoft (Windows 8). All of these companies are having their own operating systems and hardware devices developed or support. The two leading operating system used by users are Android and iOS. Android operating system is basically created by an American company Google but they do not manufacture their own hardware device and therefore, it is used in android based mobiles such as Samsung. On the other hand, the iOS is an operating system developed by Apple and is used in apple hardware device such as iPad and iPhone. In our research paper we will be analyzing critically Android and iOS based applications. We will be highlighting issues related to both of these operating systems. We will also highlight advantages and disadvantages of both systems. Moreover, the most popular features people prefer to use on these devices.

This research will be conducted using quantitative surveys using sample size 200to get people's feedback about the said devices. In addition, existing literature will be explored to form supporting arguments for our research. This research will help in identifying major issues related to both operating system applications which might help in designing new application based on people preferences. Furthermore, this research will help in understanding latest trends of operating systems which might be leading the market in the coming future.

Expo 2020 Effects on Dubai Tourism Industry

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ABSTRACT

Dubai will be going down in history for yet another reason, hosting the World Expo in 2020. The World Expo has been around for approximately 164 years, beginning in 1851 in London. Winning the right to host the World Expo 2020 will have a significant impact on tourism in Dubai. The Expo 2020 is expected to attract approximately 25 million visitors. Seventy percent of those 25 million will be coming from outside the United Arab Emirates.

Dubai hosting the Expo 2020 is a significant topic as is the Expo's expected influence on the 'city of life'. Dubai depends highly on tourism in order to maintain and increase foreign cash flow into the emirate. For that, hosting the Expo is an important opportunity for Dubai to improve its tourism and in turn, positive cash flow. Visitors may be visiting the emirate with the aim of attending the Expo 2020, but they will definitely involve in exploring Dubai. For that, the Expo 2020 is simply a means for visitors to have great cultural experience in Dubai. Not only that, but hosting Expo will raise Dubai's international status and placing the spotlight on the emirate. The Expo 2020 is and will be covered by the internet, Expo office, Dubai's department of economy, Dubai's department of tourism as well as the media. Existing studies claim that the Expo 2020 will not only affect tourism as well as the tourist industry in Dubai, but also many other industries parties including the United Arab Emirates as a whole, as well as the Gulf countries and the Middle East as a whole. By hosting the Expo, Dubai will be representing a positive image of the region both all Gulf and Arab countries. In addition to that, Dubai's current residents will be affected by the coming of the Expo 2020 to Dubai as renting and real estate prices will be increased. However, income may not increase. While the Expo 2020 will bring about significant benefits to the emirate, an argument can be made for the other side as the effects on residents may not be as positive. Despite the mentioned effects of the Expo 2020 on Dubai, still no one grantee these effects. That's why further investigated and explored need to be done.

The main question to address in this matter is how the Expo 2020 will affect Dubai's tourism industry. While the Expo 2020 will serve its purpose, it will also be a means to attract people to the emirate, not just for the Expo itself, but to explore the city. Tourists will engage in visiting attracts, shopping and exploring what the emirate has to offer. By providing a positive experience to these visitors, Dubai will further see itself as one of the hottest cities to visit in the world. For the purpose of this research, the Expo 2020 will be covered as per its effects on tourism in Dubai. Findings will be presented in the form of a report which will be supported by statistics as well as final conclusions on the effect of the Expo 2020 on Dubai and its tourism industry. This study will identify the benefits of the Expo 2020 on Dubai and how these benefits can be taken advantage of to raise Dubai's international status.

Measuring Success of Mobile Education in UAE

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ABSTRACT

Mobile Education is a new form of learning enabling people to use electronic devices for learning and communication purposes. The world is moving towards smart innovations, 78% of the United States white-collar employees use the mobile phones for work purposes and the figure is expected to increase even more. The United Arab Emirates is trying to always coop with the latest in the industry and currently initiated the plan to convert the government into a smart one. It is important to start early in training the youth for the future. Therefor, UAE is focusing on improving education in its 2021 strategy. One of the objectives is to convert the traditional education into a SMART education. Mohammed Bin Rashid Al Maktoum Vice President and Prime Minister of the UAE, Ruler of Dubai started the initiative of Mohmmed Bin Rashid Smart Learning Program (MBRSLP) during the Government Summit of 2012. Many public and private schools have already converted to mobile base education. MBRSLP plan was to implement the program on Cycle2 (grade 6 to 12) first. In our research we are going to find out and measure the success of Mobile Education in the UAE. Our search will be based on other authors' opinions, books, websites, questionnaires and surveys that will be conducted to take the public opinion on Mobile Education. Our objectives are to find out the gaps in the current MBRSLP plan and come up with solutions and recommendations to overcome these gaps for better education.

Social Media Influence on Emiratis Lifestyle

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ABSTRACT

Social Media is mobile or web-based technology tools that people use to share pictures, videos, ideas and exchange information through a network. There are many applications generated for Social Media where it became a core tool for communication between people worldwide and an extensive means of exchanging cultural and traditional thoughts or opinions. The emergence of Social Media has spread rapidly where most of businesses and organizations had enrolled into and joined the rising communication technology.

Social Media became common phenomenon and essential part of people daily life recently. It started with Facebook and spread to other famous social applications such as Twitter, Instagram, Kik, Snapchat, tumblr, Pinterest and YouTube.

There are many positive effects of Social Media but it's still considered a negative tool in a way. Some of the big concerns are privacy, ownership of contents, effects on interpersonal relationships, reliability and trustworthiness of information and political effects.

In this research, a major issue will be addressed which is the effect of using social media in people real lives. The research main objectives are to study deeply the social media phenomenon effect among local of the United Arab Emirates and examine its negative impact precisely on their daily life. In order to fulfill this research requirements we will have to study this case based on a methodology that will include research reviews, statistics and surveys among the different age groups of nationals of United Arab Emirates to see how frequent they use Social Media, for what purpose and how it's affecting their interpersonal relationships and changing their daily habits.

The Effect of Education Sessions on a Group of Diabetic Patients

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ABSTRACT

Diabetes mellitus is a metabolic malady characterized by aberrantly high levels of glucose in the blood. Recent studies says that 20% of UAE population is suffering from Diabetes, type 1 and type 2. Diabetes can curtail life expectancy by as much as 15 years, and the majority of deaths in people in UAE with type2 Diabetes are due to cardiovascular complications. Diabetes and its impediments are largely avertable. Lifestyle interventions aimed at obesity, one of the principal risk factors, have been shown to prevent or delay the onset of disease. At the same time, proper diabetes management has proven effective in lowering the risk of complications in those who already have it. Left unchecked, the spread of diabetes foreshadows devastating social and fiscal consequences, including threats to economic advancement and investment stability in the region. The reason why this disease continues to grow includes demographic changes and increasing rates of overweight/obesity. Numerous population studies in the UAE have identified high rates of obesity and overweight. Hasty pecuniary evolution has steered to lifestyle alterations that resulted in low levels of physical activity, unhealthy nutrition, and increased obesity, all key risk factors fueling diabetes prevalence in the region. Particular reasons that are only related to the United Arab Emirates believes, culture and level of education were not fully identified yet.

The research paper aims to investigate developing of effective factors that enhances those patients confidence by optimizing their knowledge and educating them, improving adherence to medication, following healthy diet, practicing regular exercise, using modern health technology are one of the world's top health priorities. It is thought that that factor plays an important role in controlling and regulating both daily blood sugar and the cumulative, three monthly, blood sugar (HBA1C). It not only focuses on how to increase their awareness of the good side of those factors, but also proposes strategies and techniques to gain maximum advantage from implementation of those factors. Patients self-confident majorly varies among males and females in a male dominating culture are left untouched. Moreover, delivering surges of educational sessions to patients on one to one base and its effect on patients' psychological aspect to maintain a good control of their blood sugar on the long run needs to be addressed. Factors will pertains to benefits and limitations of those factors that will apply in their daily life were identified through literature review and desk studies. These factors will be use to construct a survey instrument, and aim to gather patient perspectives. A pilot study will conduct with the patients also a case study will conduct. The research will concluded by analyzing data collected from both methods and provides a list of recommendations.

Smart Phones in UAE

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ABSTRACT

Smartphone use has penetrated to 78% in the UAE in the last year, the majority of smartphones used by the 18-34 demographic are: Samsung (35%) followed by Apple (24%) Blackberry (21%) and lastly with Nokia (16%). The brand name and image above all else affects the choice of smartphone in UAE. There is a lot of competition to promote the best brand in UAE with people changing their smartphone every year. Other important criteria about choosing smartphone are the applications that are provided on them. Additionally, the applications help to maintain customers on a particular platform preventing switching and add an alternative stream of revenue for the platform used for the smartphone. For these reasons smartphone companies are continually increasing the applications on their particular devices. As of July 2014 the smartphone providers with the operating systems in brackets have a substantial portfolio of applications; specifically: Samsung (Android) has 1.3 million, Apple (IOS) has 1.2 million applications, Nokia (Windows) has 300,000 applications and lastly Blackberry (Blackberry IOS) has 130,000 applications. Sadly, many applications like Tinder, Skype, Viber as well as many more interesting applications that have helped smartphone manufacturers gain market share in Western Countries are shielded from smartphone users in UAE. How can smartphone providers. Samsung, Apple, Blackberry, Nokia increase their market share and popularity within the UAE by providing new applications in private marketplace?

In order to become popular in a particular market space companies need to adapt. This especially holds true for companies within the fast growing and seemingly borderless IT industry. Unfortunately, in the UAE there are much more government intervention than in Western countries. Thus there are many applications banned within the UAE due to censorship conditions and fear of dissidents. One advantage is that the UAE government has increased its IT capacity in recent years and has brought out a number of their own cell phone applications. With this the UAE is capable of assisting global technology companies in providing more applications for smartphones. Smartphone manufacturers can design and implement culturally sensitive application with the aid of government help. In turn this will by make better applications in UAE to increase market the smartphone market share . Smartphone companies can increase their popularity within the UAE by working with the government to provide good applications on their platforms.

Smart Education in UAE Government Schools

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ABSTRACT

Smart education can be a combination as intelligent and customized teaching and learning with the help of technologies. Smart education is comparatively new to the United Arab Emirates (UAE). Most of the government schools have allocated Information Communication Technology resources to provide replacements to the previously used teacher-positioned "talk and chalk" methods to learning and teaching. Furthermore Smart education resources and methods, and their fullest potential have not been completely understood by the government schools education sector in the UAE.

Vice-President and Prime Minister of the UAE and Ruler of Dubai, His Highness Shaikh Mohammad Bin Rashid Al Maktoum, has launched the Mohammad Bin Rashid Smart Learning Initiative on April 10, 2012 (Barakat, 2012). The mission of smart learning in public schools in the UAE is to deliver world leading education solutions for the UAE education community in order to drive up the educational achievements excellence and creativity of our students (smartlearning.gov.ae, 2014). The Mohamed Bin Rashid Smart Learning Program (MBRSLP) has become so popular that it has been recognized by the World Summit on Information Society (WSIS) and awarded 'Capacity Building' in 2014 for its role in promoting the use of ICT in federal schools and in building a communication and information infrastructure in the UAE (Smartlearning.gov.ae, 2014). There are many benefits that can be achieved from both teachers' and students' perspective such as enhancements in students' activeness, critical thinking etc. as Hirsch (2011) pointed out. However there is no research that has been done to identify whether all UAE public/government schools can adopt and make use of smart education to the fullest. If they have adopted then what is their success; the teachers from the Government schools have the knowledge, experience and willingness to use smart education technology tools and the students have the ability to get and adopt to the technology devices and tools.

According to Wright (2014), there are five barriers to adopting new educational technologies which are: electrical power, internet speed, training and professional development, value teachers and sustainability. UAE does not suffer from electrical power but other factors need to be considered.

Research Question:-

Based on the above, this research aims to answer the research questions listed below:

- What is smart learning and what are the technologies and methods that can make the learning process to smart learning?
- What are the factors which hinder the adoption of smart educational technologies for learning and teaching in UAE public school?

Aim:

The above research questions helped in formulating the aim of the research which is stated as below:

Investigating and identifying the factors affecting the smart learning technologies adoption in the UAE public schools.

Objective:

To following objectives will help in achieving the objectives;

- Investigate and understand smart education and various technologies that can aid in the smart teaching and learning process.
- Explore various government initiatives which have motivated the UAE publication to adopt Smart Educational technologies and their success rates.
- Identify the factors that motivate and hinder the adoption of smart learning technologies by the UAE public school teachers.
- Propose methods/Roadmap to prepare the teachers to smart teaching and learning environment.

Research Methodology:

The research proposed is a combination of exploratory and analytical research as the first part of the research requires the researchers to explore to identify and understand smart education, technologies needed for smart education adoption, UAE government's initiatives towards smart learning, the factors that hinder the teachers adopting smart technologies in general etc. The later part of the research will collect data from the teachers and analyse to find the factors that obstruct the adoption of smart technology tools in the teaching and learning process and propose methods to remove the barriers. The research aims to use both qualitative and quantitative research methods to collect data.

Result & Benefit:-

The result and the benefit in our research is that all government schools will be able to use our results to successfully adopt smart technologies and make the education process in to real smart education. The barriers identified will not only help the teachers and management in schools but also the policy makers to look into and choose methods and technologies that would suit the public school teachers. Also it will help them identify the types of training and support needed for the teachers.

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Virtual Reality Assistant for Dubai Women's College

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ABSTRACT

Dubai is one of the major cities in the world which embraces emerging technologies naturally. In fact Dubai always aims to implement and utilize the emerging technologies for the benefits of its citizens to enhance their life in every aspect and make the city, a smart city. Moreover, Dubai's vision is to focus more on providing excellent educational services using the latest smart educational technologies (smartlearning.gov.ae, 2014). One such technology is virtual reality. Virtual reality is a technology to create encompassing and simulated environments that provides natural and intuitive ways to interact with computers (National Security Agency, Produced in 1992 & published in 2011). Virtual Reality Assistants (VRA) are applications of virtual reality. The concept of VRA was first developed in the late 1960s by Weizenbaum (1966) of MIT. VRA is a technological advancement which can be used in a fun and interactive way to obtain crucial information related to a specific location such as airports, hospitals etc. One such virtual reality for airports proposed long back in 1998 during the International Conference on Simulation (Crook, 1998). Such systems are popular in airports and hospitals. This research aims to address the possibilities of implementing a virtual reality assistant in a higher educational institution in the UAE not as teaching tool but as an assistant to educate and guide the visitors and students.

Research Problem

Aligning with the mission of His Highness Sheikh Mohammed bin Rashid Al Maktoum, the Vice President and Prime Minister and Ruler of Dubai (UAE Ministry of Foreign Affaris, 2014), this research focuses on identifying and proposing Virtual Reality Assistant implementation in Dubai Women's College. The reasons behind the proposition to have VRA in Dubai women's college are as below:

- Students and visitors face issues such as slow services because they are all operated by humans which might cause lots of traffics. Therefore, it may decrease the college performance, operation which may affect the efficiency of the services.
- Though the clear manual sign boards are there to assist the students and visitors, Majority of students especially freshers and visitors get confused in finding directions.
- The IT services unit which serves the students to tackle their IT related issues is always busy and students always approach them even for very simple issues like password reset etc.

Research Questions

How implementing Virtual reality assistance will enhance the college efficacy and its reputation and what sorts of obstacles they may face while using it?

The Aim:

The aim of the research is to propose methods to utilize emerging technologies such as virtual reality assistance to enhance operational performance of a higher educational organization such as Dubai Women's College.

Objectives:

The various objectives of the research are as below:

- Understand the Virtual Reality Assistant (VRA) technology and it its various capabilities.
- Investigate and identify the various VRA initiatives in Dubai and their implementation strategies in order to understand the advantages and disadvantages of implementing such initiatives.
- Analyse and evaluate the necessity for VRA in Dubai Women's College (DWC).
- Propose a conceptual model to implement VRA in DWC.

Research Methodology

The research will be a combination of exploratory and analytical research as : it will explore to create an understanding on the VRA technology and its implementation opportunities and barriers and analyse and propose methods to justify and implement VRA in DWC.
Both qualitative and quantitative methods are needed to collect the data related to the research.

Results & Benefits

The research as mentioned earlier will justify and propose methods to implement VRAT in the DWC for the benefit of the visitors and students. Separate systems will be introduced for them in which one will be a humanoid VRA and the other one will be an application which can be embedded in the portal so that students can make use of the system whenever they need it.

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Driverless Cars for a Safer Tomorrow

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ABSTRACT

Driverless car is an automated car or an autonomous vehicle is a robotic vehicle that is designed to travel between destinations without a human operator (Fuoco, 2014). To qualify as fully autonomous, a vehicle must be able to navigate without human intervention to a predetermined destination over roads that have not been adapted for its use. Moreover the future based on driverless cars could mean big changes to the way cities are shaped, Cars that aren't beholden to a single driver would mean cities wouldn't have to use up so much valuable land on parking lots, the advantage of driverless car are Timing and Cost Convergence would help reduce the cost and complexity of stand-alone. Popular companies such as Google, Nissan, Intel and Daimler have proposed driverless cars in the future which clearly indicate that driverless cars are the future cars (Fuoco, 2014). Furthermore this new technology could be cruising down Dubai's roads by Expo 2020 (Road and Transport Authority;, 2015).

Problem

According to Fuoco **(2014)**, global statistical information related to cars and road accidents are as below:

- The number of cars worldwide exceeded 1.015 billion in 2010 and has been projected to grow by 21% between 2011 and 2016.
- Earlier this year, the OECD's International Transport Forum forecast that the number of cars worldwide would reach 2.5 billion by 2050 **(International Transport forum, 2011)**.
- World Health Organization's Global Status Report on Road Safety 2013 showed that 1.24 million people were killed on the world's roads in 2010, and another 20 to 50 million sustain nonfatal injuries as a result of road traffic crashes.

The same was reflected by **(Karnatak & Gupta, 2012)** in his article on Looking Beyond the Present: sustainable energy - a necessity. The issues that affect the UAE roads include: traffic, number of cars, accidents, impact etc.

Research Question:

1. **Will driverless cars be the future cars in the UAE?**
2. **Are the infrastructures in the UAE ready for driverless cars technologies?**

Aim:

To investigate and identify the possibility of implementation of driverless cars technology in UAE.

Objectives:

1. **Exploring and understanding the driverless cars technology.**
2. **To study the advantages and disadvantages of driverless cars:**
3. **Examining the UAE mindset about the driverless cars**
4. **Investigating the infrastructure requirements of the driverless cars technology:**
5. **Propose methods to integrate the driverless cars technology to UAE government:**
6. **Exploring the benefits of driverless cars in the UAE.**

Result & Benefits

The research will not investigate the technical aspects of driverless cars but investigate the possible implementation of such technologies in the UAE which is open to new innovations for the benefits of its people and sustainability. The various benefits include: Moving between the 7 emirates would become quicker and less stressful; Self-driving cars could make walking and biking more appealing; Self-driving cars could make the transition to electric vehicles easier etc.

Methodology

This research will be conducted using analytical and exploratory and will use both quantitative and qualitative data.

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Transforming Health Care Industry data into Big Data in UAE

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ABSTRACT

While UAE is open to adopting new innovations, it is inevitable that the healthcare industry should be able to incorporate those technologies for the benefits of the people and data related to them (Goldschmidt, 2005) (Klein, 2007). UAE is one of the countries with rapidly growing population with an estimated population of 9.2 million residents with the Compound Annual Growth Rate (CAGR) of 7.9% (Colliers International, 2013). The healthcare sector in the UAE caters to this rapidly growing population and therefore its requirements also change constantly. As the population grows the data storage size also grows. If the data storage issues are not tackled properly it may result in compromising the quality and security related to data storage. Some of the solutions to take these issues include: Cloud storage, Big Data etc. Big data refers to the content that is stored in it but cloud computing is a technique which can be used to manipulate the data stored using big data. In addition, Big Data can save from missing data and patient records. It could help patients to improve their personal health and care quality (Morley-Fletcher, 2013).

Research Problem

Hospitals in the UAE use their own storage and it is not enough for their data so they need to have extra storages to save their data. There are many issues that face the health care industry related to data such as the storages are not enough for their data because the data as medical records are increasing all the time, second issue is using cloud storages. Cloud storages suffer from issues such as privacy and in the UAE, laws related to patient medical records and privacy are set at each emirates individually, but the premise is continuous as defined in the Health Authority of Abu Dhabi policy paper (Department, 2012). The last issue is the cost of the storages is enormous and this affects the industry.

Research Question:

The research will answer the following questions:

- What is big data? How does it work?
- What are the opportunities and challenges of adopting Big Data for Health Care Industry data storage?

Aim:

Investigating and identifying the opportunities and challenges of transforming Health Care Industry data to Big Data in UAE.

Objectives:

- Investigate and identify the current data storage methods adopted by the UAE Health Care Industry.
- Investigate and understand what big data is and how big data has been used in the health care industry in developed countries such as UK and Europe.
- Identify the challenges and opportunities of using Big Data in UAE.

Research Methodology

The research will follow exploratory and analytical method of researching and use both quantitative and qualitative research methods to collect the data related to research.

Results and benefits

The result of the research will be useful to the healthcare industry and researchers who would like to investigate on applying big data in health industry.

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Educational Robotics in UAE primary schools

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ABSTRACT

Nowadays the technology is everywhere and it's growing quickly, everyone is communicating through technology. Even kids are interested in learning new technologies. Technology is advancing due to advances in the computing power. The advancements are happening not only in the computing technology but also in fields such as genetics, AI, robotics, and medicine (Sami, 2013). The United Arab Emirates (UAE) is one of the countries which embraces technology very quickly. Government of UAE is also promoting the adoption of new technologies for the benefit of its citizens and to change the cities of UAE to Smart cities. For the benefit of the educational institutions, the Vice-President and Prime Minister of the UAE and Ruler of Dubai, His Highness Shaikh Mohammad Bin Rashid Al Maktoum, has launched the Mohammad Bin Rashid Smart Learning Initiative on April 10, 2012 (Barakat, 2012). In line with this learning initiative, educational institutions are adopting new technologies to increase the logical skills and critical thinking of the school children. Also H.H. Sheikh Mansour bin Zayed Al Nahyan has proposed a list of the 7 key initiatives in our government and they all aim at innovations, one of the key initiatives is introducing the robotics in primary schools (smartlearning.gov.ae, 2014).
According to (Ilieva, 2010) the primary school is a place where children acquire initial knowledge and skills in diversified areas along with developing their basic skills and habits. Therefore new technologies introduced at the primary school level will create many opportunities. This research aims to look at how robotics can be introduced in the primary school education.

Research Questions:

-What robotics can do for primary school children?
- How can we introduce robotics to primary school children for the benefit of learning process?
-What type of robots' education can be introduced at the primary school level? And how they can be introduced?

Research Aim:

To investigate and identify the various type of robots which can be introduced at the primary school level in the UAE for improvement of various skills of the primary school children.

Research Objective:

1- Studying and understanding the types of robots that are suitable for the primary school children.
2-Find out what kind of robotics can be introduced to the primary school children in the UAE based on the social, cultural and economic values. Evaluate their applicability and benefits of such robots in Emirati schools.
3- Proposing methods for successful implementation of robotics and the benefits.

Research Methodology:

This research will use both qualitative and quantitative research methods to collect and analyze the data that will help to improve the way of using the robots for learning purposes by the teachers and kids.

Results and Benefits:

Group	Benefit
Primary School Student	Robots is not simply a group of toys, it is for learning skills. Primary school robotics lessons will give children a good educational environment, different and more interesting than the traditional classroom. In this new environment, children construct on creative thinking, hands on science and computer, team work and public speaking.
Teachers	Robotics builds on highly qualified teacher along with widely recognized curricula to provide its quality services to children. The new technologies can influence the educational environment Teaching. Lessons can be delivered easily and effectively with the help of robots.
Community	Educational robotics have a significant global impact to develop the communities. When a student graduates from high school will be an expertise and creativity it will not only benefit the student in getting the best possible higher education which will lead him through better career path but also will help in building a stronger community.

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Wearable Technology in Higher Education in United Arab Emirates

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ABSTRACT

Wearable devices refer to electronic technologies or computers that are incorporated into items of clothing and accessories which can comfortably be worn on the body (Tehrani, 2014). Google glasses, Nike fuelbands, Pebble smart watches are few examples of wearable devices. Google glass is a popular wearable device. It can be used to give students real-time interactive field trip experiences to reach places difficult places, teachers can use google glass during lectures to open up hangouts. Students can use the glasses to take notes and book mark important information etc. Wearable devices help students to connect with one another easily. For the education industry, it means teachers can connect their students with each other and experts out in the field. By using the wearable technologies in higher education for teaching, students will be effected by positive ways.

Wearable devices can be powerful tools to those with visual, auditory, or physical disabilities. Experts can monitor students with learning disabilities remotely and recommend interventions. Students can use such systems to immediately translate the contents into their understandable form (EDUCAUSE, 2013).

RESEARCH PROBLEM:

Most universities and colleges are using new technologies for the benefit of the students and teachers to enhance the learning process. Taking advantage of the innovative technology initiatives this research will find out how education industry can embrace wearable devices to enhance the teaching and learning process.

RESEARCH QUESTION:

The research attempts to answer the following questions:

1. What are wearable devices and what are the types of wearable devices that can be used in higher education?
2. How can wearable devices be used by teachers and students to improve the learning process?

Aim:

To investigate and identify various possible wearable technology devices that can used in higher education for learning and teaching.

Objectives:

1. To Investigate and identify various wearable devices which are very popular currently.
2. To Investigate and understand how these devices be used in higher education and what could be the benefits.
3. Propose effective methods of using wearable devices in higher education.

RESEARCH METHODOLOGY:

This research will use qualitative and quantitative methods to collect data related to the wearable devices through the available resources in libraries and surveys and interviews.

BENEFITS:

Wearable technologies are the best tools to improve the education industry. The benefit of wearable technology is that it can conveniently integrate tools that track sleep, movement, location and social media. So there are many different benefits of using Wearable technologies in higher education in the UAE, such as:

- The students can benefit from the Wearable devices to access to campus information, assistance with getting oriented to campus services, etc.
- Wearable technologies are lightweight and can be of great help in stimulating students' passion for sports. However, teachers can use wristbands to track students' activity in classes, as well as their overall fitness later using all this data to adjust the program.
- It can benefit the students and the teachers by recording instructional videos, so teachers can use devices, such as Google Glass or VRG (Virtual Reality Headgear) and the students can then record themselves performing an action and share the video with their instructor, who will be able to assess them individually and with greater care.
- Wearable technology will work great in all kinds of learning environments from traditional classroom to distance learning. Moreover, using Google Glass for students can discretely ask a question without disrupting the rhythm of the teacher's instruction.
- IT department use the wearable devices for other types of IT projects implementation since the environment is similar.

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Future Internet: a New Era of Web Computing

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ABSTRACT

The Future Internet is becoming a hot research topic all around the world from different angles and perspectives, since the current Internet has many limitations and issues (e.g. not designed for a global scale or integrated and composite services). As such, this research paper focuses on proposing a new idea to help out the Future Internet ambition to be achieved and its excessive infrastructure to be built up.

Composition of web services, components, functions, and other resources are at the heart of Future Internet. Internet of Things (IoT), Internet of Services (IoS), and Internet of Everything (IoE) are just new names (a glossary like) for the aforementioned composition derivations for the web standardization purposes. In addition to composing web-based soft and hard resources to serve the Internet clients' requests and demands to fulfill a certain task, the web clients themselves are becoming important web resources "*Web Clients as a Web Computing Resource*", formulating what so-called Internet of People (IoP). However, they are all based on the same idea of integrating different massively distributed computing resources from everywhere in the world.

It should be noted that the above technologies work completely separately from each other and there is no standard framework to bring those technologies together to devise the Future Internet structure. In this abstract we are proposing to integrate those technologies together to achieve the Future Internet idea. In other words, the Future Internet will exploit all the technologies and joins individual computers in a network to share resources with each other and allow people from outside the network to access any computer for personal usage.

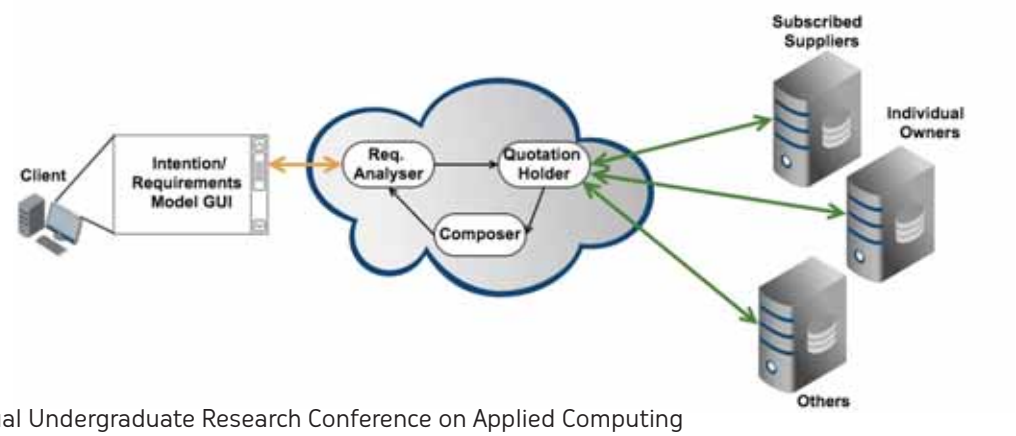
Now, with the proposed model in mind, instead of purchasing a new computer to accomplish a certain task, Internet users can user the Internet to request any type of resources and to process their computing tasks on other web client machines from everywhere in the world. This idea has much potential: (i) cheaper Internet Infrastructure (ii) greater total performance (iii) energy efficient.

But notwithstanding, this model has some limitations and difficulties associated:

1. since it is completely based on loosely coupled machines and resources, the communication bandwidth will be vary depending upon the client machine and the other connected machines;
2. will always have much higher latency than classic massively parallel machines,
3. the security and privacy issues when using others resources.
4. the availability of a node(s) where someone in a real need and no nodes/resources available.

Here is a scenario to address most of the problems within this research. A video editor does not have enough resources in his computer to finish rendering a video. He accesses the network and tries to find a node that has the potential hardware to help him finish rendering. He will check for availability, bandwidth and hardware specs before he moves on. Once he finds a node, or nodes, he has to go through a certification and verification that he will only use the resource for a good reason. The owners of the nodes then see this certification and choose whether or not to allow the person to use their resource or not. But a big question arises here is what if there is no node available?

Our future goal is to conduct some more research on the aforementioned model applicability on mobile computing, such as smartphones and tablets. If a person wants to use an application but cannot download it due to storage problems/limitations then he or she can stream the application via the community network.



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