6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

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BOOK OF ABSTRACTS

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Message from CONFERENCE CHAIRS

Welcome to the 6th Annual Undergraduate Research Conference on Applied Computing (URC 2014). 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 and interact with other young researchers, faculty members, and technology leaders from the region.

Contained in this eBook, you'll find one hundred and forty nine 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 educational institutions in Egypt, 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 our sponsors, Zayed University Office of Research and emaratech, for their continued commitment and generous contributions that helped make this conference a reality. Thank you! This year's conference is technically sponsored by the IEEE, thanks to Dr. Wathiq Mansoor and the IEEE UAE Section.

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 Hind AlDosari, Dr. Huwida Said, Nagaraj Chandrashekran, Mona Bader, and Izzeddin Asad. 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 and providing the needed resources.

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

Dr. Leon Jololian
Dean, College of Technological Innovation
Zayed University, UAE

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

Dr. May AlTaei
Conference Co-Chair
Zayed University,UAE

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

URC 2014
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Motion Analysis for Sport & Biomedical Applications

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Yarmouk University, Irbid, Jordan

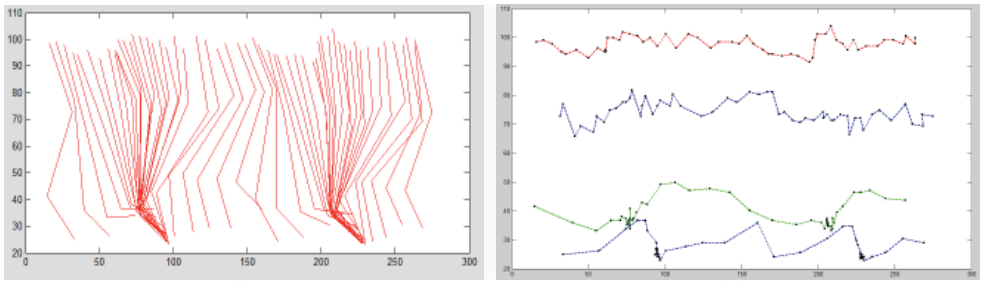
Supervised by Eng. Sami Faris almshagbeh

ABSTRACT

Motion analysis is the systematic study of human motion, using the eye and the brain of observers, augmented by instrumentation for measuring body movements, body mechanics and the activity of the muscles. Motion analysis is very essential in sport activities to enhance the performance of an athlete and to ensure the correctness of regimes. Because motion analysis is very important, the hospitals become to use motion analysis software to help patients to recover from their injury without any problems. So the goal of this research is to develop low-cost two dimensional motion analysis software with using just one camera and our software, to calculate all kinetics and kinematics calculations and get full motion analysis.
The increased interest in business analysis of the movement and increased demand, especially by hospitals and sports facilities ...Made us care about providing an easy and practical way to work a full analysis and integrated for the person who wants to improve himself.
The obvious competition between companies in recent times to provide care products analyze movement made us think in a practical way in which we can get more results and less equipment in the field of motion analysis and be available to all people interested in this area, not only in the field of sports. We have been successful through this project to reach this goal.

- Features

1 - The ability to work anywhere in the test does not require the presence of a person in a private laboratories or places
2 - The tools needed by the supervisor of this test is a camera and something fixed length of the work of the calibration phase
3 - A person who wants to do the test wearing any clothing he wants and does not need to wear a particular dress, as in other projects
4 - Ease of development of the project to become the 3D system and that's just adding extra camera
5 - Very accurate results and up to 98% accuracy
6 - was the work of many projects in motion analysis, but all rely on find Kinematics the equipment only, but in this project can get kinetics & Kinematics data
7 - You get comprehensive information on every detail in the body
8 - Advantages of this method is that it did not need to install markers on the body, and this provides us with more money
9 - Data can be analyzed at any time where he can record more than a video and then analysis can be done at any time



(1) (2)

Figure 1,2 Show how movement is detected by a camera and analysed by the software

Tracking Criminals' Activities using Social Network Analysis

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ABSTRACT

The internet, specifically social media, has provided criminals with the opportunity to plan and commit criminal acts. Social media has made it easy for criminals to communicate and organize crimes. Preventing crimes requires tracking and monitoring criminals' activities. One way to achieve this goal is to trace their communication/link channel, which is the social network.

Social network analysis has already been utilized in many fields such as medicine and business. For example, social networks help business managers to spot certain trends among customers, to be able to anticipate their needs and create products that satisfy those needs.

In this project, we would like to develop a novel system capable of monitoring criminals by mining their activities over social networks. This is important for both crime investigation and the development of effective strategies to prevent crimes. Criminal network analysis has been, and for a very long time, a manual process. The only step forward that has been taken in this field is the visualization of the network. To date, applications that have the capabilities to effectively mine and extract knowledge from large amounts of criminal data are not available. Our system has been developed to contain an algorithm inspired by Google PageRank and ProRank that ranks individuals in the social network based on their importance. The system quantifies the importance of each individual in the network based on the links between individuals in the social network. Novel ways of identifying influential individuals and detecting related suspicious sub-communities have been developed. This system which we call "CriNet" is also capable of visualizing the distribution of criminals in a social network. This is important indeed in tracing their activities and finding patterns within their links. In addition, CriNet provides several network statistics such as: number of individuals, isolated individuals, communities and connections in a network, and average number of members in a community. An overview of CriNet is shown in Figure 1.

This system is expected to be used by law enforcement officials with limited computer skills and, therefore, the a user friendly interface for CriNet was developed as also shown in Figure 1. The application has been completely developed and can be installed on any computer.

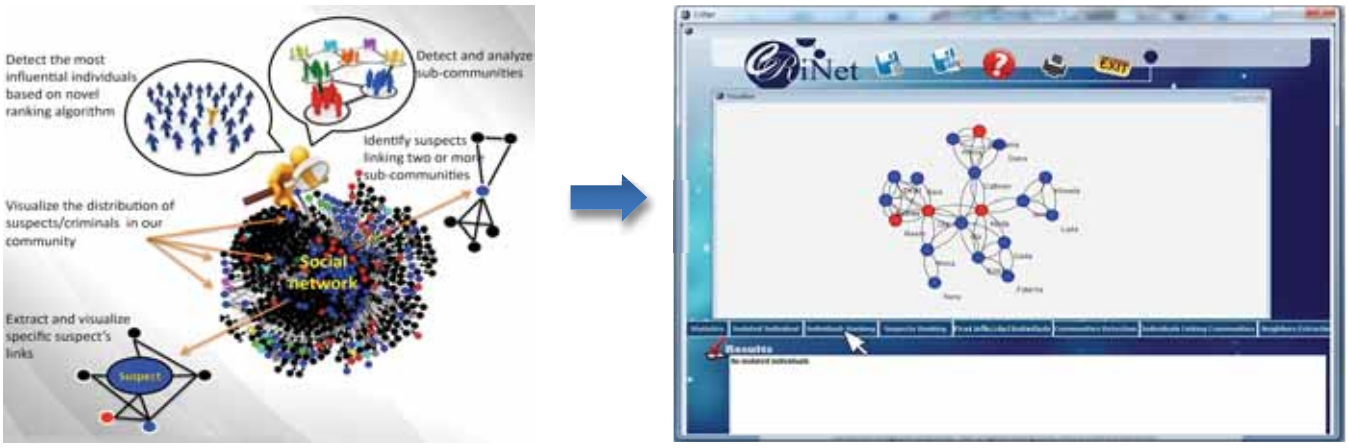

Figure 1: CriNet overview.

Scalable Vector Capture of Audiovisual Content

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ABSTRACT

In the early days of teaching, teachers were using basic methods to transfer knowledge to the students. The simplest method was writing on notebooks or reading from books, which was boring for the students. With the development of technology and IT, new ways of teaching are introduced. They enable creative thoughts and interaction between the subjects, students and teachers. For this reason, teachers try to develop their own methods of teaching by using new tools to ease student understanding. One commonly used of these tools is the Smart Boards. Smart Boards are interactive whiteboards that detect touch for user input, which can be interpreted to mouse events – e.g. scrolling, dragging or clicking. Some methods exist to capture and archive the lessons being taught on a Smart Board; however these generally result in large video files that are difficult to publish over the web, and download on mobile devices. In this work we present a vendor independent capture system with features that enable fast and automatic publishing of lessons. The contribution in the proposed system is making it independent of vendor, Operating System (OS) of the capture device, and OS of the viewing device. Additional contribution is made by making the format of the output compact in size, scalable to fit various screen sizes without quality degradation, and digitally structured.

There are many applications that can be integrated with Smart Board for multiple uses. Some applications support recording the lectures and publishing them as a video to the blackboard. Our main goal is to develop an application to record session by capturing audio and pen strokes as SVG file which has very small size compared with other video formats. The session can be edited later on by the teachers before publishing. Sometimes, the session may involve unnecessary parts that can be removed easily by simple steps. Moreover, it helps in developing teaching techniques in several ways, for example; it can offer a comparison between two teaching sessions about the same topic, aiding the development of a completely new way of teaching. It can give an idea about what to include and not to include next time to improve teaching skills and it also can be used to train new teachers.

The program will record the mouse or pen motions and save them in the SVG format, which does not require a high bit-rate. Capturing these as strokes rather than pixel data which used in other systems that captured video sessions, would enable processing them. Furthermore, strokes are “structured” data but pixels are non-structured which is the same as comparing screenshots of text document instead of comparing the text data itself. Also it will record the sound and then synchronize the audio with the strokes. After that, the user can edit the file by deleting unwanted frames from the file.

The program developed in this project is divided in two parts: capturing interface and management interface. Capturing interface is a simple white screen that runs in a full-screen mode. When the mouse is idle nothing happens. When the mouse is clicked or dragged, the program records the position of the hidden mouse cursor at a very high frequency until the click to drag is over. Also the program records the audio via a microphone. Everything is time-stamped so that audio and video can be synced later on. The audio can be saved in any format, while the video must be saved in SVG format as simple lines, which will save a lot of space. SVG format would enable fast upload to the web. Since we are capturing the mouse, almost all Smart Boards can be used with ease – no integration with Smart Board APIs is required at this stage.

The management interface loads a list of all teaching sessions that have been recorded. For each session there are the options to delete, rename, group, replay, or edit. Group function would enable the teacher to group his/her session into something like folders. Replay functions loads the SVG file, the audio file, and the timestamp data and then play back the audio and visual recording in a synchronized manner.

The edit function is the last extension. The first functionality is a simple trimming/deleting a selection from the beginning or end of a session. The second functionality is trimming/deleting parts selected in the middle of the session and inserting time gaps in the audio or the video to enhance the synchronization. The last functionality is rerecording parts of a session.

The first module of the project is that which records the strokes using the Graphic 2D and record audio using other Java APIs. The second module converts the strokes data and the audio to SVG file with XML tags. The third module is the editing interface and functionality. This includes implementation of time synchronized cutting of the strokes and audio. Finally, the last module consists of an interface that connects all components of the solution.

The output of our program is a SVG video file. As mentioned before, the output is easily publishable via online systems and highly editable. Other file formats, such as HD video, are non-structured pixel data, making them harder to edit and require lot of bandwidth to publish.

In summary our project direction falls under educational track, which help to develop learning skills and techniques. Smart Board is one of the common tools used in classrooms and laboratories. As a result of the search and the feedback that we got, we observed that most of the users have a positive impression about it. Therefore, our project developed functions for the Smart Board.

Smart Money Reader for the Blind and Visually Impaired

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ABSTRACT

People with complete blindness or low vision often have a difficult time self-navigating outside well-known environments. In fact, physical movement is one of the biggest challenges for blind people. They face many problems in their life such as not being able to drive, not being able to read anything they want to, not being able to watch movies or TV shows or computer web pages. Traveling or simply walking down a crowded street may pose great difficulty. Because of this, many people with low vision will bring a sighted friend or family member to help navigate unknown environments. This issue and the fact that smart phones became very common made me thinking to find a good and an easy way to help blind people and make it easier in their life than before. Smart Money Reader application is an android based application that provides the blind user with services that they might need it during their days. This application benefits from the services that provided by smart phones such as internet access, Camera and it's processor in the image processing techniques. Money Reader is a helpful application that's simple and easy to use. While shopping, use the application to verify money while checking out or to ensure you are getting the right amount of change back. This application can be used to quickly and easily sort money with independence and confidence. The denomination is also displayed on the Android devices in high contrast large numerals, for those having sufficient vision to make use of the display or displayed in high clear Sound for the blind ones. We have used agile methodology based on iterative and incremental development where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams. The user will face some difficulties; my application provides services designed to reduce these difficulties, which make their day easier than ever and helps them save time.

Clinical social network

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ABSTRACT

Most of us (if not all!) experienced a situation where we wondered " who's the best physician to visit?!", when we are or our relative is in an unhealthy situation in addition "where is that physician clinic?"

In our project we are going to introduce a web based social network that help people find the best physician around and the location of his clinic. Our proposed Clinical Social Network (CSN) will help the community to have better treatment based on trusted information, knowledge and corporate among users to achieve better societies.

It will enable people (users) to interact with each other and let them post comment and learn feedback about physicians and clinics they dealt with, or already know them and their qualifications so as to help people determine the best clinic to visit.

The proposed system will achieve several benefits such as providing e easy and fast way to have trusted information getting used of the level of trust (LOT) concept that will be described soon and the feedback given by users. Also one can find his best physicians using our proposed system easily. Every user belongs to our system is given a value of LOT, determined according to the following rules:

1- Every user will be given a positive LOT value based on a criteria or criterion.
2- Socially known and trusted persons will be given a high LOT value (i.e. 10)
3- New users who are unknown socially are given a low LOT value (ie.1)
4-The LOT value of any person is increased or decreased based on his posts and feedback, whether it's true or false.
5- The post of a user with high LOT value is considered true.
6- The post of a user with low LOT value is determined as true or false, is either by comparing it to a similar post of a well known and trusted person, whose LOT value is high, or by checking whether there are several similar posts.
7- Every physician will have a value that will be used to determine his rank between all other physicians , by default all physician will have a value of 1, and this value is increased or decreased based on number of good or bad post from users .

The proposed system is designed in a way that can be used easily by different type of users, CSN help the community to have a better healthy services that guaranteed by different factors used in CSN. The future work on CSN is to be used in all cities and countries in Jordan and to cover all the clinic types, so the future work will be about (full healthy environment).

Prototype of Virtual Reality Library

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ABSTRACT

Virtual reality library is a web based application that has been implemented to provide the library visitors an attractive virtual three dimensions tour with the ability to locate a resource, favorite a resource, set reminder and view the resource in Google books.

Over a long time libraries symbolized information. When looking for any type of information people would most definitely be at a library. However in our era technology made it possible to acquire any type of information using the Internet. Because of this, people deserted libraries and are living more in virtual world. When it comes to researchers, students or faculty members, they are in need for library services to find authentic resources yet they lack free time and their time is mainly wasted just touring the library to search for the required resource besides that off-campus visitors sometimes seek a rare resource and they might be miles away which leads them to rarely visit the library.

Nowadays there are so many digital libraries on the Internet such as King Saud University digital library. The digital library is a very efficient, modern, and helpful technology spreading knowledge, however the visual representation of information and user interactivity can make data easily processable in a digital library. New technologies such as multimedia, 3D graphics and virtual reality can be used to enhance the presentation, offering a more vivid and enjoyable experience to the library visitors.

The main objectives of our application is to implement a virtual reality library that shall save the stakeholders' time by allowing them to view a 3D display of the library, navigate around library sections, use a navigation map that guides them to the required section (see Figure 1) and they can view the resource information (resource title, authors, edition, publisher, year of publication and small description). The visitor can also register to become a member of the library. Membership allows the user to locate a resource by the resource's Dewey Decimal Classification (DDC) code (see Figure 2), share a resource on social networks and favorite a resource. In addition the member is allowed to set a resource-related reminder.

In order to achieve the above requirements, this application is designed as a set of three-dimensional objects which model the library structure, using Maya® 3D modeling software. To guarantee services availability, a system architecture based on "*client-server*" has been chosen. The interface pages of the system are programed in Unity Game Engine using C# language, and PHP and SQL for server-side scripting and database connection. The Virtual Reality Library website is uploaded to SiteGround web hosting server. A usability study was conducted through several testing to validate the effectiveness and efficiency of the functionality and quality of user experience of the developed application.

In summary, the main goal of this project is building a prototype of an interactive, user-friendly library web application, which gives the user an entertaining virtual visit experience. The aim is to raise awareness of the importance of libraries, increase library visits and most importantly help users find the resource in less time. This prototype provides a baseline that can be adopted by any library.

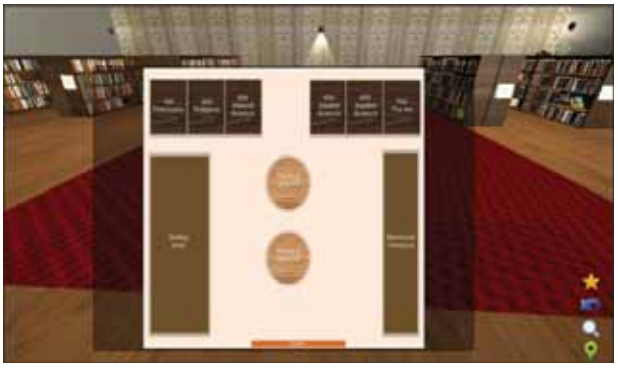

Figure 1. Library's map

Figure 2. Locate a resource

Online Recruitment Management System

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ABSTRACT

Online Recruitment Management System (ORMS) is a Web-Based system that aims to improve the academic recruitment process at King Abdulaziz University (KAU). In the current process, an applicant must fill in the required forms, prepare necessary documents and submitted them personally to the KAU Human Resource Unit. It is non-flexible and non-timeliness. Data organization is difficult and it is not easy to track or retrieve certain information from stored data because of the huge amount of manual files. The users of the ORMS are job Applicants; who are seeking for academic jobs, Human Resource Unit; who are responsible for managing candidate files, and responsible units those who carry out the last decision-making of hiring job applicants. ORMS contains several functions such as registering of applicants; creating curriculum vitae of applicants; searching for vacant jobs; automatically sends SMS/Email notification on any relevance vacancy; matching and filtering job candidates under certain criteria by employers; browsing all candidates' information and evaluating them during the interview. ORMS uses Gopher Software Agent to execute a simple task based on determined rules. This agent has the ability to perform and execute most of their problem solving tasks without human intervention. Along with that, it uses Application Programming Interface (API) services that connect human to the system through sending text messages over the Internet. ORMS built by many software such as Database Engine Microsoft SQL Server to save the system information, C# programming language, ASP.net framework to build the Web Pages and the website of the ORMS, Microsoft Visual Studio.Net 2010 environment to develop the user interface along with the website. ORMS aims to minimize recruitment process and add value-added tasks. It will reduce the time consumed by filtering and sorting job candidates under certain criteria automatically, and manage them by selecting the qualified ones in the interview. It will reduce paper waste, provides more credibility secured data and eliminates data manipulation. Figure 1 below shows the Contact information page in creating applicants C.V

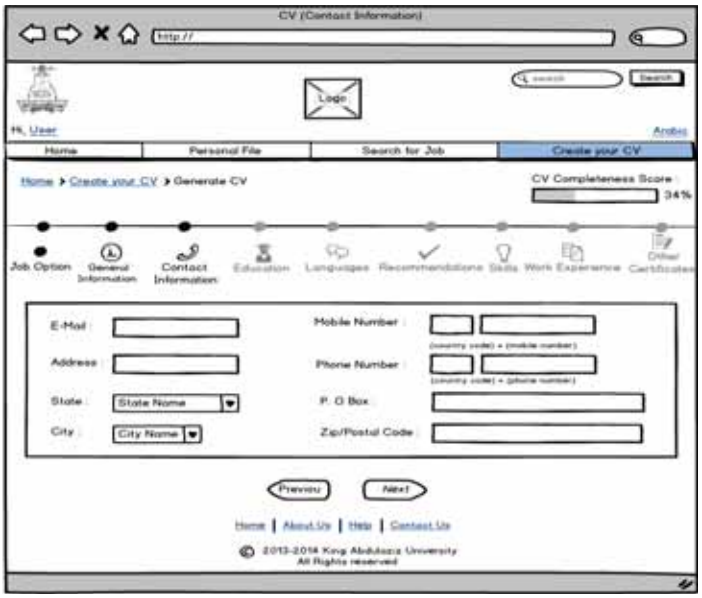

Figure 1: Contact information page in creating applicants C.V

Ophthalmology Images Archiving System

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ABSTRACT

Nowadays, technology is affecting every aspect of our society. All domains, such as transportation, communication, security of healthcare are relying on technology in different manner. But the technology impact is more tangible in the field of medicine and healthcare. Technological advances are transforming the way healthcare is being delivered. For example, the electronic health records have improved patient health and safety. Patient files are being kept in databases that can be accessed from anywhere. This is not only a time saver but it also results in better data coordination and management.

In this context and in order to facilitate and simplify the ophthalmology images archiving and sharing, we developed Ophthalmology Images Archiving System (OIAS).

OIAS provides a unique medical solution for ophthalmology section at King Abdulaziz University Hospital (KAUH) (Riyadh, Saudi Arabia Kingdom). It seeks to archive all eyes images of the ophthalmology section after reading them by different medical machines, unifying image formats to be in DICOM (Digital Imaging and Communications in Medicine) format which is the standard used for handling, storing, printing, and transmitting information in medical imaging and storing them in one database to be shared via a web application.

The idea of the project came to cover the need of hospitals in Saudi Arabia. There is no similar system in all ophthalmology sections over the kingdom. The current problem is that the hospital has many imaging devices. Each one is filming a particular area of the eye and then provides images in his format which is different from the rest. To develop a Picture archiving and communication system (PACS) in medical we need to convert all images to a DICOM format.

The system provides a web application which is linked with the hospital information system to retrieve patient information, create, search and browse patients cases with their images and diagnostic reports, create a favorite list for each user and share different cases between interested and researchers. Figure 1 shows the OIAS workflow.

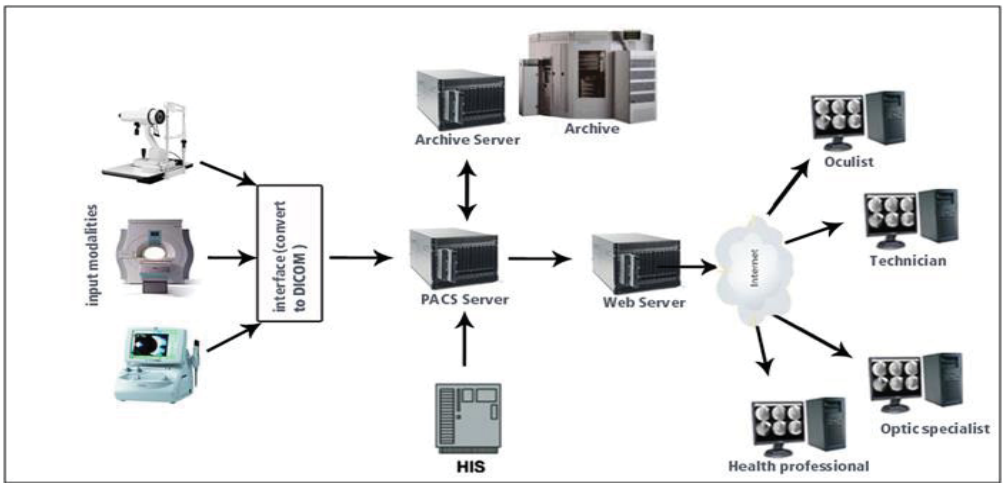

Fig. 1. OIAS Workflow

This system will facilitate the work of the staff in the Department of Ophthalmology, where it will reduce the use of paper, stores images for longer range, facilitates the sharing of cases among examiners and those who are interested in various places.

Nutrition and Health Control System

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ABSTRACT

Nutrition is the science of food explains the relationship with the activities of living organisms, among the eating, and the expulsion of waste, and the start of the energy of the body, and synthesis.

We are going to build a system that focuses on relationship between the health body and individual personal habits in food. And we will give a web based system that introduces all information about food and drinks, calories benefits and its effect on human healthy and weight.

The information of our system will be collected by expert's consulter, scientific books and trusted magazines and web sites, Then based on the information that we supply to our system an artificial algorithms will be used to retrieve accurate useful advices and detailed information that help users decide the best practice, and we will introduce a mechanism that helps users to follow up their daily meals, what it contains (calories, fated), so as the user can referee to it any time he needs a consultant.

The idea behind this system is reach the largest possible number of people, to get benefit in the field of neutrinos, which will form the program and how it works as easy as possible, appropriate in line with the needs of people. Because some people suffer from some diseases that do not allow having random food of calories that might affect on their health and weight either increase or decrease it.

If a person is aware and wants to control weight, food and drink effect or his health , he will face a big or serious obstacle until he get what he looks for so as to control and follow up health conditions. He has to search the internet, books, and magazines or even consult experience people.

As a result user of our proposal system will have an accurate control on their health condition. By follow up what they have food and drinks. In addition; they can get a direct consult concerning their health condition.

The mechanism of the system how it works is that every user going to register in the website for his own account that nobody else can access it and nobody else should use it, after that he should have a commitment to insert everything he eats and the actions that he does like sports or some habits 3 times in each day at least and it all should be real and accurate, so based on what he inserts the system will Monitoring and follow-up his activity from day to day, by recording the all the information that he given and find the relationship between that activity and Impact on health, so in the end we will give him a warning message or consultant of he should do and eat to have his perfect weight and the best treatment to his health which is the most important thing.

Transportation Management System

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Supervised by
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ABSTRACT

Transportation service is one of the main services in the hospital. Currently, this service is facing many difficulties as scheduling trips and managing vehicles due to lack of organization. Managing transportation by online website will reduce these difficulties.

Our project has as target to realize a web application “TMS”: Transportation Management System. This application aims to help and facilitate the hospital services to effectively manage their transportation. It helps organizing the movements of the vehicles, schedule all trips, manage drivers, warehousing, communications and accounting. it aims to help the Hospital staff to save his time and effort.

This project is a web application to facilitate the hospital to manage their transportation service. The system is used by a large number of users as managers, nurses, secretaries, and drivers.

We developed a system that enables the customer to submit a transfer request online according to a schedule indicating the availability of drivers and cars to make it easier for him/her to choose. In addition, it provides a functionality to calculate the consumption of gasoline There is no need from now to use the manual way to fill the transport application. TMS helps hospital staff to fill applications for any type of transportation easily and without any delay. This process saves time and effort, manages drivers schedule online, assigns vehicle online and displays report transactions which are not usually found in another transportations system! Which that means those functions add some benefits to our system to the other online transport systems!

A Fast and Robust Protocol for Reconstruction and Re-Enactment of Historical Sites

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ABSTRACT

This paper is part of a currently ongoing series of Cultural Heritage projects in collaboration with The European Union, aiming at creating new technology driven installations for the museum to facilitate information and learning of the history at the museum in interactional way. One of the ways of engaging the visitors of the museums interactively with the artifacts is reconstructing missing parts. So, this research proposes a novel reconstruction protocol for restoring missing surfaces and low-quality edges and shapes from photos of artifacts. The idea tackles this reconstruction process starting with the extraction of points cloud, based on four toolkits that use specific algorithms. These reconstruction algorithms of these toolkits are differing in the robustness and amount of resultant noise after the process is complete. Moreover, they differ in some related features and the way they build the quality meshes. Any 3D reconstruction regulation has a particular instrument, which gets materialization and status of the object. The data liberated from the device must be processed in order to build a 3D model. Most of the photo reconstructing methods based on the projection of corresponding 3D points for specific images. Those points will be the "sight" of the new reconstructed model. Virtual SFM software used for 3D reconstruction using Structure From Motion method has the ability to process dozens of photos to create a very dense point clouds. It is hard to determine which point is the start to be compared with the corresponding point in another image. Thus, if two images exist then the position of a 3D point can be defined as the result of the intersection of two projected rays. This method is called "Triangulation". Thus, matching results of low resolution pyramids are used to limit disparity search ranges for high resolution pyramids. SURE is software that is used for that purpose; based on the Semi-Global Matching method. The corners of the triangles are nodes that are connected to each other in a mesh form; the way that those nodes are connected into meshes is based on building Octrees. The MeshLab software depends on the Ball Pivoting Algorithm. Finally a dynamic color rendering system helps the user to visualize per-point scalar fields in an efficient way. Therefore, CloudCompare provides a set of tools for editing, rendering 3D points clouds. The algorithms in the proposed protocol can obtain a good dense sample of points collected as a smooth model. After applying each algorithm and comparing the results with the previous one, the quality of the mesh is improved; the resulted model is noiseless and with less holes. Also the number of vertices resulted in the mesh are doubled more than 3 times in each experiment. The results after each trial are shown in the figure below.

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Meeting Scheduling Algorithm: a straightforward solution to a complex problem

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ABSTRACT

Time is an important resource and everyone has the same 24 hours in a day, yet some people get more out of them than others. The key reason behind this is effective time management. This includes keeping a schedule on when a task should be started and completed. The performance in any task may rely on when the task is scheduled. Breaks need to be scheduled after any tangible progress to recover enough to do more work later, but not long enough to miss a deadline or waste energy. Although personal scheduling may be an easy task but scheduling events involving more than two persons is definitely cumbersome. When scheduling an event involving a group of people, their schedules must be reviewed in order to come up with a common free time among the entire group. The complexity of the problem rises as the number of people involved increases. Meeting scheduling is a common problem faced by multitude of domains such as schools, professional organizations, hospitals and so on. Ineffective scheduling may lead to missing deadlines, inefficient working hours and dire consequences in critical applications. The aim of this paper is to develop an algorithm to find common free times among a group of busy people using a Greedy Slot-Merge technique. This algorithm is then applied to a university setting and observed how effective scheduling leads to reduction in overall work hours with the same work outcomes.

In order to conceptualize the algorithm, we have developed six functions to manipulate schedules and come up eventually with valid common free times. Four of these functions are essential: "*merge Busy Time*", "*extract Free Time*", "*eliminate Ranges*", and "*eliminate Short Times*". We used "*merge Busy Time*" function to combine all the already scheduled meetings that involves at least one person of the new meeting that we need to schedule. The meetings are represented as discrete time ranges on a linear time line. Then we used "*extract Free Time*" function to take the inverse of all the busy time ranges which results in a set of all the time ranges that people involved are not actually working. The extracted free times might contain time ranges where people are not working, but still can't meet such as vacations, weekends, and other non-working preferences. We used the function "*eliminate Ranges*" to eliminate any common free time range that we can't use. We developed two supplementary functions that is utilized by the main functions "*eliminate Ranges*". "*eliminate Weekends*" generates time ranges of all the weekends that intersect with the extracted common free times and is used by the function "*eliminate Ranges*" to eliminate weekend time ranges from our common free time set. The other supplementary function is "*eliminate Dead Time*" which generates discrete time ranges of the daily hours where people involved can't work such as lunch hours and sleeping hours and is used by "*eliminate Ranges*" function to eliminate the generated ranges from our common free time. The fourth main function is "*eliminate Short Times*" which eliminates short ranges that are not long enough for the meeting that we need to schedule. The final output is all the common free times where people involved can actually meet and are long enough to cover the whole meeting.

To test our algorithm, we have collected weekly schedules of twenty member of our college. Eight of them are graduation project evaluation committees whom are also faculty members and the remaining twelve are senior students. Both senior students and evaluation committees need to meet on irregular bases to discuss graduation projects. Before we come up with our algorithm they used to inspect each other's schedules manually to come up with a free common time. We ran our algorithm on the periods where they scheduled their meetings to test if our algorithm can extract times that students and evaluation committees couldn't extract manually and then see if one of the found common free times were better than the manual solution. In all tests, we were able to extract better and newly discovered common free times where people involved would be more productive.

Usability Evaluation of Arabic Mathematical Educational Mobile Applications

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ABSTRACT

In recent years the quick growth of mobile technologies is promising a new revolution in educational field. The use of mobile touchscreen devices such as tablets and smartphones in educational process for children has gradually increased. In the Arab world, statistics shows that about 33% of children use iPads for education. However, Arabic educational mobile applications target children include many usability problems such as lack of proper feedback, interface aesthetics, etc.

This paper, reports on the findings of a pilot study conducted to measure usability of two Arabic educational mobile applications available in the Apple App store, used to assist learning addition for children. The first application represents the knowledge through games, while the other was designed to present the content in formal and linear structure. The applications were evaluated using usability testing. Fourteen participants of age 6-8 years old elementary "female" students (Mean M=6.5; Standard Deviation SD=1.2) joined this study as subjects to test the applications. Each child required to do specific tasks during the testing session to measure the usability of specific activity. The result shows that 75% of the children failed in understanding the scale idea in the first application. For the second application, all children completed the tasks successfully. The analyzing of the results shows that the success in the second app is attributed to the way children learn addition in school. The children studied addition in a linear way 1+1 =2; while balancing idea wasn't familiar to them. They didn't recognize that the value of 1 and 1 in the right hand of the scale is equal to the value of 2 in the left hand of the scale.

Figure 2: First Application

Figure 1: Second Application

According to the conducted pilot study, a set of recommendations is given for Arabic educational mobile applications designers and developers, as follows:

- Before start designing an educational game for children, take a look for children's curriculum, it will help you to understand some of children knowledge.
- Identify the target user correctly by specifying the educational level for the children not only the age, and make all activates in the application suitable for the chosen target.
- Give a clear example before starting the educational game in your application, to facilitate the interaction with the game, and to gain more knowledge from the context.

Student Information Systems in Saudi Arabia The case of AlJauhara International School

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ABSTRACT

Saudi Arabia is undergoing astronomical changes. The country's demographics, its culture and its industries are all experiencing subtle but continuous reforms. One such change is the establishment of an e-governance system called Noor by the Ministry of Education (MoE) which is for all the schools across the kingdom. While the system is the central hub for all schools to store their school administration data, it is a property of and is hosted by the government. Despite Noor being a success and receiving awards for its exemplary effectiveness, a key component complimentary to its function remains untouched and unrecognized: Student Information Systems (SIS) that in essence are the true source of information that is fed into Noor. SIS consists of tasks such as registering students, attendance record keeping to control absentees, producing report cards, producing official transcript, preparing timetable and producing different reports for teachers, parents, officials from the Ministry of Education and other stakeholders. Due to lack of competent systems used, especially by the small schools, working with Noor is a constant struggle. Thus, this paper intends to shed some light on school SIS's by taking a case of a small-sized international school's system into focus and analyzing, designing and implementing an improved system for it which would better compliment the e-governance system, Noor.

Schools in the Kingdom are at a clear disadvantage due to their inadequate information systems. Given that Noor works solely in Arabic and international schools hold data in English, we can see the dire need for a bilingual system that can manage data in both languages. Furthermore, a key trend to be recognized here is that the schools using packaged solutions were the ones to complain of process complexities in their system, justifying the schools' need for a system or software that is tailored aptly to their technical expertise and skills. Schools that are suffering the most are the small-sized ones that can neither afford the packaged nor the in-house development solutions. Moreover, many small schools in the Kingdom are not automated at all and their record officers generate transcripts and reports manually while the school administrators generate school schedules through continuous iterations that take up to days for a group of seven classes. As such, the system developers of this project choose to study and develop a system for Al Jauhara International School, a school with less than 500 students, which would fulfil all their administration management needs as well as allow smooth integration with Noor. The success of such a project would open low-cost local SIS opportunities for a wide-range of schools in Saudi Arabia.

The proposed SIS aimed to solve school's problems by centralizing all the data and making it accessible to all the users through the Web. Mostly, this eliminates data and process redundancy while maintaining data integrity and confidentiality through customized access to multiple users. Student profile, student grades, student fees and parent portal as well as report generation related to all these areas defined the boundary or the scope of this project. Only basic information of the teachers was recorded in the system in order to facilitate student grade records. Other key features of the system include: bilingual capabilities that allow it to function in both, Arabic and English language; enable formats of existing documents to be changed effortlessly. Complete faculty information, schools legal documents, library, canteen, admissions and resources were all agreed to be a part of the project's second version. A hypothetical methodology used for this project was Framework for Application System Technologies (FAST). The system was developed in C# using Microsoft Visual Studio.Net while the database was designed as a relational database and implemented in SQL server 2008.

The industry for student information system in the kingdom is becoming intensely attractive and is rapidly growing. Countless opportunities exist for the authors to explore and incorporate into the proposed system. One such opportunity is to use cloud computing for the SIS. This will not only further reduce the cost of locally developed SIS's, but will also allow a wider audience to be reached. Given that this SIS will be the first of its kind in the region to have bilingual capabilities at quite a low cost comparatively, the project is bound to be a success among schools and other educational institutes alike. The purpose of the project so far was basically to make it functional while respecting the minimum requirements of a user friendly interface. Nevertheless, further work on the design of the graphical interface is required. The authors look forward to working in collaboration with MoE to not only standardize school SIS's but also to transform the way schools and MoE's communicate with one another, making the whole industry more efficient and effective in the long run.

A Comparative Accessibility Analysis of UAE E-Government Websites

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ABSTRACT

The UAE has been in the forefront countries in the region to promote universal access to all citizens . Today, e-government websites have created new opportunities for people with disabilities in the UAE to benefit from convenient government information and e-services. Examples of disabilities that can hinder web accessibility include visual impairment (e.g. color blindness, restricted vision), cognitive disability (e.g. dyslexia), hearing impairment, motor skill impairment, and temporal injuries, among others.

In this study, we evaluate and compare the accessibility of the local e-government websites for six of the seven constituent Emirates in the UAE, based on the latest Web Content Accessibility Guidelines (WCAG) 2.0 guidelines and using an automated accessibility testing tool. To our knowledge, no nation-wide accessibility study of UAE e-government websites has been reported, albeit some earlier web accessibility research has focused on the special case of Dubai e-government. In addition, in line with earlier research on web accessibility in developed versus developing nations, this contribution also aims to investigate if there is a strong correlation between e-government web accessibility conformance in a given Emirate and its contribution towards the UAE Gross Domestic Product (GDP).

The assessment of e-government web accessibility can be accomplished by different methods. These include expert testing, end-user testing, automated testing, and surveys. In this study, and for the sake of practicality and scalability, we opted for an automated testing approach. Among the various commercial and open-source automatic accessibility tools available, we selected the 1.10 standalone version of the Web Accessibility Assessment Tool (WaaT) .

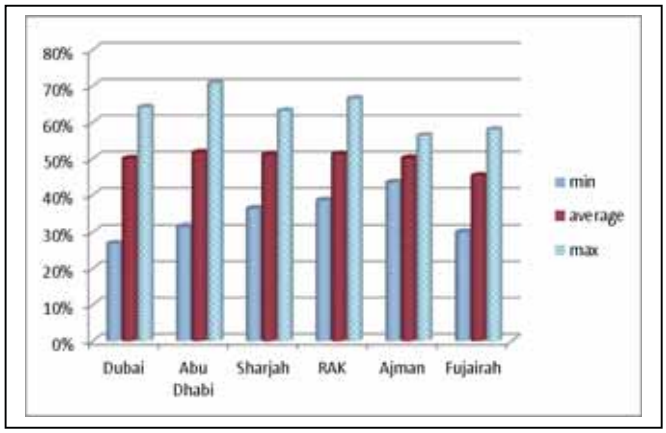
Using WaaT automatic accessibility testing tool, we conducted several rounds of WCAG 2.0 accessibility conformance tests on the local e-government websites belonging to six out of the seven UAE emirates. We have excluded the Emirate of Umm Al Quwain as, with the exception of two portals, all its remaining e-government websites were still under development when the testing took place. All accessibility conformance checks took place during the period December 2013- February 2014. All accessibility conformance checks took place during the period December 2013- February 2014. As a result, the accessibility results reported herein might have changed since the last time we conducted our testing. We have configured WaaT to use the strictest AAA conformance level, thus testing compliance to all WCAG 2.0 [A, AA, and AAA] levels.

Several observations were made from the WaaT accessibility testing results:

First, none of the tested e-government websites has fully met the WCAG 2.0 level A conformance level for people with disabilities.

Second, the dispersion of the accessibility scores from the average was highest in the Emirate of Dubai where we noted that the accessibility scores were spread out over a relatively larger range of values.

Finally, based on a bivariate correlation analysis, we found that there is a weak or low correlation between an Emirate's web accessibility score and its corresponding GDP contribution. The correlation is found to be very strong for the Emirates of Abu Dhabi, Sharjah and Fujairah, while it is was insignificant for the other three Emirates.



Statistical summary of web accessibility scores

Workflow System at KAUH

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ABSTRACT

Now a day the business processes have been much complicated, it's full of documents and tasks which are submitted every day by many persons to a different departments in the organization, either to be approved or signed for them. The traditional documents workflow has some disadvantages, such as: the document form could be lost by a certain department, because of the huge number of forms requests they have, and the person who is requesting that form to be approved will be waiting for the approval without knowing that his form has been lost.

To avoid the traditional workflow problems, we can replace it by a system which has the same idea of the traditional one, but instead, we will use an electronic forms to be transferred among different departments with an easy, fast and efficient way. By providing an electronic forms we can increase the organization productivity by reducing the process cost and efforts, also we can improve the process quality by having a system that provide flexibility, well-organized work and a high performance.

Finally, we found that we must develop a web based application to solve the traditional workflow problems and to add some other beneficial features. In this project, we will be more interested in developing a purchasing workflow management system for King Abdul-Aziz hospital.

Workflow System at KAUH goal is to create a clear picture of organizational processes that are driving the business, a comprehensive auditing of all actions will be available, reduce paperwork and tedious manual labor, reducing the time required for processes thus minimize cost and increase profit, create cross-functional, cross-departmental accountability and cooperation and optimization of process criteria such as processing time (to be minimized) or faithfulness to deadlines (to be maximized).

The recommendation system in Workflow System at KAUH, support KAUH by analyzing the current status, studying the gap and analyze it, design the proper workflow for a new purchasing system in order to support them. This new approach will certainly enhance the communication processes. Therefore, the web-based workflow application is the final product of our project that enhanced and solved the user needs by taking all their requirement in account.

In our project we built a web based application that enables purchasing department in King Abdul-Aziz Hospital to easily route electronic forms online in accordance with their defined business processes. The purchasing department benefited from it, as they reduce paper handling and manual routing to eliminate errors and shorten the lifecycle of forms processing. Also, ensures the right users can track and have access to the right information when they need it. In addition, The routing provides automated email notifications.

Change-Proneness Prediction using Machine Learning Algorithms: A comparative study of two different validation approaches

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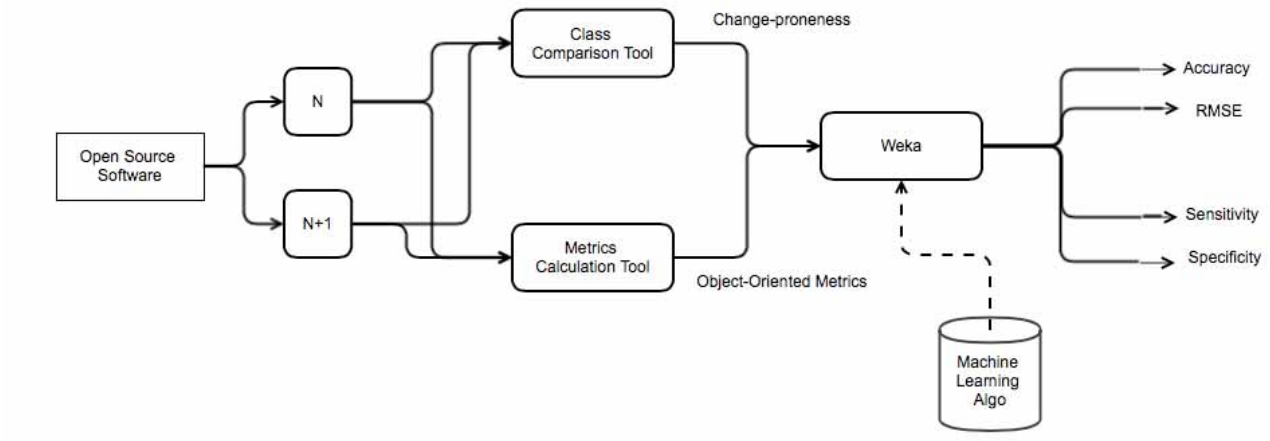
ABSTRACT

Open source software (OSS) has become a huge part of today's software market and a good source for investments. The establishment of the "National Program for Free & Open Source Software Technology" by the top research center (KACST) in Saudi Arabia to encourage the use of OSS within the community is a major motivation of our work. OSS comes with numerous challenges, one of which is constant change. Every software changes over time and this change in inevitable. Time for change from one version to another is much smaller in OSS than regular systems. Change-proneness can be defined as the probability that part of a software might change. Being able to identify and measure the change proneness in open source software will ensure stability of the software and will result in increased confidence of users, identify problematic components earlier that needs a lot of maintenance and reduces overall cost as changes are expensive. In this paper, we measure the capability of certain machine learning algorithms to predict change proneness in OSS using object-oriented metrics. We used Heritrix, an open-source project, as our test subject. 17 object-oriented metrics were used as independent variables and change-proneness as the dependent variable. A class is change prone if it has changed from its previous version. Four classes of machine learning algorithms were considered: Probability-based (Naïve Bayes), Function-based (Multilayer Perceptron or MLP), Instance-based (Nearest Neighbor) and Tree-based. Baseline accuracy was established using ZeroR and OneR algorithms. One complete version of the open source software was used as a training set and tested on the subsequent version to predict the change. The machine learning algorithms were compared based on accuracy, specificity, sensitivity and root mean squared error (RMSE). The research methodology is depicted as a model in the figure below.



We found that Naive Bayes and Nearest Neighbor are better when it comes to accuracy considering both have given the best result in most of the instances and Naïve Bayes gave resultant in the highest accuracy percentage (68%). We could not find any ML algorithm that performed better than the baseline algorithms when it came to specificity, which is a call for concern and future investigation. Nearest neighbor algorithm was the had better average sensitivity and MLP had the lowest RMSE. Moreover, we also found that using a new version as a testing set or using cross-validation on the same training set has minimal impact on accuracy, sensitivity, specificity and mean square-error of the prediction algorithm. In future, we plan to make use of correlation and principal component analysis to select only those metrics that seem to affect the change-proneness.

Smart Cart: A Ubiquitous Shopping Guidance System

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ABSTRACT

Shopping centers, stores and large supermarkets are considered as attractive locations for offering a wide-variety of products and services. With the increase of the necessities which ranges from food product, apparels, electronic devices and the demand of the community, the number of small and large stores and shopping malls keep increasing. Shopping in large areas could distract a leisure experience or delay a rush purchase. The causes of shopping distraction could include the lack of familiarity with an area and/or unguided searches.

Smart Cart is an automated personal guidance shopping system that aids different styles of shopping (See the Figure below). The system is portable and enables ubiquitous access. The automated system enables the shopper to find the section of the desired product. Thus, it offers an opportunity to improve the quality of the shopping experience. Smart Cart system consists of RFID tags distributed over the market's sections. An RFID reader wirelessly connected to a web server, attached to the cart; the reader will be able to detect the tags and send the information to the web server. A website is available to the customer once he/she is connected to the Internet. Via the website, the customer will be able to select the sections of the desired products, or track his/her or another trolley. Smart Cart provides a true pervasive and ubiquitous computing experience.

The Smart Cart system provides the customer with two main features. One feature is "Find your way" that displays a map with the shortest path to visit several sections in a supermarket. The other feature provided for the user is “Track your trolley.” This option is provided for the user partner (mother, wife, friend …etc) to securely track a used trolley. Both should have the correct authentication code in order to benefit from this option. Once the user has chosen the “Track your trolley” option, a page will appear asking for the authentication code of the trolley. The same mentioned message will appear in a case of invalid code or null submission.

Smart Cart comprises different modern hardware and software subsystems. The hardware subsystem employs an Arduino Uno microcontroller, Wifi shield, RF reader, and RF tags. The software subsystem includes a webserver, website, and web-database. The software development is done using PHP, MySQL, and the development environment that supports the Arduino. The computational components of the software subsystem builds on Dijkstra’s shortest-path algorithm.

Presenting the Smart Cart system as an option in a supermarket could have a dramatic result on the entire shopping experience in a variety of fields such as business, economic, social, and the environment. The system does not only smooth the shopping experience, but also saves time and effort. In terms of social influence, the shopping experience has positive outcomes on the person and could extend to the small structure of society because of the time saving element. Also, the Smart Cart system can be, to some level, a bonding experience and an activity that parents can do with their children. It combines fun with teaching children to take part in sharing the responsibility when given the option to lead the shopping journey while being safely tracked. Furthermore, when individuals have a time- and effort-saving tool added to their shopping journey, smart shopping is positively associated with favorable useful evaluations and purchase satisfaction which will have influence at the business level. The Smart Cart system is environment friendly since it uses RF technologies. Smart Cart enjoys its ubiquitous accessibility, high communication speed over Wifi, attractive web-design, short time-to-prototype, maintainability, flexibility, scalability, low-power requirements, and its adequate size for placing in a small cart.

The invention of many different technologies has offered businesses more flexibility and efficiency. Businessmen are willing to embrace these new technologies in order to survive and prosper in the business field. Smart Cart can help businessmen in attracting new customers to their supermarket. The proposed solution for improving the quality of shopping experience provides business owner with differentiated service. Future works include automating the billing process and enabling a multi-customer single-bill option.

A Photo Editing and Sharing App for iOS Devices

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ABSTRACT

Recently, smart phones, with many applications including photo-editing applications, have become very popular. So, developing mobile applications has become one of the hottest topics in information technology. Photo editing and sharing applications such as Instagram are growing popular among users. These applications are used for photo manipulation and enhancement. Users usually use them to adjust color, add effects, crop, resize, rotate and/or annotate their images.

There are many photo editors available. We conducted a comparison of some of these photo-editing applications. But most of them still have an element of difficultly and ambiguity in their user interface. Furthermore, some of these editors do not support enough filters and effects that satisfy the users' wishes and needs. In addition, we have designed an online survey to study what are the aspects and functionalities that users expect to have in a photo editing applications. Based on the data collected, 59% of users often use a photo editing applications. 82.9% of users consider that the interface of the photo editor as an important factor to decide which one to use. Also 77.9% of the users believed that the names of editing effects are important. We used the information extracted from the collected data to guide us to decide about our GUI design and the filters to consider.

This project is divided into two parts. The first part is designing Graphical User Interface (GUI) elements with high usability features specific for the screen size of smart phones. Some effects/filters that can be applied to photos have their own user-adjustable parameters. The second part is developing sharing features. After an image is modified and saved, there should be a mechanism for sharing it. The sharing mechanism should be connected with social networks so that the user can choose with whom to share the photo with.

During the development phase, we tested our application periodically using the simulator. We used two testing levels: 1) unit testing and 2) integration testing. First, we were testing and verifying the functionality of an isolated part of the code. This testing gives us the ability to ensure that a specific sub-functionality is working correctly and as expected. We did not start the integration process unless each unit was running successfully. This process validates and verifies that the application meets the requirements and works as expected. The integration process is done by combining the modules together one after the other. This way errors and issues are found more quickly and fixed. Based on this we were able to detect some errors but since our testing was focused we were able to correct these errors. Not only this approach was beneficial to us in finding and correcting errors, it was also helpful in improving the overall quality of our application.

In summary we designed, implemented and tested our application. We implemented the application using Xcode development environment. Then we deployed the application to the iPhone devices. In the future we plan to do more usability testing. This type of testing will help us to evaluate and measure the ease of use of our application. The process would involve asking different users to use our application, and provide us with feedback and comments, which should be useful in improving our application.

Tayseer: Hadith Narrations Authenticity

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ABSTRACT

When we forward the texts and opinions of the scientists in different science, we should transform them truthfully, accurately and search about them in many trustful resources. For the Science of Hadith, Islamic scholars throughout the centuries have been very careful in making sure that the Hadith narration is the actual saying/doing of the Prophet Mohammad -Peace be upon him-. They have put very detailed methods and strategies to ensure that the Hadith narration is accurate, these methods strategies formulate and the science of “Takhreej”.

“Takhreej” means studying the sequence of narrators of the Hadith until we reach the Prophet -Peace be upon him-, and coming to a conclusion on its authenticity. The structure of the Hadith is composed of two main parts: the "Sanad" and the "Maten" of Hadith. The “Sanad” is sequence of narrators who narrated the Hadith until the Prophet -Peace be upon him-, the “Maten” is the actual words of the Prophet, description of his action or response to a certain situation.

The process of Takhreej, usually starts with the collection of all occurrences of the Maten from all available sources. Then, they analyze the sequence of narrators and the relationships between them, compare and contrast the different ways on how the Hadith reached us. However, the method is complex, and requires a vast amount of information from various resources, and it is also a time consuming process.

Scholars have been providing various methods for helping young learners understand the science of “Takhreej”, such as “AlAsaneed Tree” and “Takhreej Table”. There are numerous applications that generate the “AlAsaneed Tree “ automatically, however for “Takhreej Table” none is available.

“Takhreej Table” is a novel method that shows a visualization of the layers of the narrators in a way that facilitates derivation of the authenticity of the Hadith. This method simplifies the process for learners and researchers, however, generating this visualization manually requires considerable effort and time because there are numerous ways in which a specific Hadith reached us “AlAsaneed”.

Tayseer is designed as a web-based application using web-services to enable the automatic creation of “Takhreej Table” visualization for learners and researchers in Hadith Science. This solution is based on converting the famous Hadith book on Asaneed encodings “Tuhfat AlAshraf Be Ma’arefat AlAtraf” to digital form, and using multiple matrices, the “Takhreej Table” visualization is created.

Tayseer provides an environment for learners to learn about “Takhreej” process, and for researchers and scholars to visualize “Takhreej Table” visualizations, derive conclusions, and elicit new information. It facilitates the process of visualizations creation, and contributes to the set of Islamic applications in the field of Hadith science.

Mobile Based Health Education System

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ABSTRACT

E-learning applications are being produced extensively due to their usages and benefits. There are different kinds of such applications. For example, E-learning applications target the undergrad and grad students (blackboard). Others are developed to be used as online exams tools. None of these are targeted the children and/or introduced an application that talks mainly about human body and its organs in an interactive approach.

This application is an educational system that helps the children to get to know the external and internal human body structure in Arabic language. The system will be as a game on mobile phones. The idea of this system is to use the game-based learning to enhance the learning process of students and improves their abilities to learn through new technology. This application is a great chance that enriches the foundation of health information that today's elementary school curriculum requires. The system focuses on children of age 5- 10.

The system is divided into three parts; external organs part, internal organs and the last part is the skeleton one. The child have to drag and drop each part of the body in the right place .When the child puts the correct parts in the right places a score will appears for that level and the student will be able to move to the next level.

A group of students have played the game and they express a full satisfaction in terms of being able to learn the human body organs. Other experienced difficulties at the very beginning and that were due to the very poor knowledge of the human body and its structure. In the future work, the system will be developed to embrace the body organs when it’s functioning (e.g. liver, heart, kidney, etc).

Converting Speech into Sign Language System "CSSL"

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ABSTRACT

There are over 70 million deaf people in the world. Many of them are either deaf from birth or became deaf before learning the spoken language. This fact has serious implications for the education of deaf people. Being deaf means not to hear or comprehend speech and language through the ear. Communication for a person who cannot hear is visual, not auditory .There are several solutions that help deaf person to communicate easily with other people.

The Converting Speech into Sign Language System **CSSL** is designed to help persons who are deaf or hard of hearing communicate more effectively with others. It combines computer software and hardware and can interface with a user's hearing aids. Using our application people of special need especially deaf and dumb person have several obstacles when communication with other people. The main obstacle is that when a deaf person wants to start talking to another normal person, the most famous way of communication is by using the sign language. In such situation normal person might not understand the sign.

Moreover, if a normal person wants to answer or tell a deaf person something, the obstacle in such case is that the normal person doesn't know the sign representation of what he wants to convey. So to help normal person convey their messages to a deaf and dumb person using sing language, we will introduce a mobile based application that converts the sound of the normal person into sings that a deaf and dumb person can see it on the mobile and understands it.

Deaf and dumb class of society have difficult social communication with other people .The solution facilitates real-time conversations by combining technologies that translate or convert spoken words into sign language, voice into text, and text into speech.

The application enables deaf persons to communicate with the hearing world when a sign language interpreter isn't available. It can also increase literacy, make education more efficient.

A main goal of Converting Speech in to Sign Language CSSL system is to help disability person to communication with other normal person easily and effectively by converting speech sound in to sign language. And also CSSL system allow normal person to convey their messages to a deaf and dumb person.

Trusted Tourist Social Network

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ABSTRACT

Tourism plays an important role in the economy strength of the countries. For example, Tunisia and Egypt depend on tourism as the main factor in the strength of their economy. Therefore, systems should be designed to help in encouraging tourists to visit certain country.

In this context, an application has been introduce "Trusted tourist social network (TTS)" as a new and unique system that form the source of trusted information about certain place and/or certain country. Therefore, tourists might or might not be motivated to do their trips to that place based on the trusted retrieved information.

This application uses the list of trust (LOT) concept that will be explained to ensure trust and honesty. The proposed system gathers information from tourists about places they visited and various services for other people who are planning to visit. The information is collected and analyzed and then is used for the purpose of whether to recommend visiting certain place or not.

This proposed system will provide information about tourist locations and the services in these locations. The system will also provide information from others who experienced that tourist so as to be of benefit to those who would like to visit these sites.

The Main purpose behind this website is sharing knowledge, information and experiences between tourists by using tool to enable users communicate with each other in easy way and share their experiences about certain places they have visited.

The LOT is an attribute which take values from 1 (lowest) to 10 (highest). When the user posts a photo and information through a website our proposed system determines the LOT through set of rules. Those rules are:

- VIP and trusted persons in society (minister, governor….etc.) are given LOT of 10.
- New users (public, unknown identity) are given LOT of value 1.
- The LOT increased by 1 for users who post correct information.
- The LOT decreases by 1 for users who post incorrect information.
- The post of a person of high LOT is considered true
- The post of a person of low LOT value is needed to be checked, and compared with similar post from other users or from a post of a person with high LOT

In this website every user has to create an account with a username and password to login, then the system collects information about users who register in this website, these information include the user's personal profile, level of education and other information to give them (LOT) based on these information.

Users can share their experiences and opinions about their trips and tourists locations, then the website automatically analyses the received information based on algorithms to determine true and false posts. The system records the number of true and false posts to determine the (LOT) for users, then the LOT value decreased based on the number of false posts and increased based on the number of true posts.

A Quadrant-Based Search Technique for Optimal Placement of Modules

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ABSTRACT

The problem of optimizing the placement of modules (cells, gates, ICs) consists of determining the optimal assignment of each module to a unique location such that a specified objective (cost) function is minimized subject to some specified set of constraints. For gate-array technology considered in this paper, all modules have the same size and shape and they are to be optimally placed on pre-defined grid locations. The placement problem is NP-complete and accordingly a number of heuristic techniques have been developed to provide good (sub-optimal) solutions for this complex problem. Most of these techniques start with a randomly generated initial solution and then apply an iterative improvement procedure by swapping two randomly selected modules. In order to avoid getting stuck at a local minimum, many heuristics utilize the concept of simulated annealing. Genetic algorithms have also been extensively used to determine the optimal placement of modules. It is a common practice among these placement techniques that for each iteration they utilize the full search domain, comprising of all grid locations and modules. This has the disadvantage, especially for large-size placement problems, that swapping of two randomly selected modules from a vast search space has lower probability of successful swap, i.e., a swap that would result in reduced value of cost function. If, however, the search domain is divided into four quadrants and the modules to be swapped are selected from only the quadrant that has the highest probability of successful swap for the current iteration, the iterative improvement process can become more efficient in terms of the number of iterations. This paper presents a Quadrant-based Search Technique for optimizing the placement of modules for gate-array technology. The objective is to minimize the total wire-length interconnecting the modules. The step-by-step procedure carried out in the presented placement technique is as follows.

Step 1: Given a set of n modules, m grid locations, and a connectivity matrix describing the number of connections between various modules, an initial placement is generated by randomly assigning modules to grid locations.

Step 2: For iterative improvement, one module is randomly selected and its gradients in x- and y-directions are calculated. This would determine the direction of movement of the selected module giving maximum reduction in the value of cost function. It would also identify the quadrant from which the second module should be selected for high probability of successful swap.

Step 3: The second module is randomly selected from the quadrant identified in step 2 and it is swapped with the first module. If the swap results in reduced value of cost function, the two modules are actually swapped. Otherwise, no actual swapping takes place except in very few cases as determined by applying the concept of simulated annealing. That is, occasionally some unsuccessful swaps are also considered, especially in the beginning of the iterative procedure, to avoid the possibility of getting stuck at some local optimal solution.

Step 4: Steps 2 and 3 are repeated for specified number of iterations.

The above-mentioned procedure has been implemented in a placement optimization program using C++. The program has been successfully tested by solving a number of placement problems involving equal-area modules. The impact of restricting the search domain to only one quadrant at a time by using the gradient information at the beginning of each iteration is also determined. Furthermore, the sensitivity of the optimal solution to the initial placement is investigated. It is shown that the Quadrant-based Search Technique presented in this paper produces good placement solutions and has relatively low sensitivity to initial placement. The placement results obtained by the presented technique are compared with those obtained by performing random search in the complete search domain. The results clearly show that the presented technique has better computational efficiency in terms of percentage reduction in the value of cost function.

Logic Design World: Smart Tutor for Logic Design Course

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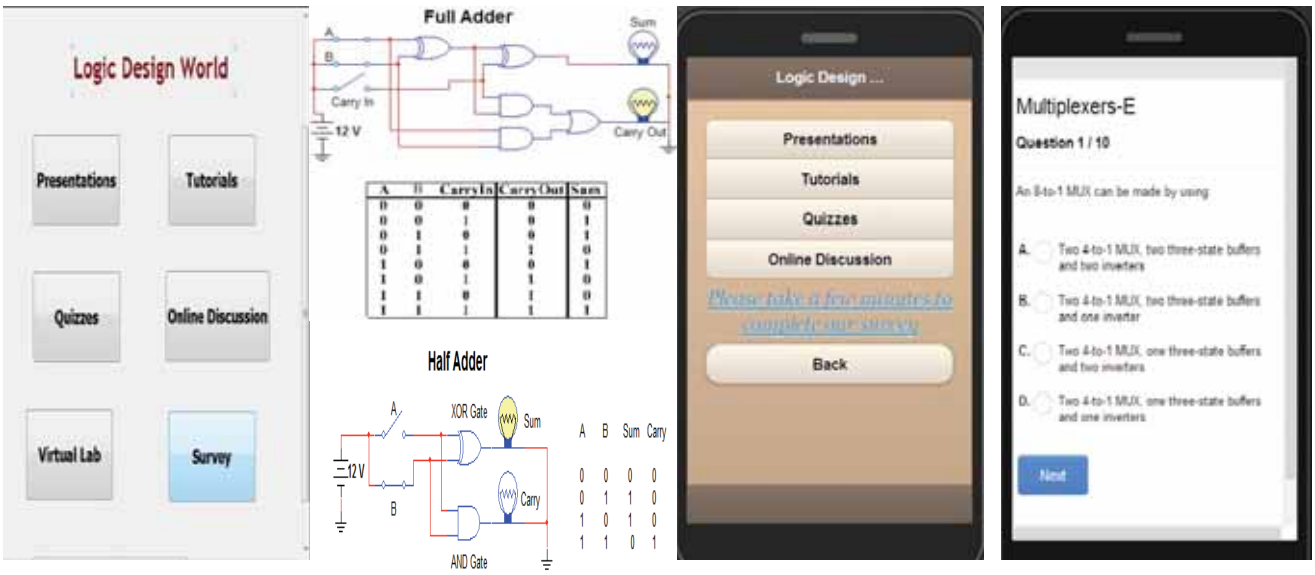
ABSTRACT

The rapid proliferation 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 own both theoretical concepts and practical skills. This paper presents Logic Design World, a software that acts as a smart tutor for logic design course. Its main objective is to develop students' logical thinking and problem solving skills. It provides an alternative support solution for students taking Logic Design course to help them enhance their understanding of the core concepts and learn through practice both theoretical and practical contents of the course.

Logic Design World is a user-friendly interactive software that includes PowerPoint presentations, tutorial videos, quizzes and virtual labs. The presentations provide theoretical background on Logic Design, giving the users the opportunity to download them and practice. Tutorial videos comprise of videos created by us as well as some useful videos downloaded from the internet. The quizzes are in 'multiple choice questions' format and are of three different levels namely beginner, intermediate and advanced. They are categorized chapter-wise and students are required to solve those within specified time period depending upon the level selected by the user. In addition to providing the correct answers when so desired by the user, their scores are displayed and their progress in the quizzes is monitored. For encouragement, certificates of achievement are issued to successful users. The quizzes are designed such that the software can identify user's weaknesses in specific topics and 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 logic design experiments using Multisim.

Logic Design World software has also been embedded into mobile technology such as smartphones and tablets as an application compatible with different platforms. We have also developed a website using weebly and a forum to provide online assistance to students with their queries and doubts. Students are able to access the website from the desktop software or through the mobile application. Users' surveys for this software have clearly demonstrated its usefulness and effectiveness in enhancing their understanding of logic design concepts and developing their problem solving skills.



Multi-Sources Patient Localization System for Emergency Response

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ABSTRACT

Reaching patients as soon as possible has always been the main concern of paramedics, especially in emergencies with potentially fatal consequences. The ultimate objective of this android based mobile application is to have a source that provides the paramedics with the patient location once the emergency call is initiated. What makes this application different is that it is based on a multi-source localization mechanism that reduces the errors associated with the localization process. In addition, the data related to the patient's location is intended to reach the paramedics within the first few seconds of the call in order to display the location on a map as soon as possible. The sequence of source usage starts with the GPS, GSM and finally the WiFi. A comparison mechanism is used to eliminate the data of the source with high error probability from the decision process. The data is sent through SMS as a primary source but an e-mail is sent as a backup. The system mainly consists of two sides, the patient (user) side which has the application installed on his/her phone while the Emergency Unit is on the reception side with an interface showing the location of the calling patient on a map. It is intended to increase the number of sources once the system is guaranteed to work perfectly with the previously mentioned ones. In fact, the project is purely based on software programming. Eclipse is used along with SDK platforms for android applications development to employ java language in order to write the system instructions. The user application will always be running in the background even if the phone has forced closure. It will scan the outgoing calls log sequentially and when the patient calls the emergency number, the application will activate the sources and then extract the necessary data so power consumption is minimized. The data includes the longitude and latitude of the GPS, LAC and Cell ID addresses of the GSM, the BSSID, frequency and signal strength of the nearest WIFI networks. After that, the data will be sent directly to the emergency response unit (ERU). The received information will help to localize the patient with some error estimation mechanism. As a final step, the server at the Emergency Unit side should extract the information contained in the SMS received via GSM modem or the email and utilize them to spot the patient location on a map. In order to accomplish that, Google Maps APIs have been used. The Google Maps APIs provide users with different methods of inserting Maps into web pages which. The system was tested at Khalifa University, Sharjah campus and Sharjah Megamall, where a database for GSM and WIFI were created and each database includes a list of the key information mentioned above, along with the physical location. The test has been done inside and outside buildings in order to validate the system with the absence of certain sources and to specify the accuracy limits. The figure at the top summarizes the system architecture.

3A Tracking System: tracking Anything, Anywhere, Anytime

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ABSTRACT

Many people are facing a lot of difficulties while doing daily activities such as shopping. Some of these difficulties are finding a product in a shop or looking for someone especially if the shop is very large and vast. For parents, they sometime lost their kids and that leads to feel uncomfortable and worry while they are doing their shopping task. These difficulties are increasing especially if the person is a new visitor for the shop.

3A (Anything, Anywhere, Anytime) Tracking System can provide solutions for such difficulties. 3A Tracking System is a mobile application that helps shops' visitors to improve their shopping habits through the use of their smart phones. 3A Tracking System helps the user to get their needs very quickly and without asking around for the location for either product or someone. It allows the user to keep track of their kids inside the shop's area. It allows the user to search for a product or someone and then finds the shortest path to that target location. The path is dynamic, when the user changes his path, the map will display a new path.

The goal of the 3A Tracking System is to use a new and improved technology which is Radio Frequency IDentification (RFID) to enhance the experience of the shops' visitors. RFID is one of the technologies for keeping track of someone or something in indoor environment. RFID is the wireless non-contact use of radio-frequency to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. RFID is one of the best solutions for helping people to achieve their needs with the minimum help of the other and doing their shopping task easily. The most features in our system are displaying a map with the shortest path in real time navigation, and support two languages English and Arabic. Displaying the dynamic shortest path in the map is done by applying the A Star algorithm (A*).

In brief, our system contains three parts. The first one is an active tag attached to the product's shelf or carried by a person and it contains a unique id. The second part is the RFID Active Reader that reads a tag that operates on the same frequency as the active reader. Since the active reader covers large area (200 m) we need to use a locator to minimize this area up to 5m in each direction. The tag sends its information with the locator's id to the reader. The last part is software (middleware). There are two separated software. One of them is a web based application for administrator to manage the system data. And the second is an android mobile application for the visitors to show target location. It displays a map with shortest path from current location to the target and this path is dynamic. 3A tracking system can be used in different places and for many purposes other than shopping. It can change everyone's daily life.

Figure 1. 3A Tracking System Architecture

DNA Microarray Gene Expression Data Analysis Tool

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ABSTRACT

The study of gene expression profiling of tissues and cells has become a major tool for discovery within medicine field. Microarray is a technology used to measure gene expression which indicates the status of the gene to whether it is active or not. Scientists use this information in order to diagnose diseases and learn more about their development. The dataset resulted from Microarray, which shows the level of gene expression, is represented as a matrix of thousands of genes but very limited number of experiment samples. Due to that high data dimensionalities, analyzing Microarray data may require long processing time, also lead to the occurrence of irrelevant genes which reduces the accuracy of the analysis.

Accordingly, we found the need of developing a Microarray data analysis tool that provides gene selection function to minimize data dimensionality and select the most informative genes. The major purpose of Microarray analysis that our tool provides is classification function, which is used to predict different diseases by their different gene expressions. It can also help on discovering the relationship between genes and identifying the critical genes in the development of a certain disease. In order to understand the classifications, and because the information in Microarray dataset contains quantitative gene expression data, we adopt association rule mining method as a final function. Notably, the most common motivation for using association rule mining is to obtain a set of rules that produce biological and meaningful association rule between most informative genes.

We aim to develop a tool with functionalities that enhance the efficiency of similar tools lack of. We provide feature selection with different models and algorithms using artificial intelligence techniques and statistics. For filter model we construct CFS, Reliefe-F, ChiSquared and InfoGain algorithms which has been selected based on their efficiency. With wrapper model, we use SMO classifier to evaluate datasets used in different search algorithms PSO, BFS, and Genetic search. Furthermore, to guarantee better results from classification, we adopt different machine learning algorithms to allow the comparison between the resulted accuracy. These algorithms are SVM, NaiveBayes, K-NN and J48. Most importantly, we append association rule mining methods such as FPGrowth, Apriori, and Predictive Apriori which have not been deployed in similar tools where it is essential to conduct informative rules.

In order to make the tool reachable by wide range of scientists, the tool will be implemented as a web-based using JSP/servlet language in association with a machine learning software “Weka”. In addition to the main analysis functionalities, we offer other functions to assist the user. We give the user a tool that provides different benchmark data to perform analysis on them, in addition to the option of uploading his own data. As for classification function, the tool allow the user to upload unclassified data file and classify it based on the already built classifier. The user can finally export the results after any analysis function. Hence, we design a tool that meets HCI principles and attains maximum usability.

Approximate query location in mobile computing

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ABSTRACT

In this project we will deal with a famous problem in the domain of finding the approximate query location in mobile computing by using General-purpose computing on GPU.

Aim of the project: The aim is to use parallel programming on GPUs using NVidia's CUDA and use this knowledge to solve problems & improve the evaluations in the domain of real-time approximate query location in mobile computing.

Introduction: The title of the project is solving approximate query locations in mobile computing. It means that if we have an environment where tens of thousands (even hundreds of thousands) of mobile objects moving around and performing queries to know where are their neighbors. For example: GPS-enabled vehicles traveling around a city, Pilgrims who are all wearing RFID tags, gamers playing massively multiplayer online role playing games (MMORPG). Such queries are called a range query or a kNN query. The moving objects needs to know all the neighbors that are close to them in proximity, so as to not hit each other and cause an accidents. Additionally, the locations of the objects are approximated because the update of the objects' locations at the server are uncertain due to the continuous motion of the objects, that mean there were a long stale time in sending the queries to the server, or the object may doesn't want the other objects to know its accurate location by sending blurred coordinates , or because of bandwidth problems or …. . During the wasted time, the neighbors may have been moved out from the objects range or at the worst case the objects may have got an accidents with the other objects. In short, all the objects needs to get the locations of their neighbors to know where they are and to avoid them. These scenarios are too difficult for the CPU to solve. by using the GPU to solve these queries in real-time the problem will be very easy to handle.

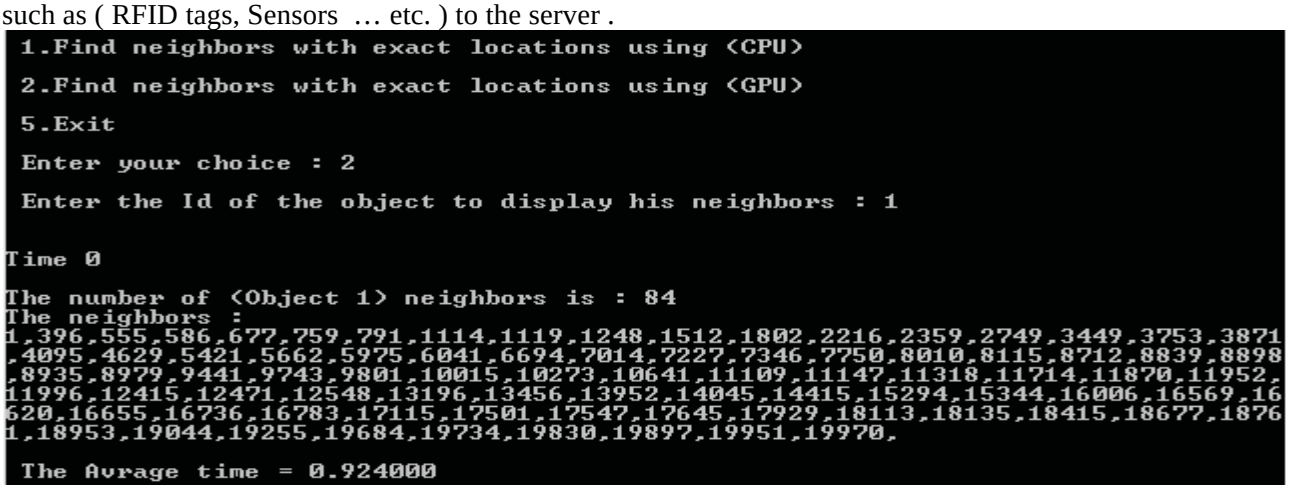
Motivation: The motivation for the project is learning new things , and since there are so many huge environments ,by the GPU we can provide solution to a lot of problems people are facing these days, unlike the early days relying on just the CPU , we were have a lack of querying , controlling or monitoring objects in a big environment .

Objective: Solve problems in the domain of finding the approximate locations of continuous moving objects.

Methodology: Make CPU-based simulation to find Exact & Approximate locations - Make GPU-based simulation to find Exact & Approximate locations.

Project type: The type of the project is simulation-based project.

Consideration: In this project we will consider the objects will be able to send their locations by technologies such as (RFID tags, Sensors … etc.) to the server .



6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Arabic Text Author Verification

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Supervised by
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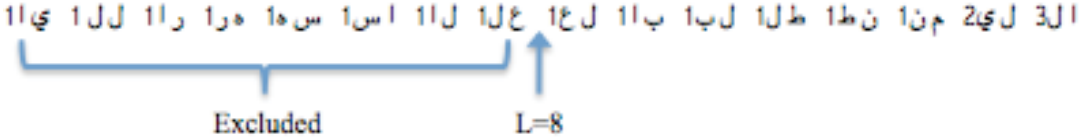
ABSTRACT

With appearance of Internet and improvement of social communication, the copyright theft became too easy; therefore, authorship attribution can be used to solve this problem. Every author has his own style "write-print" in his writings, which set him apart from others. Moreover, several methods were proposed to find out author's style in English language, but very little in Arabic language.

The main goal in this project is to develop an Arabic Text Author Verification system, which is a visual studio program that verifies if a specific author did or did not write a given text. For that, we need a way to discriminate his style by defining a write-print for him based on the analysis of some of his articles. A write-print can be composed of repeated vocabulary, length of sentences, and use of special words etc. With respect to character-based features, N-grams at the character level have been widely used in authorship attribution with acceptable performance has been reported. In our approach the author write-print for Arabic language will be obtained from text character N-gram model, which is a list of N-gram frequencies arranged in descending order.

In our system, there is a database where the write-prints for a selected set of authors are saved. The write-print and dissimilarity threshold for each author are generated from known author's articles. These documents are preprocessed first to eliminate spaces, then their N-gram models are generated and N-gram frequencies are calculated and stored in descending order. The first "L" frequencies will be author profile (write-print). The dissimilarity threshold for each author is defined as the maximum dissimilarity measure between his authoritative writings.

Following a simple example of generating of write-print of length L=8 using 2-gram model:
Assuming the text is:
من طلب العلا سهر الليالي
Then the character 2-gram will be:
من ظن ظب بل اب ال لع عل ال اس سه هر را ال لل لي يا ال لي
The write-print will be the first 8 frequencies:



The dissimilarity is calculated using the following formula:

$$\sum_{k \in \text{profile}} \left(\frac{f_1(k) - f_2(k)}{\frac{f_1(k) + f_2(k)}{2}} \right)^2 = \sum_{k \in profile} \left(\frac{2*(f_1(k) - f_2(k))}{f_1(k) + f_2(k)} \right)^2$$

Where f1(k) and f2(k) are the frequencies of an N-gram "k" in the author's write-print and the tested text.

To verify if a given text is written by a specific author the system generate the write-print for this text and compare it with the write-print of the concerned author. If dissimilarity is less than the author dissimilarity threshold then the new text belongs to this author. If not, the new text belongs to another author.

Our extertion here is to determine the most suitable N, L and dissimilarity threshold for the author to obtain the best verification result.

Patient monitoring system in intensive care units (ICU) using wireless networks

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ABSTRACT

The Intensive Care Unit (ICU) is the most crucial section in any hospital; in a large city like Hewler, a large number of patients will be admitted to ICUs every day. Doctors struggle to serve the large number of patients and in many cases patients do not receive the right treatment at the right time. Therefore, finding a system or a way both to reduce the checking and monitoring time and to classify the patients based on urgency would convey significant benefits.

We are proposing a remote patient monitoring system. This system enables doctors and nurses to monitor patients in the ICU or any other area in the hospital. In general, a patient will have a number of monitoring sensor devices and the results of these devices will be wirelessly transmitted to the duty staff, but also to the webserver. The patient's vital signs like body temperature, pulse and oxygen in blood sensor (SPO2), ECG and airflow sensor (breathing) are captured and the data are stored in the database. The data are then uploaded onto the webserver and sent to the doctor's phone using Android technology or another application. The system also enables the doctors to instantly respond to an alert or to send instructions to the clinical staff. Mobile phones or other hand-held devices with wireless networking capabilities may serve as gateways that receive, process, store, and transfer measured parameters to clinicians for further analysis or diagnosis. All ICU patients are connected to a sensor, and all sensors are connected to a micro- controller (Arduino mega2560) that sends the data to a remote server which will process it according to the rules set for the database. The information is then sent to the doctors' mobile phones or tablets via wireless technology. The patient information will be keep in a specially designed database. The system will not alert doctors if the patient's status is normal and the information will go straight to the database; however, if the patient's status is abnormal, the system will immediately send an alert providing the latest data relating to the patient, thereby allowing the patient to receive quick medical care.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

QuizVis: Interactive Quizzes Using Augmented Reality

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Supervised by:
Mashael Al-Duwais

ABSTRACT

We are now living in the mobile era where anyone carries mobile devices anywhere. The rapid spread of mobile devices and recent advancement in mobile technologies offer excellent opportunities for new learning styles.

The traditional way for running quizzes in the classroom tackles many problems for both the teachers and students. For the students, the regular way for delivering paper based quizzes are often not interesting. They need more enjoyable and attractive way. However, for teachers, producing quizzes papers, making sure there is no error while copying, and grading the quizzes are the main problems. These tasks are time and paper consuming, new technological solution that adds enthusiasm in the classroom is needed.

QuizVis is an interactive quizzes system that is based on Augmented Reality technology. Augmented Reality is one of the most interesting mobile technologies that refers to the supplements of real world objects with virtual world and provides a way of real time interaction [1]. Augmented reality can be built easily and it is being increasingly embraced as an effective tool for education. It gives students an opportunity to be involved in more than passive listening and actively engage with the materials. The Project involves presenting the quiz question in a projector using any image viewer, then when the students point their devices to the slide and scan the question, interactive answers related to that question will be immediately available to them. The students can choose one answer, submit it and get it graded in the grading server. Figure 1 shows the process of performing quiz by student. The proposed project QuizVis meets the challenges of today's classrooms by employing Augmented Reality technology and provides an exciting way for improving the learning process. Augmented Reality technology will be used to build an interactive quizzes mediated by Layer™, these quizzes will add excitement in the class, and help the teachers to easily following the progress of their students. QuizVis will be connected with a grading server to track the students' performance and with website to allow the teachers with no programming experience to create their quizzes easily.

Figure1. Process of performing quiz by student

This project is expected to improve the learning process by providing the students and the teachers with a more interesting way in conducting quizzes. Implementation and evaluations of Augmented Reality experiences in an educational setting will provide insights into how this technology can enhance traditional learning models and what obstacles stand in the way of its broader use.

Solving the Vehicle Routing Problem for School Buses Transportation

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ABSTRACT

Students using school buses usually face many problems. For instance, they generally waste their time waiting for the bus without knowing if it is close to their houses, or if it will not come in a specific day in case of accident or emergency. Also, they ignore how much time they will have to wait before arriving to destination, and how many other students will be served before them. Furthermore, the route achieved by the driver is usually dictated by habit or experience and there is no guarantee of its optimality. In addition, drivers are not aware about absent students, so they waste their time waiting instead of skipping them. Moreover, the school buses administrators face some challenges such as assigning students to suitable buses.

Based on these observations and on the results of the surveys filled by the targeted audiences, we concluded to the need to develop the School Bus Monitoring System (SBMS) application. We started this project with the goal to dedicate our knowledge in technology to resolve this kind of problems since there are no much advanced mobile applications supporting school bus management.

Our project is to develop interactive Android and web-based applications to facilitate monitoring school buses. The application allows students and drivers to inform each other if they are absent easily by clicking one button. The main functions provided in SBMS application are to help schools' administrators assigning students to appropriate buses according to their locations and computing the optimal paths for the drivers.

Our transportation problem is best represented by an Open Vehicle Routing Problem (OVRP) where a fleet of buses of same capacity is used to service a given number of students. The focus is on optimizing the path for each student and reducing the total waiting time. We use a Cluster-First-Route-Second method that first allows assigning students to buses according to their geographical zones into clusters by applying Sweep Algorithm. The algorithm is implemented by representing the students' houses in polar coordinate form with the origin as the school and then sorting the students in increasing order of the polar coordinate angles with the school as the reference point. After that, the shortest path is computed for each zone by resolving a Travelling Salesman Problem (TSP) in each cluster. First, the students are visited in an increasing order of their distance from school then the routing solution is improved by using student relocation algorithm.

As a result, Administrator, Driver, and Student all benefit from using the SBMS system. For the Administrator, the system helps reducing the efforts in assigning a huge number of students to appropriate buses. Also, it helps computing a path near to optimality for each bus. For the drivers, it saves time that could be wasted while waiting at the student's house by using SBMS function that informs the student when the bus is near his house so he can prepare himself beforehand. It also saves the driver effort while following an updated path each day. Once a student sends an absence message to the driver, his house will be omitted from the path for that day so, that will reduce the total distance. For the students, it saves their time by managing the waiting time and allows them to reach their houses earlier. Also it helps them finding an alternative way to go to school if the driver sends an absence message to state that he can't pick them up. SBMS is also considered as an environment-friendly because it reduces the noise that rises from the bus horn. It also reduces the cost by reducing the consumed fuel while following optimal paths.

Wireless Pipe-Inspection Robot

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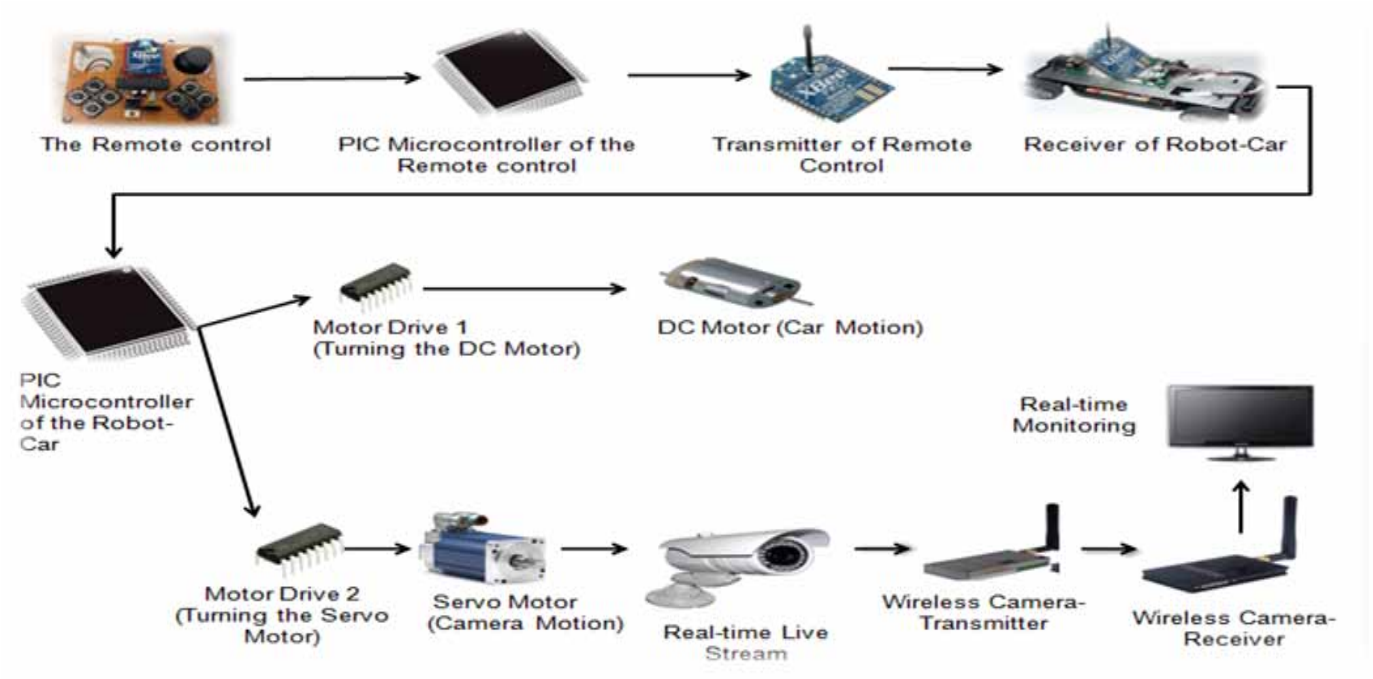
ABSTRACT

In this project, a wirelessly controlled robot-car is designed and implemented. This robot-car can be used to detect and locate the cracks and leakage in any underground sewage pipes. This designed system can be used in testing underground pipes used by many municipalities in UAE. The car has been designed in a way to avoid any damage by water. The operator in the control room can wirelessly control the motion of the car. This motion could be forward and backward. The car is equipped with camera whose its motion can be controlled. The video captured by this camera is wirelessly transmitted and is shown on a monitor in the control room. Moreover, the auto-car is equipped with a system to locate the place of detected cracks. This system uses the Infrared sensors mounted on the car wheels. The number of wheel rotations can be calculated and converted into measure of distance. This deigned auto-car could save effort and time for the underground pipeline inspection
.

Fig. 1: Block-diagram of the Project



Real-Time Multimodal Biometric Authentication Web-Based Application, Using Electroencephalography, Face Recognition and SMS Token

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Supervised by
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ABSTRACT

Living in the era of rapid information exchange, has made the need for powerful authentication systems a paramount. Recently, despite the fact that there is a revolution in the development of unimodal biometric authentication systems, yet they are facing efficiency and accessibility challenges. Efficiency is effected by problems such as: noisy data, restricted degrees of freedom, spoof attacks, and unacceptable error rates. As for accessibility, authentication systems are not suitable for individuals with disabilities, for example, mute individuals can't use voice recognition security systems because they simply can't talk. Additional challenge is addressed for newer biometric systems such as EEG, that is the absence of real applications for EEG in authentication.

This project address the previous problems and propose a multimodal biometric system as a solution. The system includes two biometric models: Electroencephalography (EEG) and face recognition. It also includes one non-biometric model, known as SMS token .The project consists of two aspects , research aspect and software development aspect .The research aspect focuses primarily on using EEG as an authentication biometric and secondly , on face recognition in authentication and multimodal fusion . It includes using artificial intelligence techniques to find the best feature extraction and classification algorithms to use. In addition to finding the best multimodal fusion technique that combines all system models (Electroencephalography, Face Recognition and SMS Token). As for the software development aspect, it is concerned with implementing the results of the research done in a web application. the core functionalities the application will have are , *acquisition* of EEG signals through an EEG headset, then face images through a web camera, *feature extraction* for each model, *EEG signal and image processing*, and multimodal fusion on the decision level for the three models , all on real time . The system is a C# ASP.net web based application, designed as a layered architecture. It includes the use of JavaScript web camera library, EEG headset device library, and SMS web service, all integrated in the Asp.net IDE. The system can be used as a library that C# software developers can include in their systems and use it as their security layer.

The expected results from this project are: People will have the ability to get access using their brains! , the use of EEG in authentication is powerful due to three main reasons. First, some features that are extracted from the EEG signals are unique from one person to another [1] [2] [3] [4].Second, brain signals are only vital inside the human brain. Third, the brain signals still considered difficult to replicate from one medium to another. A good solution for individuals with disabilities who are unable to use recent authentication systems, since it only requires an active brain to generate the signals and the existence of a face. A new step in the world of wearable technologies ; just like how computers became smaller and faster ,we believe that in the near future the EEG headset will be less expensive , more convenient and available , as a result , this system will be ahead to serve the demand . By the composition of selected models through fusion methodologies; a user won't be just authenticated using one model but three, thus, the efficiency of the system will be definitely higher than any unimodel biometric system, the identification accuracy will increase, as will as the system robustness (e.g. If one of the models fails for any reason, the system can still provide accurate identification of a person through the fusion algorithm). A great contribution in the field of biometrics, EEG science, multimodal fusion techniques, and authentication systems.

Plagiarism Detection System For Arabic Documents

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ABSTRACT

Plagiarism is a big problem facing people in academic environment. Thus, detecting plagiarism plays important roles in many academic applications. Therefore, people need in the academic environment guarantees to prevent the existence of plagiarism and guarantees to detect it.
Although plagiarism detection systems in English, French and others exist now, but until now there are very few techniques to detect plagiarism in Arabic. In our project we aim to build a Plagiarism Detection System for Arabic Documents.
We aim to build a system where a suspicious text is compared to a set of source documents. The system applies an n-gram based detection algorithm and uses two steps of comparison, one on the level of the whole document and the second on the sentence level.

The system has a database that contains source documents and their n-gram models. The system performs documents preprocessing by removing the meaningless characters (punctuation characters, whitespaces, etc.) in order to get pure words without any added extra characters.

The system will be able to retrieve all n-gram models from database one by one to compare them with target document after converting it to n-gram. The comparison will be done in two steps:

First, to compare document to document we try to find similarity between each source documents and target document by using Jaccard Similarity measures. The Jaccard coefficient measures similarity between sample sets, and is defined as the size of the intersection divided by the size of the union of the sample sets. If N(t) and N(d) are the n-gram models for the target document and for a source document respectively, similarity will be defined by:

$$JS(t,d) = (N(t) \cap N(d)) / (N(t) \cup N(d)) \quad (1)$$

The result will be compared with a predefined threshold. If it is higher, it means that there is a plagiarism.

Second, here we will try to find out the plagiarized sentences from the target document by comparing n-gram model for every target document's sentence N(si) with the n-gram model of the source document N(d). Due to the difference in size, we use containment measure for measuring the similarity:

$$Sim(si \mid d) = |N(si) \cap N(d)| / |N(si)| \quad (2)$$

If Sim(si |d) is greater than a given threshold, the sentence si becomes a candidate of being plagiarized from d.
The value of n affects the result so it is very important to define the best value for it that gives the best result.

Our system is important for academic field to detect plagiarism in Arabic documents, this is important to the document owner which prevent others from getting their efforts, also this project helps in enrich the academic field with new researches depends on do efforts in search.

Riyadh Schools Finder

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Supervised by
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ABSTRACT

The city of Riyadh has a huge number of private schools that vary in their education methods and characteristics. Parents may spend hours commuting between schools to get the necessary information to choose the best school for their children. Based on this problem, the goal of our project is to create an android application to help the parents locate the schools matching their criteria.

Education is the foundation to establish a civilized society, and that is what any parent hope for their children. They will look for the best school that meets their requirements to make sure that their children will get the kind of education they want for them. However, there are a huge number of schools located in Riyadh combining public, private and international schools. They provide education which varies in teaching quality, teaching material, percentage of students 'success, intellectual and cultural trends, reputation, location, registration conditions and fees, etc. These are some of the main difficulties that might face the parents and especially foreigners who are facing more difficulties since they do not know the city very well while searching for the appropriate school for their children. Parents might search through search engines to get the necessary information, but the search engines might not provide all the information needed, or might provide out of date information, incomplete information or information from untrusted sources. All of that will add to the difficulty of finding the needed information required by the parents.
According to these challenges, we developed ' Riyadh Schools Finder ' which is a mobile application that provides an automated searching process and enables parents, teachers and students to arrange their schools' criteria. The application is optimized for Android devices. The search is made by GPS, area, name, cost, language of curriculum and type. The result is a set of schools viewed as a list or map for easy decision-making. The application uses PHP My Admin database in the backend. To feed the database, data (as school's name, address, phone number, number of students, type, etc.) is retrieved automatically from external resources by using Microsoft queries. For ethical issues, information about schools we use is provided by the ministry of education in Saudi Arabia as web pages and excel sheet to ensure any updating. The application applies inference rules to seek information needed by users. The language used is Arabic, to reach a wide range of users. The application allows the users to save the search results in a favorite list, to rate schools and to share the information of a school via social networks or email. It shows the ranking of schools according to users rating.

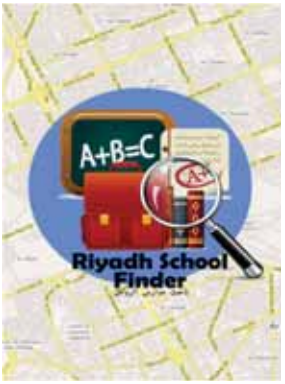

Figure 1: Splash screen

Figure 2: Home page

Mayfly: A social networking iPhone application for Saudi Arabia focusing on events

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ABSTRACT

Events are published nowadays using different methods, e.g., newspapers, e-mails or social networks. However, currently there hardly exist any mobile applications which are fully dedicated to and designed for handling events. Even applications that do exist, present many problems to users, particularly those residing in Saudi Arabia: Lack of support for Arabic language may be the most significant one. Moreover, none of these applications cover events specifically in Saudi Arabia. In addition, some applications require a fee to be paid by event organizers to publish their events, which may deter them from publishing their events.

People have always resorted to social networks to publish their events but since these are not designed explicitly to manage events in a user friendly manner, an application designed specifically for this purpose should certainly solve several of the above problems.

A survey conducted by us to determine local user needs revealed that 80% of the participants had never downloaded an event application – this confirms the novelty of our idea for the local population. We also discovered that though people in Saudi Arabia are interested in events, they are facing difficulties in finding events within their local area.

To address some of these problems, we are developing a social networking mobile application for Saudi Arabia focusing on events which will provide the following functionalities:

- Allow users to create personal accounts and profiles.
- Allow users to sign up via Facebook, Twitter or email.
- Allow official organizations to request account authentication which permits them to post events without waiting for the administrator's approval.
- Allow users to follow other accounts.
- Allow users to add events to their page.
- Allow users to share events via Facebook and Twitter.
- Allow users to like events.
- Allows users to save events to their phone calendar.
- Provide users with an "attend button" which, upon clicking, indicates that the person is attending an event.
- Allow users to view and search for events (organized in categories such as sports, health, technology, etc., to facilitate searching)

Mayfly is being designed for the iPhone with Arabic and English interfaces, and will be available for free with all its services. To implement the system, objective C language will mainly be used along with Twitter and Facebook APIs.

Mayfly is unique in that it is the first Arabic language social networking smartphone application dedicated to events in Saudi Arabia. As such, it will aid event organizers in publishing their events on a social hub enabling them to reach their audience and promote their events. It will also assist the public in finding events in their local areas. Though we are focusing on Saudi Arabia at present, however, in the future, we plan on extending this application to include other parts of the world. We also intend to introduce additional capabilities such as the ability to purchase tickets via the application and displaying maps and routes to event locations by utilizing the Google Places API.

VPTA (Virtual Physical Therapy Assistant)

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ABSTRACT

VPTA (Virtual Physical Therapy Assistant) is simply a virtual assistant using Hologram technology that helps stroke and cerebral palsy survivors during rehabilitation to overcome the impact of the disease and recover from disabilities caused by a stroke and cerebral palsy. This is done by performing the required exercises within the physical therapy program. Problems to be tackled in the project are that the physical therapist cannot have an accurate movement's detection of the patients. Also there is normally difficulty in communication between the patient and the physiotherapist because the patient may not respond properly to the instructions given by the physiotherapist. In addition, the assistant could be very busy with full schedule or he/she could be absent from clinic with no replacement due to staff shortage. Also, rehabilitation centers usually face some problems with appointments management of sessions due to the shortage of physiotherapist serving large number of patients, which needs extra time and effort. Our project aims at helping stroke and cerebral palsy survivors to become as independent as possible and to get the best possible quality of life. This is done by developing an effective tool, i.e. a virtual physiotherapy assistant (VPTA), which will enhance disable people's life. VPTA will motivate patients to keep doing the exercises and help them to achieve the best possible long-term outcome. VPTA provides an accurate measure of the patient's movement for physical therapy. It also provides automated and accurate weekly/monthly reports of the patient treatment progress to be sent to the supervisor of the patient. VPTA saves physical therapist time and effort and will help easing the burden on the physiotherapists by supervising more than one patient at a time which will reduce the expenses of physical therapy clinics. It also helps increasing the rate of patient's interaction and improving communication with the specialist in physical therapy sessions that may contribute to improving the performance, and hence the condition, of the patient to reach the desired results. VPTA tool is to be utilized in physical therapy centers which will help to receive and respond to a large number of patient requests for physical therapy under the supervision of few numbers of specialists, which will decrease the centers expenses while taking into account the quality and effectiveness of the exercises. In our proposed solution, we will use Holography technique which enables three-dimensional images to be made. The Hologram technology will help us to reach and achieve VPTA tool aims and objectives. The hardware to be used to implement VPTA tool includes Holographic film, Acrylic, Frame, Projector ~4,000+ lumens and Kinect. The software we will use to develop and design the proposed solution includes Visual Studio 2012 C#, MySQL, Adobe illustrator. VPTA will be developed to run compatibly on any type/model of laptop. VPTA will be tested on real patients with collaboration of applied medical science college and the results will be compared with traditional treatment to measure its effectiveness and efficiency.

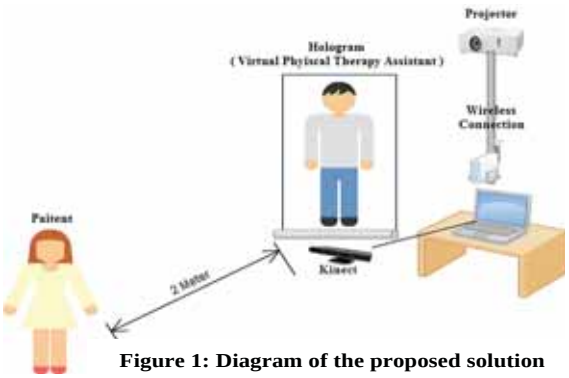

Figure 1: Diagram of the proposed solution

Impact of IPv6 Implementation on Mobile Network Applications

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ABSTRACT

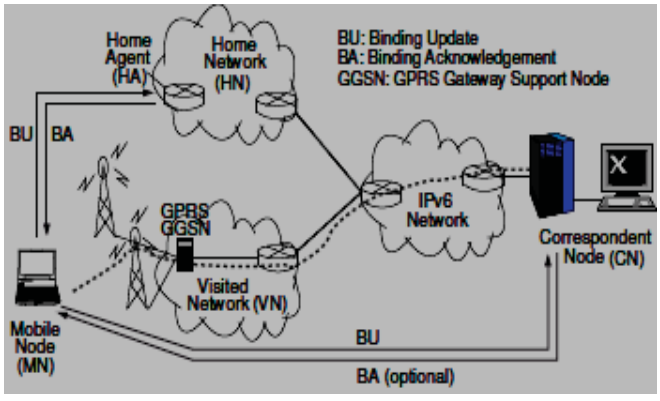
In this paper, we have proposed impact of IPv6 implementation on mobile network. IPv6 is the next generation protocol for the internet. It is designed to provide numerous benefit over the concluding internet protocol version 4(IPv4). The Internet Protocols defined in the network layer protocol mainly how data is sent from one computer to another computer over packet-switched network. On the contrast of IPv6 has a very large address space and consists of 128 bits as compared to 32 bits in IPv4.In addition, this addressing scheme will also eliminate the need of NAT (network address translation) that causes several networking problems (such as hiding multiple hosts behind pool of IP addresses) in end-to-end nature of the Internet. IPV6 brings quality of service (QoS) that is required for several new applications such as IP telephony, video/audio, interactive games or ecommerce. Whereas IPv4 is a best effort service, IPv6 ensures QoS, a set of service requirements to deliver performance guarantee while transporting traffic over the network.

There is a strong growth in mobile Internet access, fed by the increasing popularity of WiFi, and the worldwide deployment of wide-area wireless networks such as GPRS, 3G and Fourth generation wireless (4G). Multi-mode devices (e.g.WLAN-GPRS cards) are becoming increasingly inexpensive, and thus a growing number of mobile devices such as laptops, PDAs and handhelds are prepared to connect to multiple networks. Therefore, the aiming of this paper is the Mobile IPv6 can play a key role in the integration of these different link-layer technologies, with the promise of a transparent, making it easier to navigate using standardized network layer.

When mobile users migrate from covering the access point network to another, the devices considered to make a handoff. Most occur handoffs between access points to the same network technology called horizontal handoffs. Referred Handoffs between different access points belonging to different networks (e.g. WLAN to GPRS) for vertical handoffs also pose a much greater challenge.

Also, it aims to enable transparent mobility of mobile phone users to move smoothly across networks, as well as wireless wired, with a minimum of disruption in streaming packets. The mechanism by which activation of this must hold latency handoff low, have been incurred by the loss of data with little or no; scale things large networks; adjust to different applications for network environments, and finally as the situation between environments and technologies heterogeneous without compromising on key issues security and reliability.

For practical experimentations of this paper, we investigate how to extent the Mobile IPv6 support migrate successfully the TCP connections through the delivery of the network and its applications. To understand the performance issues in the delivery of applications in terms of operations, we characterize the first process in the delivery of Mobile IPv6 in two main steps handoff decision and implementation. Discuss how Handoff decision is completely independent of implementation, while contributing to the implementation of the overall delivery latency. In this paper, we will focus on the process of implementing handoff using Mobile IPv6 by breaking it in 64-bit route prefix, which is used to route packets to the network right, and the ID 64-bit interface, which defines a specific node on the network, and can be essentially arbitrary. So, it can be IP addresses in Mobile based IPv6 select either a node or a web site, or even both. We offer and evaluate structures such as Fast Router Advertisements (RA), RA Caching, and Binding Update (BU) simulcasting to aid Mobile IPv6 protocol during inter-network handovers. We show how a proxy installed in GPRS network for smart buffer management, can improve TCP performance during handovers involving GPRS, and also use of soft handovers to develop TCP performance. We demonstrate the benefits from each of these schemes, and conclude with our experiences using Mobile IPv6 to successfully migrate TCP connections during inter-network handovers in an environment. The above figure shows (MIPv6 Structure).



Mindwave Alert System

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ABSTRACT

This project deals with the design and implementation of a mindwave alert system. This system can be used to alert tired or sleepy car driver so that many car accidents could be avoided. The system tests the mind status of the driver. If the driver feels dizzy while driving, the system will turn on car radio; it will turn on car alarm system to worn neighboring cars and it could send SMS to the police or driver relative. The designed system uses mindwave reader, microcontroller, wifely shield and Bluetooth connection between the mindwave headset and the dongle (see Fig. 1). The program is written in C-language. The final project includes analysis of the alert levels detected by the mindwave headset and based on that level, action will be carried on (See Fig. 2).

Fig. 1: Components of the proposed project.

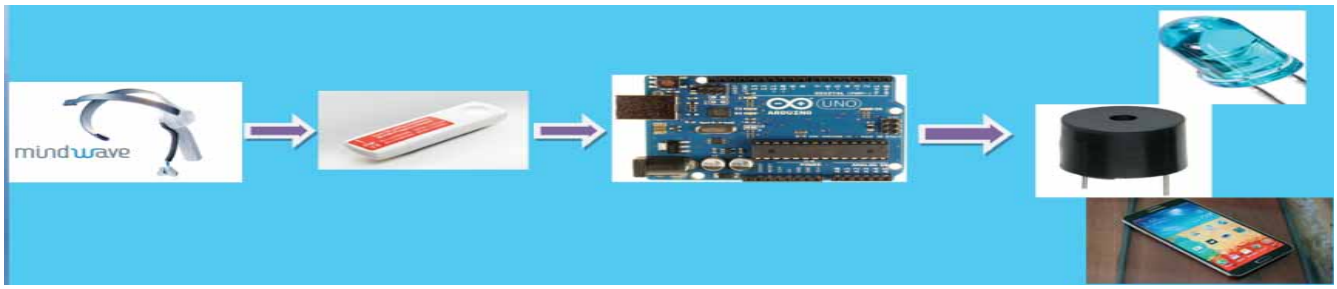
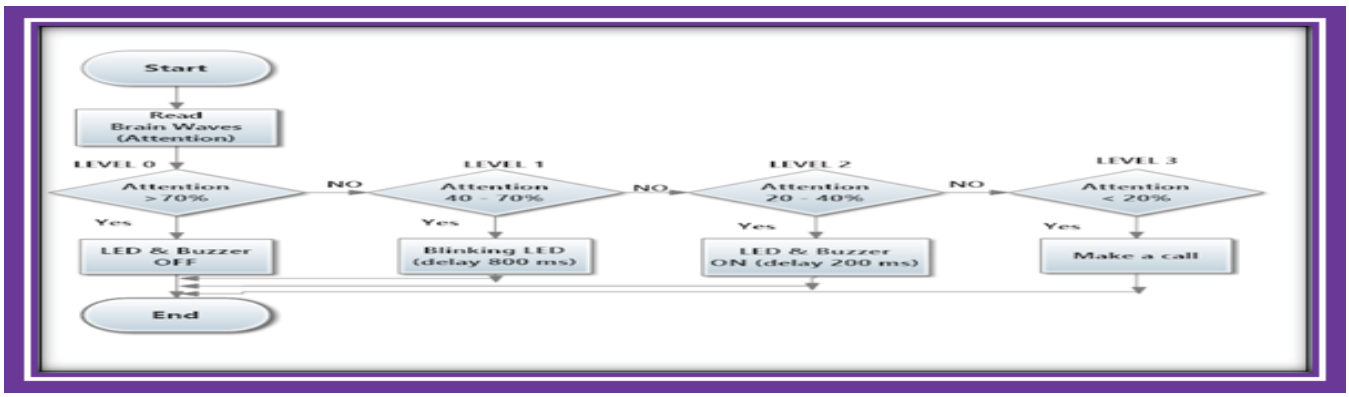


Fig. 2: Flowchart of the proposed Mindalert system



TAXI MANAGEMENT SYSTEM

Samaher Al-Khuzaim, Salma Althebiani, Bashaier Almotairi, Hebah Alafary and Sahar Altalhi under the supervision of Dr.Wafaa Shalash

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ABSTRACT

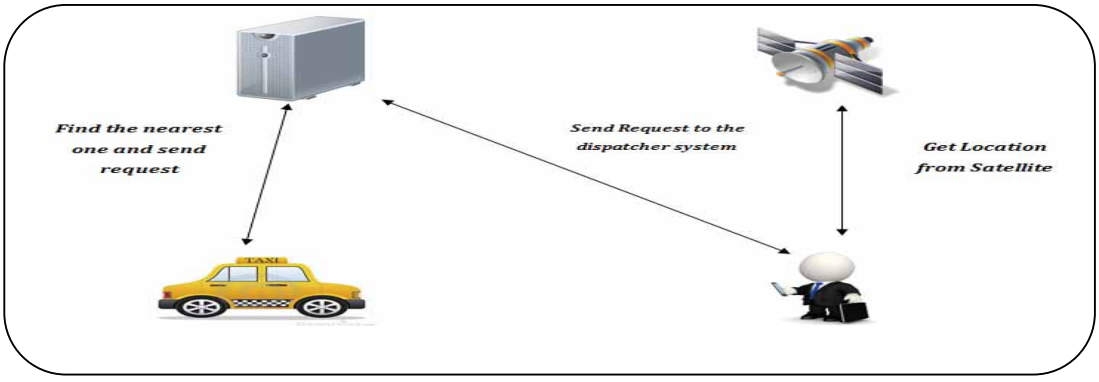
In Saudi Arabia there is no electronic taxies managing system. The taxi organization provides every driver with a taxi so he is responsible to look for taxi seekers. The organizations don't have the idea of the driver's location and the number of seekers that he reached them. Actually there are many problems. **Firstly,** for taxi seekers: they are consuming their time or they may be in a place that doesn't have a lot of taxies. Some people such as old, kids and women may get in trouble while waiting or getting abduction by unknown taxi. **Secondly,** for the taxi driver: wasting his time in looking for customers or wasting some effort without any benefits. **Finally,** for the company itself: it doesn't have the ability to track all taxies. Sometimes the drivers are unlucky in getting the customers places, so the company will be affected.

Developing and building a Taxi Management System (TMS) to facilities the communication of these three stockholders and also integrating the modules to be one complete system. For **taxi seeker**: we suggest that the one who needs a ride has a smart phone application in which he can ask for the nearest available taxi and get reply of the expected time for the taxi to arrive. For **taxi driver**: we suggest that the taxi driver should also has a smart phone application in which he can use the following features: receive seekers request from the dispatcher server, track the location of the seeker and show map with the traffic conditions and a point to the target seeker. Finally, for **company dispatcher Server**: the dispatcher system will be at the middle of the seeker and the taxi driver. The following functions will be on this dispatcher server:

- Receive taxi seekers requests that include (number – location).
- Track and monitoring taxies locations.
- Find the nearest available taxi to the seeker location and send him that request.
- Save all information in the Database.

Currently we have finished the system prototype with the basic functions and We are going to integrate unique features with our (TMS) system such as traffic monitoring feature for taxi driver map to avoid crowded roads. We also thought about applying a feature for special needs people, specifically adding voice recognition for blinds that will enable them to ask for a taxi through speaking.

(TMS) is a flexible system, which divide into 3 main modules for (taxi seeker – taxi driver – Taxi Company) integrated together to offer the best services for the three benefiters. The system will make the communication process between them very fast and more reliable, moreover the transmission process for the taxi seeker will be safe and easy by using some modern IT technologies. Here is a simple structure of the taxi (TMS)



Super Calculator: An educational tool developed by students to help other students

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Supervised by
Dr. Emad Bataineh

ABSTRACT

Super Calculator app is both a smart calculator and convertor. It was developed as an IT solution to meet the needs of many students in the college of Technological Innovation. Vast number of students is required to take CIT 215, Computing Foundation in the first semester of their majors. In this course, students learn number representations (Binary, Octal, Decimal and Hexadecimal) and how to perform mathematical operations on them. Most CIT 215 students found this tool useful and helpful to double-check their final answers. Such application would save the students' time and effort, and enable them to do all needed calculations in one integrated environment with few clicks. This application was planned, designed and developed as part of the final project for CIT 320 course, Programming & Problem Solving II.

The features that make this application unique are several. Firstly, it is available on Smartphone platforms. Secondly, it combines several computational functions that run in an integrated environment. Thirdly, the user does not need an Internet connection to use this application once it was downloaded on his/her smartphone. Finally, the design is intuitive, simple, easy, and the user does not require any prior knowledge to be able to use it.

During the application development process, the project went through several stages:

- Stage one: identified the application's major functions and features
- Stage two: developed the application architecture and its main programming modules
- Stage three: conducted a usability test to choose the most effective GUI design for the application
- Stage four: implemented the design using GUI component.
- Stage five: enhanced the application with additional features in order to run the application on two Smart phone platforms (IOs and Android).
- Stage six: Created a poster to illustrate /highlight all the steps involved in the development process.

Various technologies (tools) used in implementing the application, including

- NetBeans.
- TopiStudio.
- Photoshop.
- Microsoft Word.
- Html.

Figure 1 illustrates the home screen of the calculator. A full usability experiment using state of the art technology "T-120 Tobii eye tracker" has been planned, designed, and conducted to measure the effectiveness and usefulness as well as the quality of the application user interface design. The results and findings from the test indicate that the application was found to be usable, powerful, useful and helpful by students enrolled in CIT-215.

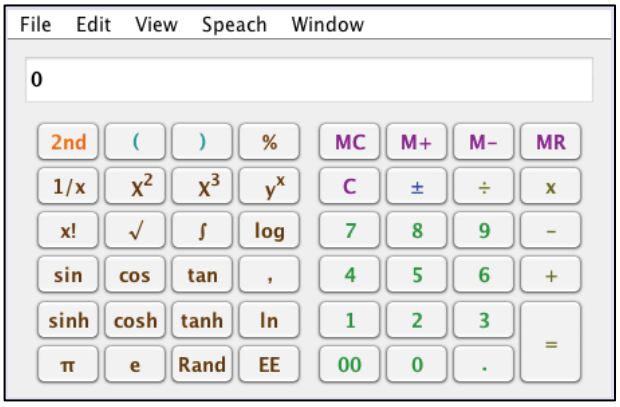

Figure 1: Sample of the application design (Calculator home screen)

Mobile Vision: Smartphone-based object recognition application for the visually impaired

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Supervised by
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ABSTRACT

According to recent estimates by the World Health Organization, 285 million people worldwide are visually impaired, 39 million of whom are blind [1]. One major challenge these individuals face is recognizing generic objects in their environment - the inability to do so causes them emotional distress, limits their independence, and exposes them to injury. Commercial assistive technologies developed for this purpose are generally too expensive (given that 90% of the visually impaired live in developing countries earning low wages [2]), too hard-to-grasp (especially for the elderly, which comprise 65% of this community [2]) or too time-consuming and labor-intensive (e.g., requiring placement of markers or RFID/infrared tags on objects).

We have, therefore, developed an application for this task which runs on a portable and relatively inexpensive computing device, i.e., a camera-equipped smartphone, that many people own or can easily purchase. The application provides the following two functions:

- Train object: The function allows the user to capture an object's image with his/her smartphone camera. The user is then asked for the object's name. The system is then trained to associate that image with the provided name.
- Recognize object: The function allows the user to capture an object's image with his/her smartphone camera. This image is then sent to a remote server, which determines the object's name using a computer vision-based object recognition method (i.e., the Speeded-up Robust Features (SURF) technique [3]) and transmits it back to the phone where it is relayed to the user via phone-embedded text-to-speech software.

To facilitate usage by visually impaired users, we have provided voice-activated or touch-based options for the interface. This prototype system is limited to recognizing whole, unoccluded objects on an uncluttered background under controlled illumination. However, more sophisticated techniques would be employed in the future to enable the system to perform well under uncontrolled real-world conditions. This application is being developed on an iOS platform using Objective-C and with Java and C code being executed on a Windows platform on the server side.

We hope that this application will greatly enhance the ability of the visually impaired to recognize objects in their surroundings, boosting their self-confidence and making them more self-reliant.

References:

[1] D. Pascolini and S. P. Mariotti, "Global estimates of visual impairment: 2010," *British Journal Ophthalmology*, 2011.

[2] "Visual impairment and blindness: Fact sheet number 282. http://www.who.int/mediacentre/factsheets/fs282/en/," ed: WHO media center, 2012.

[3] H. Bay, A. Ess, T. Tuytelaars, and L. V. Gool, "Speeded-Up Robust Features (SURF)," *Comput. Vis. Image Underst.*, vol. 110, pp. 346-359, 2008.

Lower-Limb Entertainment Physiotherapy [LEP]

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Supervised by
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ABSTRACT

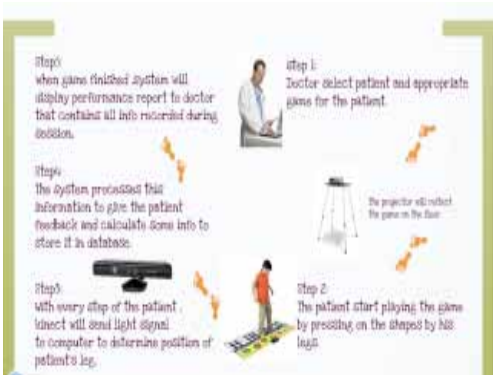
Recent years had witnessed a great development and versatile in the methods and techniques used in physical therapy. These techniques can be used to treat several types of injuries, illnesses, and disabilities for different parts of the body. Despite the improvements in the rehabilitation techniques physiotherapy specialists are still looking for new interactive techniques that are aimed to increase therapeutic effect and to reach the maximum level of the rehabilitation.

The aim of this research is to introduce Lower-Limb Entertainment Physiotherapy (LEP), which is a medical interactive system provided to physiotherapy community. LEP main objectives are to improve traditional physiotherapy sessions by embedding technology. This will give the treatment another meaning by making sessions more interactive, gaining patient attention and increasing their acceptance and response.

The intervention of video games in physiotherapy sessions is also very acceptable for patients to increase patient motivation and compliance with rehabilitation goals. LEP is based on integrating different technologies to create a novel virtual physiotherapy application.

LEP system consists of the following components:

- LEP Virtual Environment:
  - Graphical Scenarios: which reflect on the floor some simulating movement that the patient should follow.
  - Touch Surface: is a program that we developed to turn the floor into touchable surface, so we can detect the patient's movement on the graphical scenario.
  - Hardware: consists of projector, Kinect that should be integrated together in specific way to represent the therapeutic graphical scenario on floor by using projector and sense the patient steps by webcam when patient walks on the represented therapeutic scenario.
- LEP Therapist Interface:
  Which enable therapist to start session by running the scenario, retrieve the information of each session to follow up the progress of patient treatment.



As a result, patient, physiotherapist, and the society all benefit from using the LEP system. For the patient, the system makes sessions more interactive; also better improvement in interactive Physiotherapy rather than traditional way. And for physiotherapist, Sessions is very acceptable for patients and will increase patient motivation and compliance with rehabilitation goals, Gaining patient attention and increasing their acceptance and response.

Implementing the Artificial Bee Colony Algorithm on Graphic Processing Units

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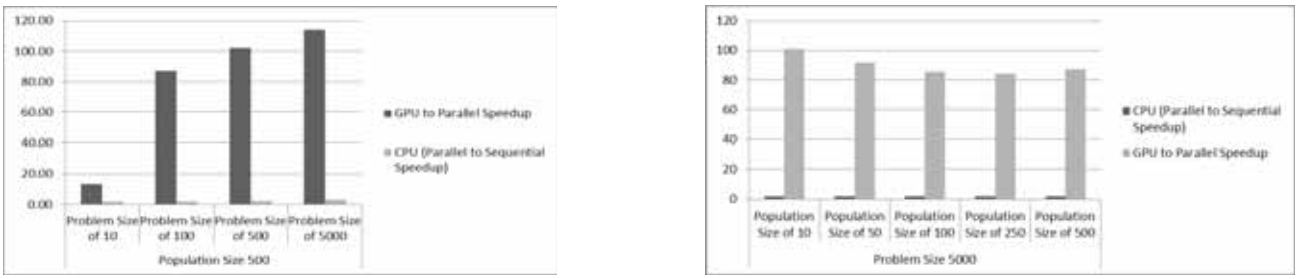
ABSTRACT

A Graphic Processing Unit (GPU) is a single chip processor that is designed to rapidly manipulate large blocks of data in order to accelerate the building of images intended for output to a display. As the name implies, the use of GPUs was initially targeted towards computer graphics applications. Nowadays, GPUs are used in personal computers, mobile phones, and game consoles.

Due to their highly parallel structure, GPUs are more effective than general-purpose CPUs (Central Processing Units) for algorithms where processing of large blocks of data is done in parallel (i.e., population-based algorithms). A CPU commonly has 4 to 8 fast, flexible cores with a clock speed of 2-3 GHz, whereas a GPU has hundreds of relatively simple cores clocked at about 1 GHz. Hence, tasks that can be efficiently divided across many threads will see enormous benefits when running on a GPU.

Many evolutionary algorithms have been implemented on GPUs showing tremendous speedup including Particle Swarm Optimization (PSO), Genetic Algorithms (GAs), and Differential Evolution (DE).

In this work, we accelerate the performance of the Artificial Bee Colony (ABC) algorithm using a simple implementation under MATLAB on graphic processing units (GPUs). The implementation approach adopted is by using MATLAB and parallelizing the entire algorithm through the division of the entire algorithmic steps over the available cores. This is done by creating a parallel region with the *spmd* instruction and dividing the work amongst the workers by using the *labindex* and *numlabs* variables. Experiments are executed for increasing population sizes of 5, 10, 25, 50, 100, 250, and 500. For each population size, the comparisons are carried out for increasing problem sizes of 100, 100, 500, and 5000. The code is run on an Intel Xeon machine with a dual 3.25 GHz CPU and 24 GB of RAM under Windows 7. The GPU card is NVIDIA GeForce GTX-580, which has 512 cores clocked at 1544 MHz. The parallel implementations of the algorithm were created using the parallel computing toolbox under MATLAB R2012.The GPU implementation is compared against both a CPU-parallel version and a CPU-sequential version. So far, the work is tested using the Sphere function and a sample of the results is shown in Fig. 1.



(a) (b)

Fig. 1 (a) Speedup across different problem sizes (b) Speedup across different population sizes

Fig. 1 shows the speedup achieved for the Sphere function when parallelizing the entire algorithm. The figure clearly shows the speedup achieved by the GPU implementation in comparison to the CPU-parallel version.

Towards An Object-Oriented Network Programming Language

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ABSTRACT

The process of the growth and development in the cities and countries led to create and design the networks which are becoming more complex and much bigger than in any other time. Networks are meant to simplify the communication between all parties. Networks consist of hardware and software components to provide a very rapid way for sharing and transferring the information.

To manage the behavior of any network, a flexible network programming language (NPL) is needed to write principles, algorithms and tools to achieve the requirements of the networks. NPL is also crucial for monitoring traffic on networks as well as preventing the network congestion. This will prevent network slowdowns and makes it also possible to reduce so many of the network problems. Typically, NPLs helps constructing sets of rules that are needed to be installed in physical network switches or routers.

One of the common and successful network programming languages is Frenetic; a high level language embedded in Python. It is a new language for programming OpenFlow networks in which switches are programmed to process many of the packets. Hence Frenetic is used to configure the distributed switches in the modern networks that are actually controlled by OpenFlow.

OpenFlow is a standard interface to setup the forwarding rules on the switches so that packets get processed by the controller. It also works on implementing the network services. The most familiar controller platform of OpenFlow is NOX Controller. NOX acts as an operating system for networks that manage a set of rules installed on the switches in the network by responding to all of the network events. Frenetic was designed to overcome major drawbacks of OpenFlow.

This project aims at going one step forward on the way of improving network programming languages. More specifically, the project aims at generalizing the Frenetic language by adding concepts of object-oriented programming to the language. This will result in a robust programming language for networks that overcomes some drawbacks of Frenetic. Moreover the language that will result from the project will be convenient to program some network applications like "load balancer" that are a bit hard to program in Frenetic without concepts of networks programming. Apparently no previous tries were made to involve object oriented concepts in networks programming languages. This adds to the value and novelty of the project. Practically, the project result will improve functionality of important network applications.

WHEELCHAIR CONTROLLED BY FEMG

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ABSTRACT

People with disabilities who are unable to walk are most concerned about human assistive devices like wheelchairs .Different methods which operate with joysticks by chin or tongue, or they use voice commands to control wheelchairs has been developed in the past to help disabled individuals . However, these examples of interface have many complications and burden to control the wheelchair smoothly and efficiently. Therefore, this is an ongoing project that aims in developing a smart wheelchair that takes commands from expressive facial muscles of the wheelchair's user to utilize fEMG signals from the users face muscle. **Facial Electromyography** (fEMG) refers to an electromyography (EMG) technique that measures facial muscle activity by detecting and amplifying the tiny electrical impulses that are generated by muscle fibers when they contract. (1) The Bioelectric signals are picked up from facial muscles, and then the Bio-signals are processed through a series of stages to obtain the desired (EMG) signal to be interfaced with the wheelchair. The advantage characteristics of using femg over other available methods are:

1. Facial Electromyography (or fEMG) is accurate and sensitive method to measure emotional expression.
2. fEMG is another valuable biometric measurement as other bioelectric signals are not as relativity easy as to obtain fEMG(1).
3. fEMG does not depend upon language and does not require cognitive effort or memory and is greater when the user is willing too(1).
4. fEMG is capable of registering the response even when subjects were instructed to inhibit their emotional expression(1).
5. It is able to measure facial muscle activities to even weakly suggestive emotional stimuli (1).
6. fMRI and EEG are more intrusive than other physiological measures like fEMG(1) .
7. Like other physiological measures, fEMG measurement technique is often the only useful approach when movement is not visible.(1)

In order to move the wheelchair the main component of the project is as follows: we will attach surface electrodes which are placed on the strongest facial muscles that record a high fEMG, for example: Forward Straight: Occipitofrontalis. , Left:Orbicularis oculi and Levator labii, Right: Orbicularis oculi and Levator labii, Head Down: Splenius capitis muscle. The fEMG sensors can detect EMG signals obtained from surface electrodes applied. Our fEMG Muscle Sensors are designed to be used directly with a microcontroller. Therefore, the sensors do not output a RAW EMG signal but rather an amplified, rectified, and smoothed signal that will work well with a microcontroller's analog-to digital converter (ADC). This sensor will be connected to a DC motors via Ardunio Uno board and then programmed accordingly to the facial muscles movement of the user in order to move the wheelchair according to his/her needs.

However, safety measures are difficult to carry out while controlling the wheelchair using the biological signal only. Therefore, to detect obstacles the speed of the wheelchairs is controlled by different sensors. When it comes within a certain distance of the obstacle, it slows down or completely stops. We will be able to test the system by getting feedback from patients after the implementation.

Reference:http://en.wikipedia.org/wiki/Facial_electromyography

Sign-Language to Speech and Speech to Sign-Language Translator

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Supervisor:
Dr. Amir J. Majid, Co-supervisors: Eng. Muhammad Rehan, Eng. Mussab Hasan

ABSTRACT

Deaf or/and mute people are a part of the society. They can play important roles in the development of society and participate like everyone else. The only problem they face is their disability is to communicate with other people using the language, based on speaking and listening. Sign language has helped in this communication process, but it requires that both sides; the deaf and others; must be familiar with it. In the case of one side of the communicator does not know it, the communication would be broken off. So how can we communicate with deaf or/and mute persons without the need of teaching Sign-language to the whole society?

To solve this problem we propose a programming based project. The project is divided to two parts. First part is to translate voice to sign-language using software to enable talking to a deaf or/and mute person, and the second is the other side of communication from sign-language to voice using hand gloves which is the sign-language detector to the software. The translated speech will be displayed as video clip(s) and the language used in the program is ASL (American Sign Language). This application can be used on a PC, laptop, Smartphone or windows based tablet.

Speech to sign-language

Sign-language to speech

The two parts of the translator are implemented in LabVIEW. For speech to sign-language translation, we designed a program linking the received voice with the associated video clip to form a library. LabVIEW is used in the second part of translating sign-language to speech as well where we looked at many applications already done and concluded the following comparison between the two following methods we have chosen:

- Capturing and image processing which requires a camera, where the normal person should have it in a PC or mobile phone and this was successfully built using MATLAB. For our usage, it will not be practical since we will have to download the software in every mobile phone to be able to listen to a deaf or mute person.
- Using hand gloves, in which the gloves with sensors and controller will detect fingers signs and then send the data to the software to translate them to voice. These hand gloves will be used only by the deaf or/and mute where they will wear them and do the signs then a voice will be heard out.

Our software is capable of handling as many numbers of words. But for the purpose of guaranteeing results in terms of accuracy, we tested the software with few words like "Finish" where the accuracy of successful trials was 90% (a total of 10 people were asked to say the words). The words "Guide" and "Eat" gave 70% and 50% results, respectively. These words were chosen randomly.

The program succeeded in receiving the data from the contact sensors, identifying the letters by lighting the associated LED (used in the test instead of voice file). All inputs have been configured correctly. Remaining work has to be done on its development of voice recognition accuracy and the design of gloves to absorb the words by adding more sensors. At the end, we will enhance the project by receiving the information from the gloves wirelessly.

Learning difficulties application " Dysgraphia "

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Supervised by:
D. Mona alkhattabi

ABSTRACT

Because society does not get up by one or two people, but the interdependence of all of his individuals as a single person from here the Idea of the application "we are one" started.
"We are one" is an android application aimed to help learning difficulties' students and specifically who suffer from dysgraphia. This application will act as a personal assistant to them, and help them to develop themselves without the need for complicated methods to be able to address their weaknesses without using another person's effort or time. Moreover, parents can follow the progress of their child and trace his/her development level by the development advices proposed by the application for each child.

The application will be based on a test level of the child to measure his/her strengths and weaknesses by converting an academic test to be interactive application, which will offer to him/her a simple games to do and this games will reflect the child's results then it will offer development advices generating by the professional for each case depending on the results.

This application is anticipated to be able to highlight the main problems with child's development and then offers solutions unlike what might you find in other applications that may offer you the problem but it will not give you the solution or offering you solutions in general, and many of them may not add anything new, this will waste the child's time in many aspects do not need a lot of time.

Impact of New Technologies in Medical Applications

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ABSTRACT

One of the most fields affected by technology is the Medical Field, because of this I focus on the impact of new technologies in Medical Field. Technologies in Medical Field are divided into two main parts : Hardware(Example: Robots) and Software(Example: Mobile Application). Therefore I designed an Android Application helps doctor to stay connected with his/her patients.

About the Hardware, best application of Hardware new technologies in medical field is the Surgical Robotic Systems and I will take the da Vinci Surgical System as an example. The da Vinci Surgical System is a computer-assisted device designed to facilitate surgery using a minimally invasive approach. The da Vinci Surgical System is used in several medical specialties and for multiple indications.

There are three main integrated sub-systems:
1. The Surgeon Console.
2. The Patient-Side Cart.
3. An Electronic Cart.

About the Software, Mobile Applications helps doctors to stay connected with their patients .Therefore I designed an Android Application and named it "Mobile Doctor". This application will put a spot light on the software part in the Medical Field. Mobile Doctor is one of Medical Applications that helps the doctor to stay connected with his or her patients.

When it comes to our benefits and perks, we have everything you would expect from special program for patients. The application will support patients location, laboratory test result, patient diagnosis, radiology images, report, patient operation, patient medication, medication plan and patient treatment. This application makes patients follow up easier for the doctor as well as the freedom of movement and boundless. Also reducing the financial costs and the time as well as efforts. Mobile Doctor contains a set of options, such as: Add patient, Manage Patients, View Lab test Result, Edit Patient Details, View Appointment and Remove Patient.

Application Logo

Some of Application Screen Shots

Car Inspection System (CIS)

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ABSTRACT

Cars are one of the essential and popular transportation vehicles, which facilitate transition from one place to another in a short time. With the increase demand on relying on cars, periodic checkup must be done to the cars for the safety of their passengers. In addition, the car may be exposed to accidents and this requires performing maintenance to it.

Nowadays, in rental car companies, car maintenance companies, and insurance companies consume long time in inspecting the car's body as part of its admission to the maintenance or returning it back to the car rental company. Currently, car's body inspection process is done manually, which needs more time and effort in its performance. In the same time it negatively affects the accuracy of the process so that it is difficult to detect the scratches and dents on car's body by the human eyes. From this point our role comes in building an automated car inspection system CIS. The system aims to:

- Automate exploring the car body defects such as scratches and dents.
- Decrease the use of papers and the loss of data.
- Make the inspection process easier and faster.

CIS consists of four main components: Sensors, cameras, database, and image processing. The figure below shows the high level system architectural diagram.

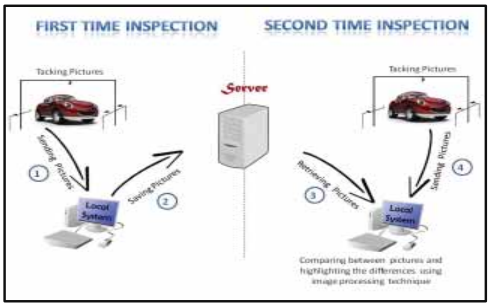

Figure1: High Level System Architectural Diagram

Before the system starts taking pictures for the car, it must ensure that the car is placed in the correct position using the sensors. There are two situations: first time inspection when the car enters the maintenance center and second time inspection when the car completes the maintenance period. In the first time inspection, the system will take pictures to the car from its different sides by using professional cameras and store them in CIS database. In the second time inspection, the system will take new pictures for the car in order to compare it with the pictures that are stored during the first admitted time for inspection using image processing technique. If there are any differences between the pictures, the system highlight them directly. The database will be updated with the new pictures for the car and finally a report with the inspection details will be sent via email to the customer and system administrator. CIS is implemented using ASP.NET in C#, Microsoft SQL Server 2008, and Canon camera SDK (System Development Toolkit).

The product will facilitate the inspection process by reducing time and effort, also the accuracy will be increased. The availability of this product in the companies contributes to make a good impression about the company and this reflects the efficiency of its work through performing an automated inspection process.

Broadcasting Tweets on LED using Raspberry Pi (BTLRP)

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ABSTRACT

Technology has been developed over the years and cannot pass a day without using it. Everyone, either old or young, uses Smartphones and social media. Now, even education cannot function without technology, either to communicate with students or share files. This project used one of the new and powerful devices Raspberry Pi and the most popular social network "twitter" to solve the communication issues between students and faculty members, especially for urgent announcements.

Raspberry Pi is a credit-card sized computer with great capabilities, it works on Linux operating system. First, it was started as a device designed to teach the basics of computer science, but recently it has been used to invent new technologies. This project has implemented by using Raspberry Pi because it is very cheap, small device and can do what desktop PC does. Also Twitter has been used because it can be accessed from computers, smartphones and tablets. In addition, twitter allows send tweets via SMS in case you don't have Internet serves

University announcements are not usually shared by technology or social networks, but via the old ways that consume papers and printer ink. Furthermore, they cannot be broadcasted instantly in order to share urgent news. While universities can use social media, like twitter, to broadcast any kind of announcements, these media are not good for urgent announcements, especially when the students do not have any connection with the Internet inside the college building. The system helps share the tweets on LED tickers to spread the announcements faster for all students, whether they are online or offline.

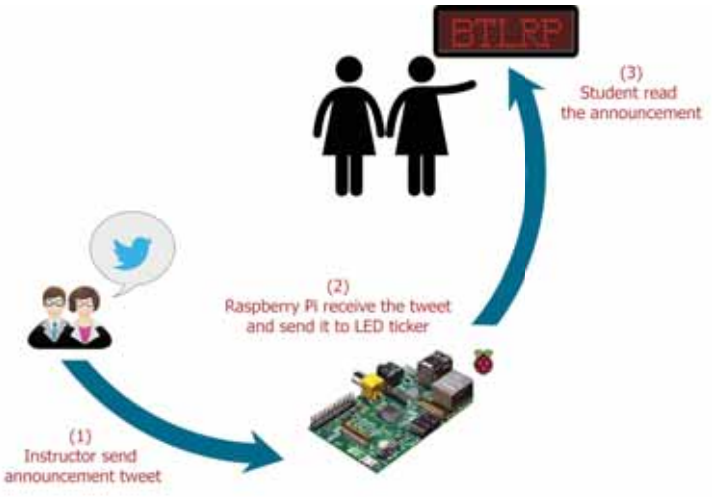

Figure 1: Illustration of BTLRP project

The result of this project is an announcing system that helps faculty members send their announcements remotely no matter where they are by using specific twitter account to LED ticker that displays tweets with the help of Raspberry Pi to all students, especially the ones who are offline. This project also helps simplify the ways we announce and share any urgent news.

SHEFA'A: Unified Patient Medical Record

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ABSTRACT

This research was conducted on the implementation of cloud computing in health care organizations. Our main focus is applying an integrated model of a patient medical record information system that utilizes the standard information format Health Level 7 protocol (HL7). The main objective is improving health care systems for detecting, preventing, and minimizing preventable causes of mortality and misdiagnoses due to the lack of precise and comprehensive medical history. Our intention is to prove how computer science can be applied to aid in addressing health care challenges, which is why we established our project 'SHEFA'A'.

Many health care organizations have either developed their own information system or outsourced the development of their IT system, in order to manage their hospitals' data. However, other organizations still rely on paper-based data in their daily operations, especially organizations of mediocre size, due to the assumption that an investment in an IT system is expensive. This discrepancy between health care organizations may impose challenges and difficulties in accessing patients' medical data.

By using e-Patient medical records and Mirth Connect Program which implements the HL7 protocol, we provide a unified, comprehensive, and automated patient medical-record system to provide better patient care and avoid preventable medical mistakes due to the lack of information and unavailability of medical records. This information has to be up-to-date. Therefore, diverse information systems must be integrated across the healthcare industry in order to unify accessibility across different hospitals.

In order to achieve our targeted, we must develop a framework for the exchange of patients' data across different database drivers throughout varying hospitals. In addition, retrieval of older data from these hospitals is an important aspect to prevent data loss in the future. 'SHEFA'A' aims to improve the traditional methods of obtaining patients' medical-records from different hospitals. Our proposed architecture focuses on how to store new data entries in our system in addition to retrieving old data efficiently from different database drivers in varying hospitals. It also manages to pre-process the data and save it in the database that resides on the cloud by using the Mirth Connect Program. These records can be identified and retrieved by the national ID of the patient. This system can be accessed by web services; an asp.net based framework. Records will be automatically updated since the last visit of the patient and accessible from any hospital in Saudi Arabia.

In summary, the aim of this study is to provide a data exchange model of patients' records in HL7 standard, a more efficient and cost effective method, while providing physicians updated and accurate information of patients which can be accessed or edited (by authorized users) from any hospital in Saudi Arabia. We hope that our plan will greatly reduce preventable mistakes while improving the quality and efficacy of health care.

2M Budget: My Mobile Budget

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Supervised by
Dr.Meriam Kefi

ABSTRACT

Many people are facing difficulties in managing their spending; which may lead to serious problems such as debt. Therefore, they need to manage their money, prioritize, organize their expenses and find the right balance between spending and saving.

With the importance and wide spread of mobile phones these days a mobile personal budgeting application is a smart solution. **M**y **M**obile **B**udget "2M Budget" is an android mobile application that provides the user with the ability to track his/her spending in order to make it easier for them to manage their finances and make smart decisions with their money anywhere and anytime only by holding their smart phone.

There are several personal budgeting applications available now, yet they do not have the feature of tracking the user's debit and credit card purchases automatically and warn them when the specified limits are exceeded. Our application "2M Budget" provides a solution to the problem stated above and the missing features in the applications available in the market.

2M Budget keeps up with the user's budget and follow his/her bank accounts. Our application takes advantage of SMS service, by intercepting the SMS that contains information about the customers expense and save the expenses information (amount, bank name, date and time) into local database, which the user has to categorize at the moment or later on manually or automatically according to category. The point of this feature is that the application will track the users spending without annoying or asking the user to enter his/her spending every time, that will be the application's job.

With statistics and interactive graphs, the user can get a visual representation of his/her financial expenses per month. This will help the user to have a better visualization and understanding of how he/she has been spending their money and mainly to help them make a good decisions for saving and planning. Also the user does not have to be connected to the Internet or to have a PC in front of him/her to manage his/her expenses. Figure1 depicts the cycle of the application.

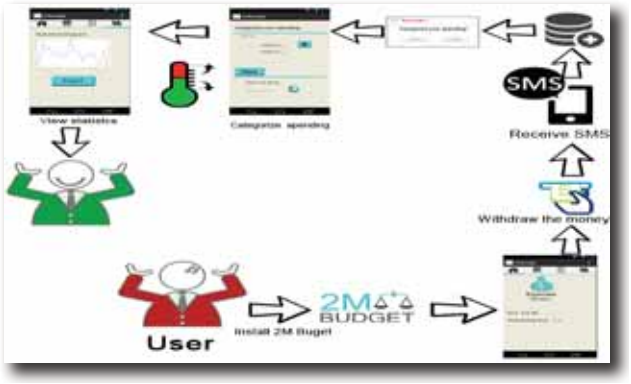

Figure 1: Diagram of the proposed application

Any user can get started by installing 2M Budget and registering to it. The software technologies used to implement the proposed application include Android platform emulator (Genymotion), Eclipse with Android Plug-in, Android API and Android SQLite Database As for the programming language we used XML, JAVA.

Down Syndrome Detection through Facial Images

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ABSTRACT

Down syndrome is a genetic disorder that occurs when a child is born with an extra 21th chromosome. Children born with Down syndrome suffer from intellectual disability, delayed physical development, and behavioral problems. The severity of these birth defects differs among affected individuals. Down syndrome affects one in every 319 children in UAE, which is one of the highest rates in the world. Early interventions make a big difference in the lives of patients diagnosed with Down syndrome.

Chromosomal confirmation is a costly process, which is only performed if the infant is suspected of having a genetic disorder. Further, children with Down syndrome born in rural areas are highly unlikely to receive proper medical care due to the limitation or lack of medical specialists. Therefore, there is a crucial need to implement a Down syndrome detection system. Children with Down syndrome have a characteristic facial appearance, which allows the detection through facial images.

The objective of this project is to implement an image analysis system that distinguishes between Down syndrome children and healthy children through facial photographs. In order to achieve that, facial landmarks are located manually. Then, geometric features are extracted. Finally, a classifier is used for Down syndrome detection. Since this is an ongoing project, the last step is yet to be covered.

A total of 74 facial images are used, with 37 images for the healthy case and 37 for the Down syndrome individuals. The dataset contains randomly chosen images of individuals of various ethnicities and both genders. Facial images of a maximum of 5 years old children are used. 44 landmarks are located for each image. Then Procrustes analysis is used to align the images to a reference image, and a mean model is derived. Principal component analysis is then used for dimensionality reduction, and the projection on the eigenspace is done. Geometric features are extracted as illustrated in the figure below. They include four horizontal distances, seven vertical distances and thirteen angles. Horizontal and vertical distances have to be normalized using their respective baselines. The horizontal base line is the distance between eyes furthest corners. The vertical baseline is the distance between the forehead point and lower lip point. These geometric feature are expected to discriminate between healthy individuals and Down syndrome individuals. In future work, they can be used in the classification process.

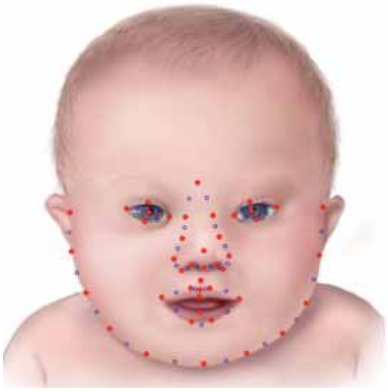

Fig.1.Facial landmarks

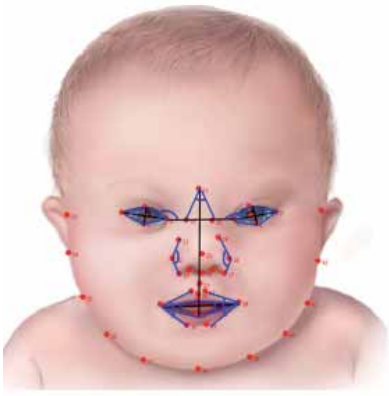

Fig.2.Geometric features

Smart Meeting Table(SMT)

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supervised by:
Dr. Maysoon Abulkhair

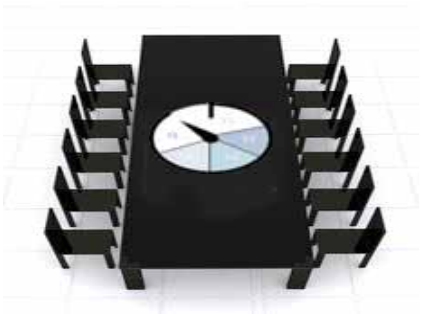
ABSTRACT

Successful meetings is a key factor in the of organizational success. to run a successful meeting, you have to address several factors, most importantly, covering all the agendas of the meeting, increase productivity in the meeting, manage time during the meeting and identify the tasks of each member clearly, and follow up.

As a result of observing the current meetings in some of the organizations and education centers, with the emergence of new terms in the world of technology, such as "smart tables " or " interactive table", found that, the meeting management systems are mainly nowadays a web-based systems, which does not address the need for real meeting scenario and have not use of new presented technology, it also lack of best user interactive method, and saving responsibilities which has been assigned during the meeting session for follow up purpose. In compare to existing similar product, such as MS-pixel sense table, SMT uses technologies as in figure, which make it, interpolatable, easy to carry along, follow systematic approach for serving meeting management purpose, adoptable on any materiel, wooden table, plastic or glass. in compare to prices the SMT will be cheaper for most of organization as they already have meeting table and mostly a projector, so they just have to buy a kinect sensor. So, solving the need for a heuristic and intelligent system to reduces the effort during -before or after- any meeting and implemented at the lowest cost has become a reality.

The SMT system contain two parts, virtual meeting, and task management systems. Which they will works together in order to run successful meeting. SMT, mainly will display the agendas of the meeting on the meeting table in away which is easy for the human visual eyes, then converting "non-touchable surface", the meeting table as an example, into a touchable surface with the use of kinect-windows sensor and sensing libraries. So the input can be read from finger position on table and converted into touches, then with the presence of the software which will translate these touches into a form of orders to be executed and then display the result on the meeting table via projector placed above the meeting table, SMT will allows you to present in real time within remotely connected user, assign task during meeting, add new tasks with context of time management solution provided which will manage meeting time.

The task management system, which will allow the attendees to, manage their task after the meeting, give the status of each task to their bosses, and remind them frequently with deadline as email messages. Also it remind the attendees before the meeting time via sms messages.



As a result of applying SMT system, organization can address, reduction of the effort before and after and during any meeting, increase productivity and promote paperless environment, introducing best interactive methods to attendees which will allow them to follow along. Follow the tasks via task management system, helping the colleague from memorizing their task frequently. with all those features the SMT will leads to management of meetings in effective manner.

Khatebni: An Android Application for Translate the Spoken Language to Sign Language

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ABSTRACT

Last statistic showed that there are about 10 million deaf person in the Arab world. This huge category is facing many daily difficulties in their life. The most important difficulty is communicating directly with normal people. They are suffering in getting services in public places. They always don't find who understands them and their needs and vice versa for the normal person. Even they are smarts and self-dependent, they will always need someone to be with them in public places. Even in their social life, there is a gap between them and their relatives. They will continuance need of a translator everywhere and this is reducing their self-confidence.

To solve this problem and reducing its impact, we are aiming to make the communicating between normal and deaf people more easy without the need for someone to translate for and to them through developing Khatebni application. This is an Android application that facilitates the communication between deaf and normal people. Its main function is to translate the Arabic spoken language to sign language through two steps. First, it takes the user speech and translates it to text using speech recognition techniques. Then, it translates the text to Arabic Sign Language by 3D avatar. Figure1 explains more how the application would work.

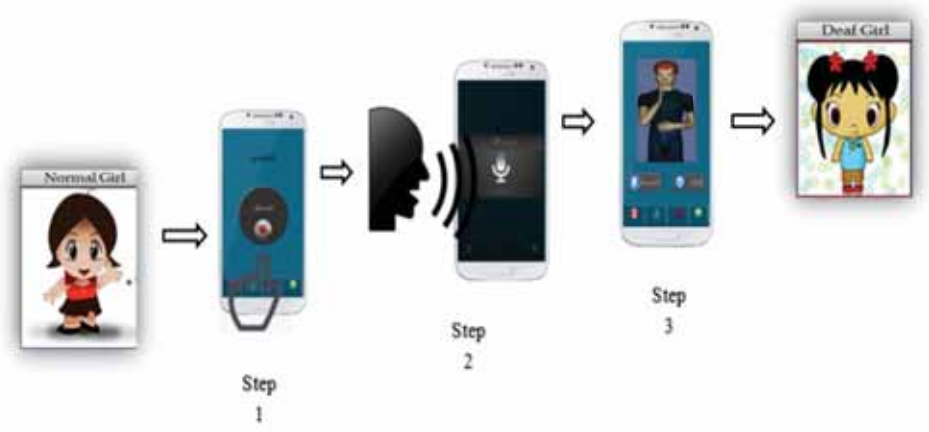

Figure 1: Khatebni application diagram

Khatebni application is developed to run on the android smartphone, but we plan to make the application available for other mobile devices because of the huge demanding from the users.

This application is consider as our senior project .We have finished Planning & Definition phase where the work outlines have been highlighted, Analysis and Design phase where we have defined the list of requirements by data gathering and choose the appropriate design included a primary the screen sketches followed by the prototype. Now we are in implementation phase .We have finished the first step which is takes the user Arabic speech and translates it to text, also we have finished designing the Interfaces of the application, and now we are working on designing the 3D avatar .We hope we can finish it before the conference date.

Hyperthermia Alarm for Children in Cars

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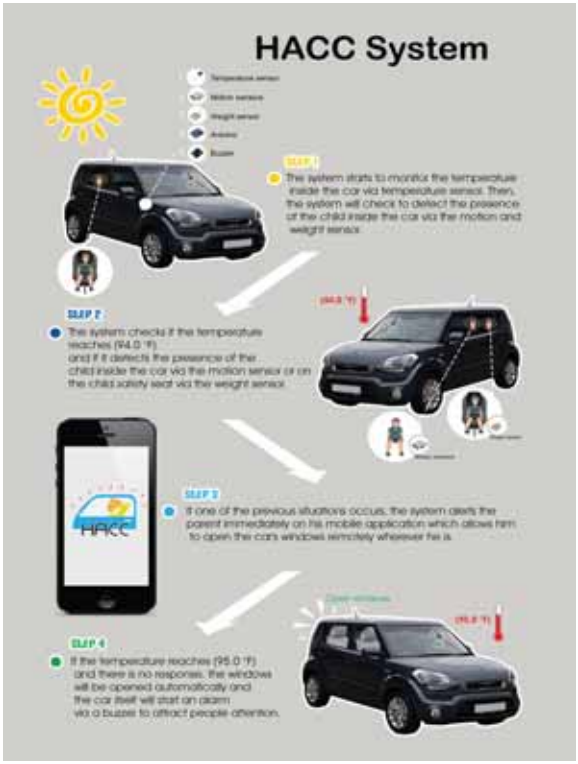
ABSTRACT

Leaving children unattended in a car for few moments, especially in hot atmosphere, can cause a catastrophic tragedy to occur. Young children can die of hyperthermia after being left in a hot car for a period of time. Hyperthermia (Heatstroke) is one of the most common dangerous that can affect children lives. Hyperthermia occurs when the body is not able to cool itself quickly enough and the body temperature rises to dangerous levels. Studies have shown that "On average, 38 children (one every 9 days) die in hot cars each year from heat-related deaths after being left inside the car"[1]. HACC system is one of the solutions that help in preventing the tragic child death caused by hyperthermia through implementing detection and control system inside the car. It is an interactive safety system that allows the caregiver to monitor the child inside the closed car to protect him/her, and to facilitate the communication between them. HACC system has been accomplished by developing a phone application and a surveillance system connected together to monitor the temperature and the presence of the child inside the car. The system starts to measure the temperature inside the car via temperature sensor. At the same time, it checks constantly the presence of the child inside the car via motion sensor or weight sensor which is installed on the child safety seat. When the system detects the presence of a child and the temperature inside the car reaches the unsafe limit, it will alert the caregiver via the mobile phone application and allows him/her at the same time to take an action and open the windows remotely. If there is no response from the caregiver, the system itself reacts and the windows will be opened automatically. In addition, the car itself starts an alarm via a buzzer to attract the people attention around the car to rescue the child. Moreover, it provides an automatically immediate connection to the emergency center to get the required help for the child. Unlike the previous solutions, our system detects any child motion inside the car and uses mobile application for notification instead of using remote devices. The first draft of the project shows improvement in the response time that has been reduced to short period starting from the temperature rising until the end of the risk which proves the efficiency of the system for the safety of children in cars. HACC is a reliable system which helps parents to protect their children and rescue them from hyperthermia danger whether they left them intentionally or inadvertently. Thus the safety inside the car will be increased to achieve a safer environment for children.



iMom2B: Pregnancy Remote Monitoring System

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Supervised by:
Inst. Reham Alabduljabbar

ABSTRACT

Pregnant woman are eager for information and comfort during pregnancy. With the huge development of Information and Communication Technology (ICT), telemedicine systems arise in order to deliver the best services to patients.

iMom2B is a real-time interactive telemedicine system that works as a channel between pregnant mothers and their physicians to monitor low-risk pregnancy progress, which provides higher quality of patient-centric healthcare. A normal pregnant woman should visit her physician for 14-16 visits during her pregnancy until delivery. At each examination, the patient's vital signs need to be measured. These signs are often to be normal in a healthy pregnancy, which means unnecessarily visits to the clinic.

iMom2B goal is to minimize the number of unnecessary visits to the hospital to give an opportunity to higher-risk and emergency pregnancies, by developing a system that gives the pregnant the ability to accomplish her check-up visits at home. In consequence saving time, money and efforts, likewise increasing the physicians' productivity by allowing them to focus on more serious cases.

iMom2B is a system that serves different types of users, it involves web-based portal for the management and an iOS mobile application for both patients and physicians. A patient will use the mobile application to perform her essential tests (Blood pressure, sugar glucose, urinalysis, weight, and fetal movement). Blood pressure and sugar glucose tests are done through medical peripherals connected to the pregnant iOS device. The system generates report for each homely attended visit with detected unusual results and informs both the patient and her physician. Physicians use the web portal to create a patient file with important information such as name, phone number, medical history, pregnancy profile, symptoms, and medication. Physician in consequence can monitor and follow-up with patients using the mobile application, and offer diagnostic and treatment advice by reviewing information sent from the patient, all could be done with a click of a button. Additionally, the system provides a messaging functionality that works as a communication channel between patients and their physicians that allows them to reach each other instantly when it is necessary to. Thus serving a higher quality of real-time healthcare, and improving the physician-patient interaction.

In conclusion, we greatly acknowledge our clients from King Fahad Medical City, Riyadh, Saudi Arabia - Dr. Khadijah AlQhahtani, Obstetrics and Gynecology Consultant, and Eng. Mariam AlMutairi, Innovation Center Director - for inspiring us with the project idea, and their valuable contribution to this project.

A Mobile Application for Controlling Domestic Gas Cylinders Remotely

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Supervised by
Dr. Wafaa Shalash

ABSTRACT

The domestic gas cylinders or cooking gas are considered as the source of energy commonly used at homes but, the potential for a serious accident such as gas leak from organizations or flow valves if the gas cylinder or its attachments are not treated properly or simply if the user forgot to close the gas before leaving home. Therefore, be the careful and following safety consideration rules is the boundary between the safety and the occurrence of accidents , which is the boundary between life and death . All previous solutions on gas problem are insufficient because it's not support while the householder out home or when he is want to check if the gas cylinder ON or OFF from his location, and the basic purpose of this project is to help people to avoid house fires caused by remote controlling gas cylinder using GSM technology.

The current project aims to develop a mobile application in order to control the gas cylinder remotely by mobile application in an effective way. The system consists of two parts. A specially designed controller connected to the gas cylinder organizer and an android mobile application to control the cylinder remotely through it. The main functions of this application are, controlling one or more domestic gas cylinder remotely, sending an audio alarm to the user if he leave while the gas cylinder opened and close it, providing an alarm if there is a gas leakage and close it and finally the system can sense if the gas leak from the cylinder and close it automatically . Figure1 depicts architectural diagram of the proposed solution. The proposed system consists mainly of two parts hardware and software. Hardware: PIC16F886 microcontroller, DTMF ,buzzer and other parts.

Software: we designed GUI of the system which is designed as simple as possible in order to make its critical function easy for the user. A well designed usability test has been performed in order to test the efficiency of the designed GUI. The interfaces include :

1. Gas Control

- Add new gas cylinder
- Change id and name gas Cylinder
- Remove gas cylinder
- Turn On/Off gas cylinder

2.Tips

3. Account setting

The proposed system was implemented using PIC16F886 microcontroller and DTMF with the cooperation of GSM and an Android application which provides the gas cylinder remote. The system prototype was tested and the results shows a promising results.

Figure1 show the whole system component and procedure with user interaction

Beauty Centers Guide

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Supervised by
Lect.Nora Al-Twairesh

ABSTRACT

The BCG application is implemented on the (IOS) platform, and is designed to help females of residents and Riyadh's visitors in choosing beauty center by displaying nearest beauty centers to her location, as well as the easiest and the shortest way to reach this beauty center using Maps. It also aims to provide all information about specific beauty center such as contact information and its services. Also it will help users by displaying other's comments and showing beauty center's rate average.

There are many ladies faces some difficulties knowing which beauty center is nearby, or which beauty center is better than the other, that's because they don't know every beauty center in Riyadh or maybe they haven't been in this area before, further more they might be from another city and they don't know any beauty centers in Riyadh, otherwise they don't know the level of the services the beauty centers provide, they may know it by seeing other people comments or the rating for the beauty center.

As known, woman loves being beautiful and always searches for anything new about beauty or about fashion, and here we provide her a favor by implementing an app that would help her knowing the nearest salon or beauty center to her location, that would be implemented by using GPS and knowing all beauty centers locations in Riyadh, the nearest ones will appear to her and she's going to choose a suitable one, even if she didn't heard about this beauty center before she can view the rating and the comments for that beauty center these rating and comments service for the place have been taken from people visited the place, and that would make the choice easier , in other hand the rating thing would help the beauty center themselves by improving their services and undo the things that annoys their customers.

The main idea of the project is to make an application for smart device (iPhone) that locate the user and displays all beauty centers near the location and evaluation of visitors to these centers.

How to add a beauty center?

To provide more flexibility, users could add BCs by tow ways:

First: when user outside the beauty center: after pressing Add Beauty Center Button application will ask user to insert information about the beauty center which include BC's name, address, and phone number. The admin will contact BC to collect missing information as the location. In this situation user should choose "I'm not in the BC" option.

Second: User in the BC, the app will ask him to insert all needed information, then he should choose "I'm in the BC" option to take his current location and assigned it to the added BC.

All BC added by user wont be shown until the admin approve it to avoid duplication and spelling mistakes and so on.

Smarty Speech Application For Children

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ABSTRACT

Children communication disabilities is life problems that effect significantly in the community . More than half of these disabilities children suffer from speech difficulties ,so some statistics show that 36% of children under the age of seven cannot pronounce words correctly and have disorders when speaking with others or interact with them and 28% of them are up to their degree of illness and requiring treatment . Children who suffer from . difficulties in speech at a young age may continue with this problem in the future

There are many applications and software that available to help the children to improve their communication and speech disorder, some of them designed for mobile application and others designed to fit desktop computers. However , there are some insufficiencies in these programs and the biggest problem was they don't support Arabic language.

Smarty Speech is an application to improve the pronunciations problems for children . It is a desktop application that has interactive games using speech recognition technology that allows the child to interact with an animated picture using their voice . The application support Arabic Language and there are three levels for improving the speaking skills of children and the child cannot be passed on to next level without going through the level before.

In the first phase: We have developed six flash games with different stories, The goal of stage one is to produce the target sound in isolation. For example, one of the games was cars race , the cars will move by the child's voice, the result was we found they interact more and more and thus increasing their ability to produce their voices

In the second stage: the child is asked to label pictures correctly as the pictures appear on the screen. The goal for stage two is to encourage the child to pronounce the target sound at the word level clearly. A good feature in our program is the use of monosyllabic and bisyllabic words. The child must achieve a good accuracy level at the monosyllabic word level before proceeding to the bisyllabic word level. After this stage, we found effective performance by .children more than the first phase

In the third phase :The child must talk and say the names of requirement things which ordered from him/her at the specific and different stories

The system will comparing the name that child has been entered with voices database

The action of comparing will happen on the object by let the child take its order

In addition to advantages for Smarty Speech application is that every child has his personal account in the system includes some of the properties such as name , age and specialist supervisor of the child and the scores achieved by each child at all stages in order to facilitate the process of assessment and recovery of some of its information by administrator.

My Informative (MI): A Location-Based Information Provider for the Sacred Mosque

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Supervised by
Hailah Alballaa

ABSTRACT

MI system is a Location-based information provider for the Sacred Mosque (Al-Masjid Al-Haram). It is developed as an android mobile application for the visitors of the Sacred Mosque since their number is huge, most of them are not from Makkah, and the Sacred Mosque's area is large and expandable. MI aims to guide the visitors to a specific destination, reduces the proportion of loss inside the Sacred Mosque, helps people with disabilities to find suitable places for them, shows the up-to-date legitimacy lessons with their instructors, and help the visitors find nearby places and services with their description. Places and services are located as markers on the detailed interactive map of the Sacred Mosque with the visitor's current location, destination and a path line between them. On the other hand, MI system is also implemented as a web-based to manage the places, inform the visitors about the status of some utilities like the gates whenever they are available or not, and register the service providers to enable them to produce their services on the mobile version for the visitors.

MI system takes advantages of modern technologies such as GPS, the Web Services, Google Maps, and the indoor maps. The indoor map that is used in MI is designed by the project's team as a static map with details and implemented over Google map which exploits the benefit of the Google map API to customize the map by using some properties such as the overlay, markers and poly lines. The map will be implemented for each floor of the sacred mosque to enable the visitor to switch between when the visitor select the floor number. The outdoor map which is from Google map will be implemented for the services around the mosque such as hotels and restaurants.

The places and services in MI will be displayed in an order with closest first according to the visitor's location by using a method called WhereNear which has been provided by Parse, the cloud database that we intended to use which let developers to build any mobile or web app without worrying about server management.

As a result, Mosque’s manager, service provider (owner of the services such as hotels) and the visitors of the Sacred Mosque can all benefit from using MI system. MI used to facilitate the movement of the visitors inside the Sacred Mosque and specify the important places and services inside and outside it. It has the potential for saving the time and effort for visitors by guiding them to the important places and services easily. In addition, it can increase the turnout to attend legitimacy lessons. Moreover, it will increase the profits for services' owners who produce his/her services, and ease crowding on some places such as gates because of the existence of place's status in MI system.

Modern technologies are rich field used to create fabulous and interactive systems, MI leverages these technologies and adds its benefits to the most popular building in world (the Sacred Mosque).

Child Tracker System

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Supervised by
Dr. Mounira Taileb

ABSTRACT

The issue of missing children in the markets, malls and public places has become a real concern and a major threat to children and their families.

Statistics about missing children are shocking. In USA, 90% of families have experienced losing a child in a public place. In India, every 8mn a child is missing, 40% of those children have not been found. Unfortunately, there is a lack of information about the missing children in Saudi Arabia or in the Gulf countries in general, but according to the articles published about this issue, many families have suffered from losing a child and some of them have lost a child for a short duration because he walks away his family and doesn't know his family name, his home address or his neighborhood which delay their return to their families.

Some systems have been developed to solve this problem, they consists of tracking the child or tracking the chip carried by the child to locate him. But some of the proposed systems are insufficient because they don't support the indoor and outdoor tracking, for others systems the size of the tracking device is not suitable for the child. Also these systems are expensive and not all of them support Arabic language

Our graduation project consists of developing a mobile application that enables users to track their children movements. The child holds a small device and the applications tracks that device. That will be done using GPS and Bluetooth 4.0 technology for tracking the child in indoor and outdoor locations. The architecture of the proposed system is shown in figure 1.

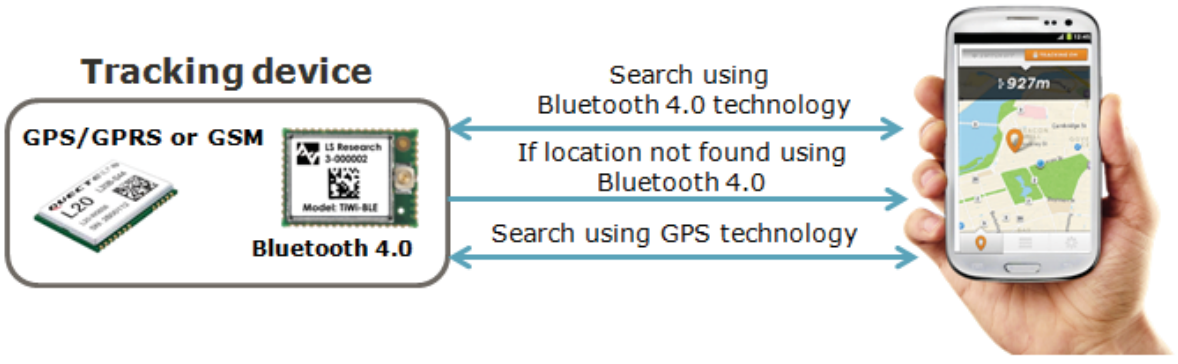

Figure 1: System Architecture

The system is compatible with any device running Android 4.3 & 4.4. Using Bluetooth 4.0 technology, parents will receive an alert when child go out of certain range. If the child goes out of the Bluetooth range, parents can request their child location using GPS/GPRS technology in order to see its location on Google map.

The proposed child tracker system is an ongoing project, the team members are working currently on the development of the Bluetooth service to allow the user to track and locate his child in indoor locations using the Bluetooth 4.0 technology. By the end of this semester, the second service of the application, the GPS service, will be implemented and the whole system will be integrated and tested.

Itqan : A mobile-based assistant for mastering Quran memorization

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Supervised by
Entesar Almosallam

ABSTRACT

There are many books have been authored in the field of mastering methods and techniques of Quran memorization due to the need for innovative ways to help Quran memorizers to memorize the Quran, understand it and connect its topics easily, but as we all know that we live currently in a global society that is rapidly changing, and it is surrounded by many challenges. The most important challenges are the technological development and the explosion of knowledge. As a result, most of the people- especially young people- prefer to use the technical resources to reach information rather than reading old-style books. Therefore, Itqan is designed to overcome this problem and provide new technology in Quran learning field.

Itqan is a mobile-based assistant for mastering Quran memorization. It is proposed to utilize visualization techniques such as mind maps, which is a visualization structure tool that represents the dispersed information in simpler way. The mobile application is developed to run on the Android smart phone. The technologies used to implement the application include Android Java programming language and SQLite databases. In addition, to construct the desired interactive mind map we decided to use Hyper Text Markup Language html and JavaScript. Using the proposed approach (mind map) to break down Quran suar into smallest topical parts will has significant impact in understanding, memorizing and practicing. So, the learner can understand the whole topic with its aspects. Itqan takes advantage from the mind mapping technique in order to connect verses with each other and with their topics then display them visually and orderly. By using this approach, all human senses are involved smoothly making it easier to link verses - especially similar verses - and remember them. Furthermore, applying the mind maps in the process of Quran memorization has many benefits such as improving the overall level of learner achievement. In addition, it provides an interactive self-learning environment with Quran parts to attract the attention, and to summarize or generalize the information. At the same time, it supports and complements traditional memorization methods (e.g. listening and repeating).

After applying this project and using this mobile application as a guide for Quran learners especially to those who are in Quranic schools, the number of people who master the Quran memorization perfectly is expected to increase; because of the employment of visualization techniques that split the assigned pages to memorize into smaller and smaller sections based on their topics. In addition, this application will help the Quran learners mastering Quran easily, improve their Quran memorization and understanding and prevent the mismatch between the similar verses in an enjoyable and more effective ways.

Using Mobile Platform to Detect and alertness of Driver Fatigue

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ABSTRACT

Drowsiness is a transition state between being awake and asleep and can have serious consequences when occurring in tasks that require sustained attention such as driving. During the state of drowsiness, reaction time is slower, vigilance is reduced, and information processing is less efficient, which may cause accidents. Vehicle accidents that caused by driver sleep or fatigue are increased, so to help in reducing these accidents we need to develop a system to alert and prevent the driver from sleeping. However, the development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems.

Vehicle manufacturers have been improving safety measures for years, but have yet to discover a sure way to prevent drivers from falling asleep at the wheel. Currently, few technologies have been tested by automobile manufacturers. We have studied different physical indicators of drowsiness and determined that a person's eyes show the most obvious signs. We believe that the symptoms of driver fatigue can be detected early enough to avoid cars accidents by monitoring the eyes. This application specifically looks at the amount of time the pupil is covered by the eyelid, not necessarily during complete blinks by the subject. It tracks the percentage of time the eyelids are closed in a given time frame. The project aims to develop a non-intrusive monitoring system that will not distract the driver and work in both daytime and nighttime conditions. The challenge is making the detecting of the eyes fast as possible to avoid accidents early.

The previous techniques that measure driver drowsiness like vehicle-based measurements or physiological measures signals are always prone to noise and artifacts due to the movement that is involved with driving. These measurements will annoy and distracting the driver because of the equipment that have to be attached directly onto the driver's body. The proposed application will solve this problem by using the mobile camera; the phone will be putting on a stand in the care to make the driver feel comfortable. Also we will use the clustering technique that will help us minimize the fatigue detecting time by detect the person pupil instead of detecting the hole face then the pupil every time.

The main components of the proposed system are a mobile camera for real time acquisition of video images of the driver, and their implementation for real-time eye tracking.

With this system, the developers achieved the following things

- Fast and real-time eye and face tracking.
- Less sensitivity to external illumination interference.
- More sturdiness and accuracy.
- Allowance for fast head/face movement.

The Main goals of this project are:

- To ensure that the driver is staying awake during his drive.
- To help decrease the number of accidents caused by fatigued drivers.

Family Tree Structure-Based Healthcare Application

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ABSTRACT

Tree structure is being used extensively in many disciplines. For example, computer and its operations, mathematical functions, engineering, etc.. Health information systems used to capture the medical history directly from patients. Most of the time, the history of the ancestors (i.e. grandfather) is needed especially for diagnosing chronic diseases.

Tree structure and tree operations are employed to serve the purpose of getting the patients' medical history. Based on the tree structure, physicians are able to read the history all the way up to certain level. In addition, the same structure can be utilized for other purposes. Such as, getting someone's relatives, in social science studies and many other applications.

The proposed system uses the tree structure to store and retrieve important information about people. The stored information is divided into two types; the personal information and the health-based information. The health-based information will be in the form of medical history and medical profile of a person. The direct health-care providers (e.g. physicians, nurses, physician's assistant) can use that structure to get the history up to a pre-determined level. The direct health-care providers can go in the tree up to the level that helps them in getting the needed information. The retrieved information can then be used by health-care providers to make the right decision in the procedure of the treatment, the information can be also used in genetics and other related disciplines. For example, the system helps people in the social science field by anticipating whether to marry someone or not. Also, people get to know each other using that information. The system is a GUI-based application that the user can add his/her input. Certain users may like to add ther photos with the related caption and other updates.

The system has achieved promising results based on the initial design and experiments. The survey shows that the physicians and other related health-care providers are highly enthusiastic to start practicing such a system. The system will save effort and facilitate the treatment procedure in addition to take the right decisions by the providers.

University Network for Scientific Researchers

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ABSTRACT

Scientific research has become lately the center of focus for almost all advancing universities in the world for its vital returned value on expanding the human knowledge in general, and among the scientific communities of universities in particular. Leading universities acknowledges the significance of scientific research and the importance of facilitating its channels to all faculties. As Computer Science senior students (Expected Graduation June, 2014), we aim through our graduation project to develop a university-based website to facilitate its researchers' scientific activities and contribute to the scientific research enrichment. Our project "University Network for Scientific Researchers" targets the university's academic staff. It provides researchers with ways of sharing their papers and scientific interests, collaborating with peers by establishing and managing research groups, being updated about the latest scientific events (conferences, forums, etc.), and communicating with peers. In addition, it provides the university with a reference for all its researchers and their scientific information besides statistical information on the research activities on three levels; faculty, department and researcher. Moreover, to expand the researcher's network of interests, **data mining** techniques are applied to implement a **recommendation system** that suggests papers, peers, groups and events that matches the researcher's interests. Guests like the university students can visit the website as viewers and see the researchers' profiles, which can provide them with a clear picture of their possible advisors or supervisors.

Websites serving scientific research already exist. Similarly, some social networks like LinkedIn or Facebook are sometimes used by researchers to accomplish research activities. Our project is distinguished by its characteristics; a university-based environment that assists in enclosing and organizing all its research activities, and incorporates features (sharing, collaboration, communication, recommendation, statistics, etc.) not found all together in the other websites.

The goal of this project is to create a connected, acknowledged, motivated and active scientific community that increases the chances of scientific collaboration and reflects the research status at the faculties and the university.

The Design and Optimization of USV Hydrofoils using CFD

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ABSTRACT

This project is part of a larger capstone project at the Mechanical Engineering Department at AUD. The capstone project focuses on the design and prototyping of a hydrofoil assisted unmanned surface vehicle (USV) aimed at meeting several of the UAE's current and future challenges in different sectors, including the oil and gas sector as well as others.

In general terms, a USV is a remotely operated marine vehicle that has the potential of automating several functions, such as collecting water samples for study. Unlike other vessels, the vessel is to be equipped with a hydrofoil to minimize power consumption during mission execution. The prototype vessel, designed to be around 70 cm x 20 cm x 10 cm in size, will be manufactured using 3D printing technology. When foil-borne, the vessel is expected to elevate around 5 cm above the water level.

In the presentation, the need for and the potential applications of this vessel will be addressed. Since it is a marine vessel, the hydrodynamic performance and fluid flow around the USV will determine its plausibility and applicability. In fluid mechanics, fluid flow is modeled differentially via the Navier-Stokes equations. Being nonlinear partial differential equations (PDE's) in nature, these equations are solved computationally to determine the drag and lift associated with the vessel.

The focus of the presentation will be on the implementation of Computational Fluid Dynamics (CFD) in design and optimization. During this research project, several factors have been addressed. For instance, the depth of the hydrofoil in water was shown to have an impact on the lift generated. CFD studies have also demonstrated the impact of the shape of the connecting rods on the overall drag on the vessel. Having streamlined connecting rods was shown to result in considerable drag reduction. Additionally, CFD has also been used in the design and optimization of the hull for drag reduction.

In addition to computational data, experimental data obtained from physical testing will be used to demonstrate the accuracy of the results and designs generated. Several physical tests, such as testing with very powerful hydrofoils, one powerful hydrofoil, and a combination of one powerful and one moderate hydrofoil will be presented. This testing procedure was carried out to gain more insight into the dynamics of the vessel and to reach an optimal configuration for the hydrofoils.

Overall, the project is multidisciplinary in nature and imposes several challenges spanning the different fields of mechanical engineering, including mechanical design, computer-aided design, computational engineering, marine engineering, fluid dynamics, computational fluid dynamics, hydrodynamics, aerodynamics, propulsion, solid mechanics, manufacturing, prototyping and experimentation.

Given the current trend in implementing automated and smart technologies in the different fields in the UAE, the implementation of a hydrofoil assisted USV is an ideal match and extension to the current developments. The vessel could also help automate several marine activities that are expected to rise dramatically with the onset of the World Expo 2020 in Dubai.

A Flexible Vehicle Crash Monitoring System in Remote Areas

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ABSTRACT

Vehicle accidents in remote areas are one of the major causes of mortality and severe injuries in hilly/mountain areas like Kurdistan region of Iraq. According to Directorate of Soran Traffic Police, a typical locality in the region, annually 65% of car accidents in Soran happen in remote areas. Clearly, many lives could be saved if emergency services are able to get information quickly and reach the accident area in time. This project proposes to utilize the capability of a GPS/GSM module by designing a flexible system on a microcontroller-based platform which can monitor sudden vehicle accidents automatically or manually in remote areas. In this system, two sensors are used together to increase the reliability of the decision. Once the system is triggered, emergency calls will be made to the nearest rescue team to provide medical treatment as soon as possible to that exact location. The need for cancellation of accidental triggers is also investigated through the use of SMS. In contrast to other systems, a unique feature to this system is the design of a new algorithm that proposes to solve the issue of dead signal zone in those places where there is no coverage of GSM networks by focusing on cellular signal strength status.

This system gives a choice to vehicle occupants to trigger/cancel the system by pressing emergency buttons if the car driver wanted to stay at no signal zone purposely. If an accident happened, the embedded system receives the car's position from the GPS receiver, and then it will send an SMS message with that position to the emergency center via a GSM modem, and the exact location of the vehicle will be detected and then displayed on Google map but the SMS will be filtered before displaying it on the Google map, and then emergency calls will be triggered from the nearest rescue team to provide medical treatment in time. The detection sensor will be embedded in the microcontroller into the vehicle with a specific code number according to the type of vehicle to give more details to the emergency center unit. Arduino IDE will be used to program the microcontroller in "C" language. A server/pc will be used to store information in a database. The future work of the similar systems are interfacing with the airbag sensor but this proposed system can give a better solution by using the airbag sensor and vibration sensor at the same time. Up to 2013, it has not yet been investigated to solve; if a vehicle went to a zone signal but this system does. At an end, this design is going to be a user-friendly and flexible system to detect severe vehicle accidents in remote areas, and even the system is triggered manually by the vehicle occupants, the emergency center can take these situations seriously even if a physical vehicle crash has not happened.

Math Assistant Web-based Application

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ABSTRACT

Nowadays, technology is playing a huge role in our lives. Using the newest technology we can achieve many goals; we can make money, communicate overseas and even study new subjects. People with special needs can also use technology to ease their lives. Students with learning difficulties are considered among people with special needs; they need intensive education to learn. In Saudi Arabia, the number of people with learning difficulties is increasing which makes developing assistant applications a necessity to help people with learning difficulties.

Math Assistant application is targeting King Saud University's students with learning difficulties in mathematics *known as Dyscalculia*. Those students have problems finding suitable applications that help them compute advanced mathematical expressions or estimate the shapes' measurements as most of the existing applications provide help with only basic operations like addition and division. Another problem is the lack of applications that uses Arabic speech recognition. Hence our proposed *Math Assistant* application is built to help them improve their knowledge and better understand the basics of mathematical operations as well as measurement problems such as calculating area and size. Moreover, it will help those students in drawing geometric shapes (e.g.:circles and triangles). In addition to the mentioned capabilities, our application uses Arabic Speech Recognition technology which is not widely used in the educational field.

Figure 1: Supervisor can review the evaluation progress of a selected student.

Math Assistant is one of the simplest web applications that serves students with *Dyscalculia* problem and allows supervisors to monitor the achievement of their students, in order to ease the education process. Indeed, students can take tests or evaluations in a selected mathematical section to improve their performance in solving mathematical problems or to simply know how to draw shapes. In the other side, the supervisor who is responsible of that student can view the student's progress in evaluation sections by generating a bar chart visualizing the student's average grades during the last four weeks (as shown in Figure 1). Moreover, the supervisor can evaluate the student's answers on exam questions, one by one, and send her a general feedback.

Figure 2: Student's main page.

In our system there are three types of views: Administrator's view to manage supervisors' accounts (registration and activation). Supervisor's view to manage students' accounts, enable general exam for selected students and view student's progress. The last and most important view is the Student's view to enable students to use our system and improve their mathematical knowledge through exercises and exams (as shown in Figure 2).

Our main concerns in the development of the proposed application were the accessibility and availability of the system. Therefore, we chose to develop a web based application to be accessible by most devices (e.g. laptops, desktops, smartphones …etc.). For the coding we used Dreamweaver version 12.0, Textwrangler v4.5.5 and Notepadd++ version 6.1, and XAMPP v3.2.1, Chrome browser v31.0.1650.63, Firefox Browser v26.0 and Safari Browser v7.0.1 to run our pages and WAPT for the testing phase.

Visual Search Algorithms Using Correlation and SIFT

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ABSTRACT

The field of image processing has had a tremendous impact on many various fields' of applications including pattern recognition and medical diagnoses.
A Visual search algorithm (VSA) is an algorithm that is used to locate an object of interest inside an image or video such an algorithm can be implemented using various techniques; in this paper we present two visual search algorithms that are implemented in MATLAB. The first VSA which we called CORR is based on simple feature correlation. The second (VSA) the well known SIFT Algorithm which relies on feature detection & feature matching. The two methods are compared for speed and accuracy, as well as ease of implementation.

Visual search involves lot of applications including the visual search of text in non textual form in which the text objects are retrieved from a movie frames or images, like most of the wide used search engines as Google.
A frequent problem arises when we locate an object of interest inside an image or a video frame is that the object of interest might be subjected to an affine transformation, or occlusions, in addition the size of the object might be smaller than its original size.
The methods proposed in this context takes in consideration the above challenging problems since the object can have a different size and pose in the target and query video frame, and also the target video frame may contain other objects that can partially occlude the object of interest

In this research we present the CORR technique which basically depends on the use of normalized cross correlation between two images as a measure of similarity in which it is mostly applied in feature tracking or template matching. . The technique is used to correlate the object of interest inside the input image with the video frames, the occurrence of the OOF in the video might be subjected to several affine transformations such as rotation, scaling and cropping. The algorithm creates multiple versions of the input image in which they are scaled and rotated at different angles then it compares them to a specific correlation threshold level to find the optimum match with the OOF inside the video frames and locate it with a boundary lines.

This research also presents the Surf Invariant Feature Transform (SIFT). This approach transforms image data into scale-invariant coordinates relative to local features. The resulting feature vectors are called SIFT keys. The quantity of features is particularly important for object recognition, where the ability to detect small objects in cluttered backgrounds requires that at least 3 features be correctly matched from each object for reliable identification. As a VSA algorithm SIFT features are first extracted from the input image which is the reference image after that the image is matched individually with each video frame to compare each feature from the video frame with the input image and match the features accordingly based on Euclidean distance of their feature vectors. The reliability of this approach depends on calculating the mean of the highly distinctive key point's descriptors surrounding the features of the object of interest which allows finding the correct match with good probability in a large database of features.

The test analysis and results are presented in this paper including all the details for both algorithms using two video samples and images .

Smart Home Energy Management System for Optimal Scheduling of Home Appliances in UAE

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ABSTRACT

Installation of new generating units, especially non-renewable plants, to meet ever increasing demand of electricity in UAE has threatened our environmental sustainability along with the increasing cost of electricity. 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. Integration of renewable energy resources and application of efficient load management schemes will avoid the blackout caused by the conventional load shedding. The concept of integrated smart grid and energy management system is expected to help to overcome problem of peak demand. Smart grid for power system refers to electricity networks that incorporate requirements and actions of all stake holders to provide reliable, cheap and safe electricity supplies. The utilities around the globe are working hard for realization of dream of smart grid a reality. Smart grid refers to integrating the latest information, communication, control and digital technologies to the current grid system. Smart grid enables utility and user to operate their load management schemes. The dynamic pricing is considered as one of the most important key component of load management schemes in which utilities create time varying rate structure. There are several ways of dynamic pricing schemes some of them are the time pricing scheme in which a variable is established for peak hour and off-peak pricing, the real-time pricing scheme which is based on market demand which allows change of pricing on hourly basis, and the variable peak pricing scheme which is a hybrid scheme of the previous two schemes. With dynamic pricing consumer are given more responsibility to manage his appliances in accordance to time of use rates. Although different techniques have been introduced for reducing residential cost either by reducing power consumption or by shifting load to off peak times, there is still a need for a smart dynamic system which consider changes of the changes of the peak hour over the months of the year.

In the present work and based on dynamic schemes, a smart home energy management system for optimal scheduling of home appliances in UAE is designed and implemented 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 to reduce power consumption and electricity bill by shifting load to off time. The present 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.

The system make use of hourly load practical data in UAE (fig.1) in order to manage the operation of appliances to avoid the peak hour load time. Based on the hourly load data, the cost function is calculated (fig.2) The system uses an efficient programming environment which allows monitoring, controlling and analysis of energy consumption in grid connected renewable energy system. The system is designed in a flexible way to allow the calculation of the costs based on different load scheduling schemes (fig.3) which are selected to fulfill the requirement of the different users. The implementation of the system will not only help the user to reduce their energy bills (fig.4) 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. Moreover, the scheduling objectives can be designed in order to be not only limited to minimize electricity bill but also to be subjective to various constrains such as sequential processing and consumer preferences. In the future work, the optimization framework will be extended to also consider CO_2 emission minimization. The trade-off analysis between electricity demand optimization and CO_2 emission minimization is based on multi-objectives ad requires solving multiple schedules instead of one as in the present single objective case.

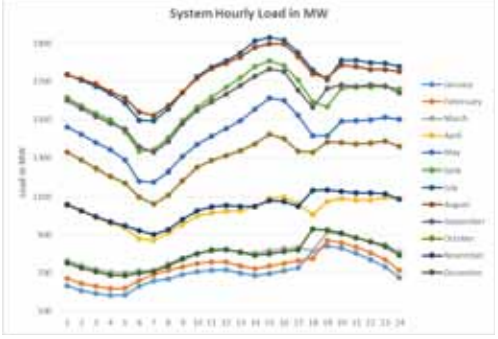

Fig. 1 Fujairah system hourly load in different months

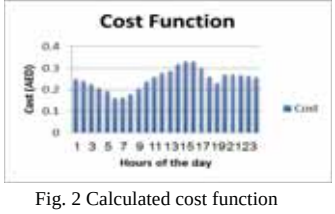

Fig. 2 Calculated cost function

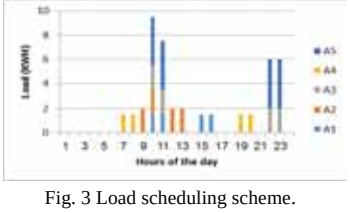

Fig. 3 Load scheduling scheme.

	Cost											
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Worst Case	407	386	389	399	380	378	397	399	380	380	380	380
Best Case	171	180	202	252	203	204	229	252	220	220	220	220
Scenario 1	286	296	325	386	331	330	345	351	346	346	346	346
Scenario 2	281	296	320	365	308	314	333	341	331	331	331	331

Fig. 4 Monthly costs in AED for different scheduling schemes

Solar Panel Maintenance System

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Supervised by
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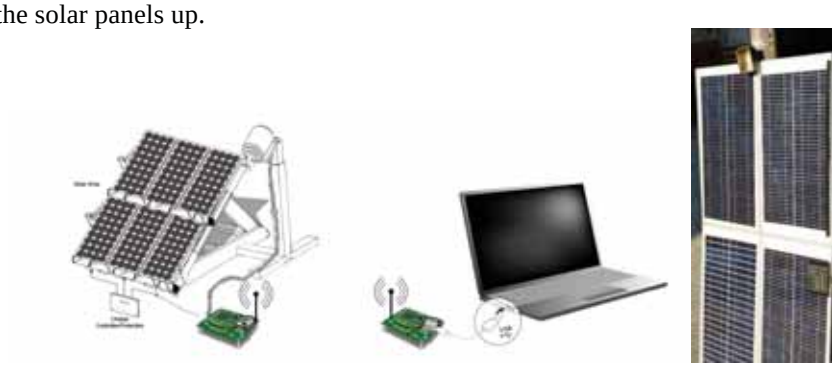
ABSTRACT

Solar panels problem is in their efficiency, since they give 20% efficiency at their maximum, that's why solar panels require regular cleaning and maintenance to keep the system working at the maximum level. But that is very consuming in terms of time and cost, since they always require workers and cleaning mechanism using special machines or robotic arms.

We propose a solution to minimize number of times the cleaning company should come to clean the panels. It is based on measuring the environmental changes around the solar panels along with the system efficiency; it will measure [***Temperature, Relative humidity, Dust*** **and** ***solar output current*** ***(****efficiency****)*****],*** after that the values will be transmitted using a transceiver to a laptop where the process will take place using Fuzzy Logic technique to order the roller brush and water sprayer motors to clean the solar panels up.



The roller brush is connected in a line along with other solar panels that's why we won't need a big amount of roller brushes to be used. The water sprayer will spray water before the roller brush starts the operation, and since this system also have water sprayer, using it will make the solar panels cool down its heat since it's considered the most effective concern for solar panels efficiency especially in summer.

In the process side we will program the laptop using LabVIEW (Fuzzy logic toolkit and Arduino toolkit). Also it will graph the efficiency verses time and efficiency verses measured values, to prove that the system is efficient and to help the maintenance company to know if there is some sort of fault in the system.

This system is made to be implemented in a large scale of solar panels (solar farm) since we are going to use a special connection for the motors to make each line of roller brushes connected to one motor which will save money as well.

The fuzzy logic process will order the motors to move depending on the fuzzy sets using the intuition method. Fuzzification will accrue when the measured data and time (in hours) reach the input. After that the fuzzy rules which are chosen by experience will pick the strongest rule of all then do the defuzzification process. Time is used to make sure the process will not accrue when the solar panels are working (morning time), unless if the solar panels efficiency dropped below the accepted range.
A manual switch can be used from the laptop to order cleaning at any time, also an emergency indication when the panels where cleaned few times but the efficiency didn't improve.

This system is an economical and practical solution for each solar system and ensure maximum efficiency and minimize the times required for cleaning, the system is made to be used by anyone that uses solar panels on their roof.
The prototype of the system showed efficiency result reaching 80 to 85% after the cleaning process until manual cleaning is required, which minimized the number of times the company coming from 4 times a month to 1 time only.

Shopping mall guidance using IPS (indoor positioning system)

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Supervised by
A.Hanin alahmadi

ABSTRACT

Smart phones have become prevalent in many aspects of life. They used in various daily tasks making our life easier. They help people organize their life. For example, they guide people to discover their location in an outdoor area anywhere worldwide. One of the latest technologies extends this capability to indoor areas and buildings. These capabilities exploited in the current project.

Shopping malls has become larger and larger among the years, with a bigger shopping mall and too many shops shoppers can get lost in the shopping mall not knowing the location of the shop they aim for, and without a shopping mall map specially here in Saudi Arabia malls. Users will spend effort and time just to find the desired shop. To solve this problem we propose an iPhone mobile application for shopping malls guidance. To locate a shop among several branches, the application first locates the position of the user using the IPS (Indoor Positioning System) technology. The shops information extracted from the database and the shortest path to the nearest shop is calculated. The selected shop displayed together with the directions.

Another goal of the application is to facilitate indoor navigation for a shopper within a mall, to guide a shopper to the best path to a selected location.
The application also provide a variety of helpful features such as finding a destination, calculating shortest path and the corresponding time needed to reach the destination also, to calculate the shortest path we will use the Dijkstra algorithm this function receives the user's current location and the desired destination, then calculates the shortest path from the current location to the selected destination Upon completion of the calculation, the shortest path is then drawn on the map to navigate the user.

The developed system relies on a server that holds the map server and the spatial database. For wide accessibility, the whole system is developed using Xcode application, which is freely available on the app store plus the indoor maps from Google developer. The selected software development model is the waterfall methodology. Database technology are used for storing the names and locations of the shops in the mall, and networking that used to determine the location of the shops, the interface will be a user-friendly interface by adding a clear and easy to read map of the shopping mall.

This application will enhance the users shopping experience by adding the taste of technology to the shopping mall map allowing the shoppers to easily find the shops they desire, save energy and time, and the number of visitors to the shopping mall will increase, resulting that the application will benefit the shoppers and the shopping mall.

My Vacation رحلتي (A Mobile Tourism Application for Consumer Electronics)

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Supervisor:
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ABSTRACT

Mobile devices such as the Smartphones are widely used in UAE but mainly for voice and text messaging. Very few applications like Dubai City Guide are available that are customized to the UAE tourism, such as an application that allows users to use their mobile devices to search , plan and calculate the total cost of the trip based on the customer's budget inside for example that are available at Travel Agencies. Such an application would save customers time and money as they don't have to drive on congested streets for comparison the cost of hotel at several choices of hotels around the UAE; they could do that from the comfort of their homes.

To address this issue, we present the design and development of an end-to-end mobile application that enables customers to use their mobile devices to browse for such hotels and available offers from several Travel Agencies. The application communicates with a database-driven website that allows companies to register, create accounts and upload their offers. We'll also present a business model for making this idea commercially viable. Figure1 depicts a high level architectural diagram of the proposed solution.

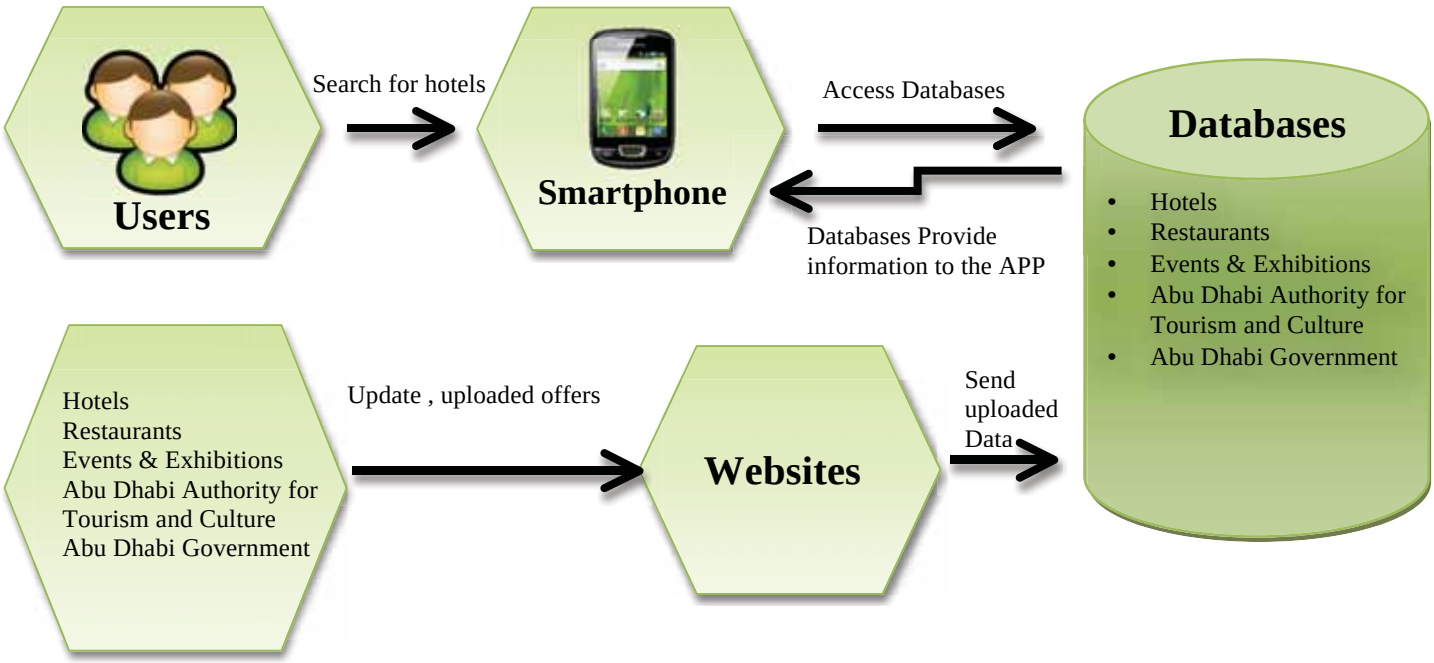

Figure 1: Architectural diagram of the proposed solution

The software technologies used to implement the proposed solution include Apache Web Server, MySQL, Java Script and PHP. The mobile application is developed to run on the Samsung smartphone, but we plan to make the application available for other mobile devices.

In order to make an application such as the one we have presented here commercially viable, we need to design a business model. Our business model is simple: vendors must pay a fee in order to advertise their offers, and users will be able to browse and search for such offers free of charge. Another source of revenue includes advertising on the website responsible for maintaining the offers database.

Help Application: Emergency and Volunteering Application

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Supervised by
Ms.Lamia Alabdulkarim

ABSTRACT

It's true that the Internet makes the whole world as a small village, if there's an event in China, an American across the world can follow it. This superior technology minimizes the distance's effects to be almost negligible. On the other side, when it comes to emergency needs and crisis situations, the distance and time become very critical factors. They could make the difference between life and death. When a person finds himself in an emergency situation, it could take a long time to get help while help could be as close as next door. On the other hand, Official Emergency Service Provider (OESP) could have difficulty finding victim's address. Even when certain assistance is needed such as professional volunteers or information from a specialized, it takes too long time to reach them.

The goal of Help application was to gain the ease and speed when sending the help request whether to the OESP or capable volunteers. Useful information about the request like the applicant location and the exact situation were needed which also had been provided. Numerous solutions have been introduced in this field, but unfortunately these works didn't reach up the ultimate solution needed. Some of those work able to connect all nearby recipients, but not only the specialized needed. Other works reached to connect to known people (family, friends) regardless how far is the distance. In volunteering cases, the available applications enable the official organization to reach the volunteers directly, but unable the individuals to get the help from the volunteers. To accomplish our goal, we used different devices and technologies for different users. Using Android application for the users to meet the usability and Java desktop application for OESP to be able to handle all the incoming requests. A cloud server is used to host the database. Finally we used GPS and A-GPS technologies to get users coordinates.

Our demonstration for solving the three problems and providing their features go as follow: For OESP problem, the application enables the user to select OESP and send the request by just few touches. In the other side the application that is with the OESP receives the requests with the victim location and his/her phone number. For the nearest capable volunteers problem, the application's users can easily select their situation and a request will be send to all nearby volunteers who registered to help in that situation. Finally for the specializes volunteers help, the application will present a list of the matched volunteers which had been selected by providing a list of categories and user preferences see figure 2, then the user could easily browse their profiles, send a direct message or even directly send the request to all the matched volunteers. The mechanism for finding the matched volunteers will consider also the volunteers preferences to make it a friendly application for the volunteers too.

The big challenge was to integrate all the previous solutions together in one application. To make it the ultimate solution for any help need. Now Help application enables the user to get the help from either an OESP or individuals, for an emergency situation or a specialized assistance easily.

Figure 2 Android Help app main user

Figure 1 User preference

Instaphosaic : Mobile Photomosaic generator

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Jawaher Awad Al-Harbi, Russiaa Abdullah Al-Harbi

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Supervised by
Lect. Nora Al-Mohanna

ABSTRACT

A picture is an excellent way to document special moments. They say "A picture is worth a thousand words", if one picture can talk more than one word what if we have a picture created from thousands of pictures!

Instaphosaic is a mobile application that aims to regenerate a picture as a photomosaic using collection of images, which allow the users to captures many pictures in one big picture, so when you look at it from a distance, you see one big picture, but as you look closely, you understand that it's not just a single, large picture but rather a collection of small, separate pictures as in Figure 1.

One of the many applications that are getting the world's attention is Instagram. **Instaphosaic** create a photomosaic using collection of images from user Instagram account, hashtag and also phone library images. However, even though there are few mobile applications for that purpose but the available photomosaic applications have very limited features, most of them do not generate good quality photomosaic in terms of matching pictures and they are not user friendly.

Instaphosaic goal is to allow the users to create their own photomosaic easily and efficiently. It also offers additional new features that are not provided in the available photomosaic mobile application.

The process of creating **a photomosaic** is performed in few steps. First, the user should choose an original image. Then, the user must also specify the source of image collection to be used to generate the photomosaic, either from Instagram or phone library.

Then, the matching algorithm starts by dividing the input image into a rectangular grid called *tiles*. After that, each tile is supsampled with a certain rate calculating the average RGB color for each sample (See Figure 2) . The same subsampling procedure is performed on the corresponding image pulled from Instagram or phone library. Then, the *cumulative error* will be calculated for each tile and target image to find the images that are most suitable for the target *tile*. After matching is done the image is resized and placed over the tiles. We repeat this process for all the tiles in the input image. After all of the tiles have been placed over the input image, the final result will appear. A single picture filled with many smaller pictures as in Figure1.

The application is designed with efficiency and usability consideration as it provides many features like modifying the photomosaic, As it allows the user to replace the matching tile with other target that is also closer to it. Moreover, the user can apply saturation/desaturation on their photomosaic also they can enhance their photomosaic so that to make the resulted photomosaic more like the input image this is done by calculating the average color of the input image and apply an overlay over the photomosaic to make it more closer the input image. The user also can share their photomosaic on social media like instagam, facebook, twitter.

FIGURE 1: PHOTOMOSAIC

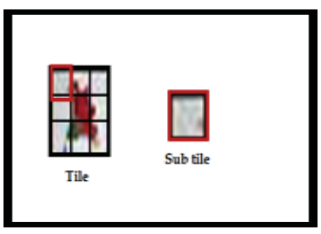

FIGURE 2: ILLUSTRATING A SUB TILE

Educational Application using Augmented Reality Technique

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Hatoon Adel Gashlan, and Heba Othman Mazhar

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ABSTRACT

In today`s complex world, children future is determined by their ability to master the basics of reading, science, math, and computers. At the same time, children now are addicted to Smartphone and tablets for entertainment purposes.

For the aforementioned reasons, in our project, we aim at building a mobile application to support self-learning by using augmented reality (AR) technique. AR is simply the process of superimposing digitally rendered images onto our real-world surroundings, which give a sense of an illusion or virtual reality. It is worth noting that, Augmented reality applications are the newest technology and the most attractive for children attention. Our goal is to be pioneer in childhood self- learning using AR technique.

Each child during his learning process will inevitably face some difficulties especially in the mathematical field. In addition to that, parents are nowadays working and hence too busy to assist their children in order to overcome their learning obstacles. Consequently, self learning applications are crucial in our daily life. It can be easily delivered to children using new technologies. However, there is a great lack of effective educational Arabic applications in software markets. As an alternative way, some people try to use non-Arabic software in teaching which could be non effective enough for Arabic children. To overcome this problem, we plan to provide an Arabic application especially dedicated for Arabic speaking children. Our application will specifically tackle the mathematical field. Aware enough of the difficulty of mathematics, number of researchers conceived various solutions.

One of the most useful techniques to facilitate mathematical learning process is visual representation. Indeed, number of different models have been used for this purpose. Nowadays, with the development of technology, many software applications even mobile ones overcome this problem while providing a high educational output especially in mathematical field by using AR technique. From the survey we make, 79.75 of parents and teachers answer "NO" when we asked them "Did you find an application in smart devices facilitate the process of teaching a child the math curriculum?" (Figure 1) . The lack of such applications from kids and parents smart phones goes back to language differences, target image availability and database accessibility issues. To avoid previous problems , we develop an Arabic application that use the academic books of the first grade math syllabus .In addition , the application use a local database to provide the accessibility to it at anytime and everywhere . furthermore, adding a kid voice to clarify the exercises is not only to make the application friendly , but its important because must of children on this age cannot read. However, adding some taste of entertainment will highly facilitate the cognitive process.

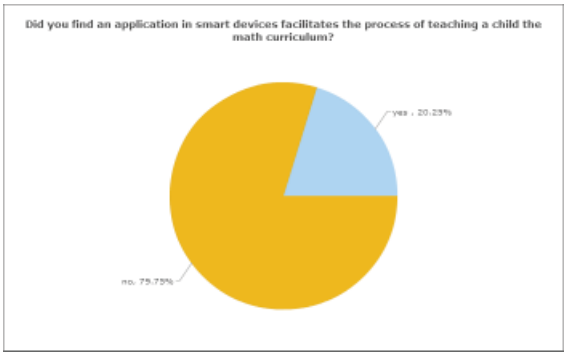

Figure 1: Survey result

In conclusion, in this paper we presented the problem of teaching children, particularly teaching mathematics. With explaining some of its reasons. However, developing an augmented reality mobile application will solve these problems. Also, we mentioned clearly why using AR is better than other previous techniques that used for the same purpose. Therefore, putting on consideration it's positive effects on children, parents, teachers and the whole educational process.

System for estimating bone age automatically using the artificial intelligence

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Supervised by:
Dr. Hanin Al-Ahmadi

ABSTRACT

The purpose of this project is to develop an artificial intelligence-based system to help radiologists estimate the bone age automatically. Classically, the bone age has been estimated by monitoring the growth of the left-hand bone using X-rays. This achieved using a book or an atlas that's one of the specialized books in this field called "The Greulich and Pyle Atlas" that includes X-rays of the left hands of patients at different ages. A given left-hand X-rays is compared using a specific method which is the Greulich and Pyle method. Thus, the doctors can diagnose problems such as growth retardation, since all doctors are using Greulich and Pyle method. On this basis, we decided to follow it.

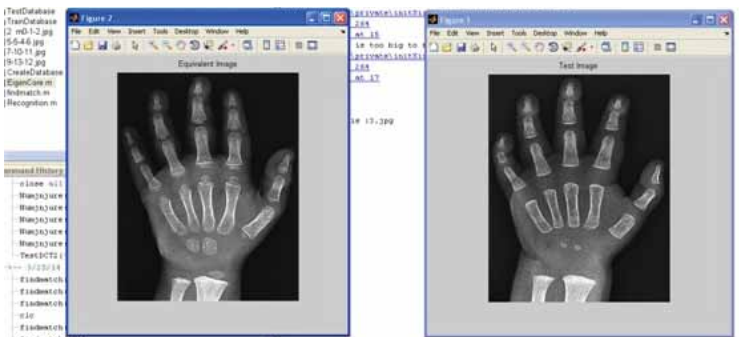
The problem with this approach is that it wastes the doctor's time by having to go through the whole book to find out the closest match. This leads to a delay in the workflow by making the patient wait for a long time.

A number of somewhat similar systems have been developed, but unfortunately, they are all unknown and unused in Saudi Arabia hospitals, we came to this conclusion after performing some interviews, questioner and statistics with the radiologist in different hospitals .Others are merely research ideas that have not been fully developed.
Thus, the purpose of this project is to develop a system that would use artificial intelligence techniques such as image processing to find the closest match in fewer steps and quickly, which save a lot of time and cut back the patient's waiting time.

To develop the system, X-rays of the left hands of patients at different ages would be stored in the database. Image processing techniques will be used to find the closest match for a given X-ray image with the exact bone age.

The image processing technique or the code of we are using is going to be in number of steps, these steps must be done on the book's images and the patient x-ray as well

Step one: Apply filters on x-ray images to convert the image to gray, and then apply the clarifying filter in order to remove the confusion that may cause problems or affect the results of the image properties discovery.
Step two: This step is about the process of implementing some equations on each matrix of the image matrices, and then have it all in one matrix to apply the EIGEN code on it
Step three: The last step is to implement the matching code to get the result. To ensure the results of these steps the image of age 16 was removed from the database, and then compared the 16 age image by the database images , the result was image of age 17 as shown in the figure.
Final Step: Give the output as the number of the patient bone age; we also aim to show the three images as an output: the result, the patient x-ray, and the normal picture for the patient actual age. So the doctor ensures the result, and this step is not implemented yet



Baharat Social Network Mobile Application for Recipe Revolution

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ABSTRACT

Cooking is love made visible. Coming from an Arabic background where cooking is considered as an important skill, where it is required to support the family, as it brings people together, and it shows care. It is spread beyond the pages of cook books into our hearts through magazines, televisions, and computers, and even smart phones. With few Arabic cooking applications that failed to satisfy cooks, the need for a subject oriented social network mobile application that fills the gap between users' needs and existing alternatives turns out to be significant. Baharat mobile application is targeting cooking lovers to provide them with the environment for exchanging recipes and tips, receiving instant feedback from people who share their cooking interest, learning, and upgrading their cooking skills. The content is user generated; giving the users the option to publish their recipes with either a video or a sequence of photos along with tagged-in ingredients. Gamification concept is highly involved in Baharat business logic. Cooks will be able to show their talents by throwing competitions, and collecting badges. The user persona will help increasing hits and growing the applications' market shares in a short time. Baharat is an application that is obeying all cooks thirst. With greatness come challenges. Baharat development is challenging due to the significant differences in the environment and platform specifications. It has to balance between the artistic elements of user need and the goals of Baharat. Baharat will be an alternative to major applications used in sharing recipes such Instagram. Transferring of Instagram accounts from being personal accounts to share dairies into cooking books is exasperating. Furthermore, it has a low degree of flexibility since cooks can share only a single picture at a time. Another limitation is that no space to share recipe's text descriptions but comments, which becomes noisy, unarranged and may get mixed with other comments or even get lost when too many comments. In addition, it has no special tools to facilities cooking process, uploading recipes, or browses them. Therefore, the Baharat application comes as a solution to many of the problems that cooks encounter. Baharat application is being developed following the Agile-Mobile-D methodology which takes in consideration the rapid change that happens in software development, support small releases, risk handling, user involvement, and continuous updating. It has five phases: the Explore phase, Initialize phase, Productionize phase and System Test and Fix phase. By the end of the five phases, Baharat will launch and the anticipated users will be practicing their cooking experience at a whole new level. Baharat application is developed on the android platform using Parse as a back end. Its system is architected based on MVC model and a rich-client platform as illustrated in figure 1.

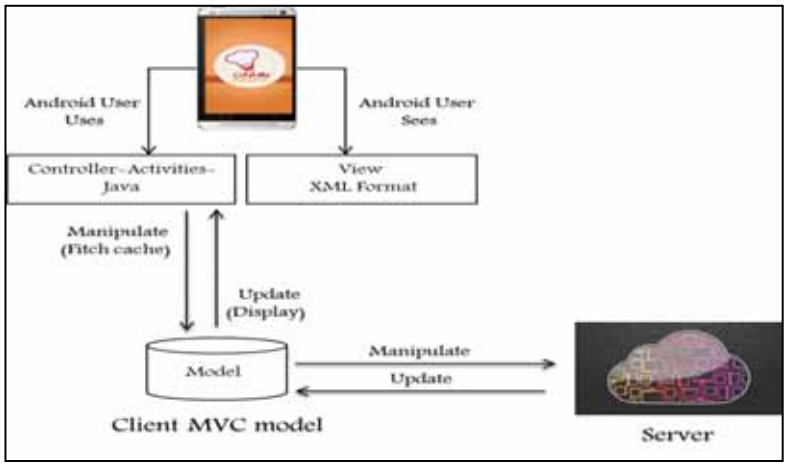

Figure 1: Baharat System Architecture

Wireless Traffic Light Control System

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Supervised by
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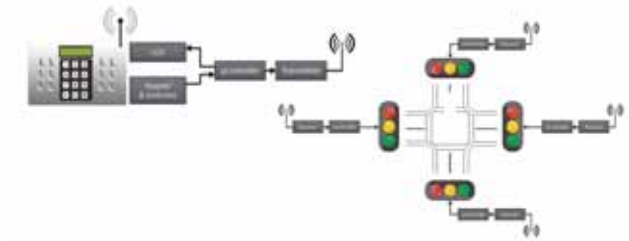
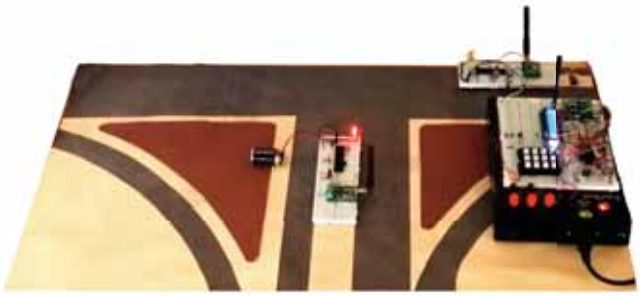
ABSTRACT

The design and implementation of a microcontroller-based Wireless Traffic Light Control System is presented in this project. The implementation of the system involves both hardware and software elements; the PIC16F887 microcontroller (µC) being the main element of the system. C code is used to program the PIC, giving it all the functionalities needed to operate the system. A set of wireless transceivers are being used to transmit the data to control the traffic light operating sequence.
The aim; therefore, is to build an efficient and an economic system that works in a stand-alone mode which will guaranty operation of the system even if there was an outage in the electrical supply (blackout) in that area.

The system is made of three units: controller unit, I/O peripherals unit, and output unit. The controller unit is the heart of the system, which includes the microcontroller. The functionality of this controller is setting the time for signals (in seconds) and sends it to the microcontrollers at the traffic lights via wireless communication with appropriate code written in C. A keypad is used to enable the user to enter the time of the signals, while a LCD is used as a display for the user. The transceivers are used to communicate with the main microcontroller and the microcontroller at the receiver side. The output unit, which includes number of traffic lights chosen by the user up to 8 traffic lights, each one of them is interfaced with the a microcontroller that will light up the traffic light depending on the time chosen using a stand-alone power supply.





To operate the system first a user should choose the number of the signals by enabling them through ON/OFF switches. Then the microcontroller (µC) will divide the signals initially to two equally teams to avoid collapsing; the first-team is in green state, the second team will be in red state and vice versa in a loop, the loop will continue until it receives new timing. The user can change the number of the signals in each team using another set of ON/OFF switches.

The minimum time acceptable as input (in seconds) is 5 seconds, and the maximum is 150 seconds. Not to forget a safety margin between the change from red to green for 2 seconds to avoid accidents and collapsing.

The proposed system is a solution for traffic jams, power outage and maintains smooth operation. This solution will help in reduction of the number of police officers as well as the working environment and the time required to regulate traffic.

Finally, the proposed system is flexible in terms of time setting and number of crossing, not to forget the scalability of the system since it's cheap in price and police officers can rely on it to control even the most complicated traffic light coordination that may include more than 8 traffic lights synchronized.
A prototype of the system have been built and tested and was able to be controlled over more than 50 meters away.

Advising System

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Supervised by
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ABSTRACT

Advising system is a central and an important aspect that functions in order to fulfill the fundamental goals of higher education. It is an intentional educational process that requires concern for and consideration of all these fundamental goals. It is the responsibility of both student and advisor.

Many of college's academic advisors suffer at the beginning of each semester from many problems that harden their advising mission; Lack of information and statistics related to students' reports, manual forms for student's desired course, plan approval with students' courses, handling tripped students, the manual update of personal information about students, difficulties in meeting with advisor, unclear list of the free courses and many such problems that delay or in some cases precludes the actual role of advising . In order to solve these problems, we have come up with the idea of building an advising system that will fulfill our needs as students as well as the needs of advisors.

Our aim is to build an advising system that supports the dissensions that are to be made by advisors each semester by generating reports and statistics about the students and the courses. The system will also supports academic, social, career, or psychological guidance, creates effective online communication, suggests course schedule each semester for each level, automates the filling process of the forms and updating information, displays clearly the study plan for each student and more information about the collage, previews the notes that include recommends and given consultations. Additionally, it contains announcements for all workshops and extra lectures that are being conducted in the collage, introduces the appointment function, warnings for tripped and senior students which require special handling, contains a detailed information about all specializations in the college and its study plans. Also, it introduces simple questions and tests that help students to choose the appropriate specialization for them. Finally, the system will helps to discover the talented students and supports them by developing their own abilities, and gives them the opportunity to show their skills and creativity. All of those are examples of our advising system solutions.

The methodology we have decided to follow is the waterfall methodology. The reason for choosing the waterfall methodology is because we have a clear understanding of the requirements and a clear vision of the desired system. Based on waterfall methodology, the division of the project phases will start with; first, the planning phase followed by the analyzing phase. Third, is the designing then the implementing last, is the testing and each phase can only starts when the previous one is completely finished. To build the project powerful software package will be used which are ORACLE with SQL, PL/SQL languages. In addition, Forms Builder and Reports Generators tools. By the end of this project we aim to come up with a web based system that will help enhance the advising process and ensure the educational quality for collages.

Motion Detection and Image/Video Recording of Wireless IP Camera for Home Security Using Mobile Application

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Supervised by
Mr.Faizal Hajamohideen

ABSTRACT

Nowadays home security is becoming more important. People who are working outside their home for long hours they become more worried about their homes. Or at home, family members want to make sure who are at door before opening the door and see what's going on.

Implementing some protection systems that provide home protection and overcome such worries are essential for the community. Installing and using a security system provides reassurance while affording the ability to monitor situations. Security systems for the home are only as good as the user, so it's important to install a system that everyone can and will use.

People can easily setup a camera at the doors of their homes that detects the motion and records images or videos. There are many types of cameras that are used by people to protect and secure homes. These types of cameras with different features like Bluetooth which can be connected through different devices.

The IP Camera has the feature of alerting by sending emails which are not an effective way to react with action immediately. The problem is how they get these notifications which are detected by this camera immediately.

To address this issue, we present the idea of the design and development of an end –to-end mobile application that enables the family members use their mobile devices to connect the IP camera wirelessly which means that the mobile devices can immediately show the motions and alarms the user of some notifications. Through this mobile application, the users can hear the alarm instead of sending an email to users, so react with actions immediately and can talk with others outdoors.Figure1 depicts an architectural diagram of the proposed solution.

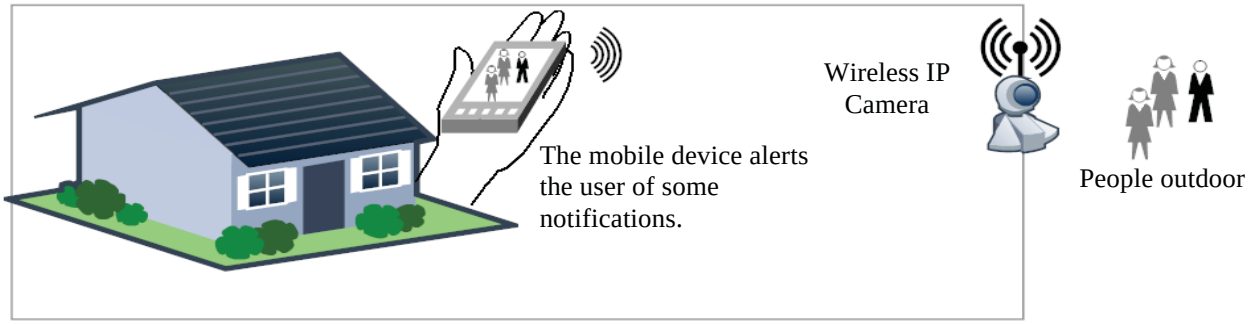

Figure 1: Architectural diagram of the proposed solution

The software technology or tools to implement the proposed solution include eclipse for android application with the use of MySQL.

As a result, the functions that we can achieve from this application are very useful for community and provide protection of properties. And come with a variety of options which can be tailored to fit family and individual needs.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Automatic Image Annotation Using Fuzzy Cross-Media Relevance Model

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ABSTRACT

Content-based image retrieval has been an active field of research during the last decade. However, the performance of the proposed solutions has been constrained by the semantic gap problem, which consists in the mismatch between the human perception and the visual descriptors. Combining text based retrieval and content-based retrieval techniques emerged as a natural solution to overcome this problem. However, most of the images are uploaded to the Internet without meaningful captions. Moreover, manual annotation of these images is tedious and time consuming. Thus, automatic image annotation has been proposed as the solution that can overcome the challenge above.

In this paper, we propose a novel automatic image annotation system which relies on two main components: (i) identification of homogenous image regions, which share the same semantics using fuzzy clustering algorithm, and (ii) membership-based cross media relevance model to learn the association between keywords and image regions. We believe our new fuzzy-based model suits the stochastically nature of the image annotation process.

The proposed system consists of two main parts: the online and the offline parts. The offline part (back-end) is run first, i.e., the user does not have to interact with it. The goal of the offline part is to build a model that will be used by the online part. Initially, the offline part is provided with a set of manually annotated images *T*. After that, a set of regions from each image in *T* will be generated using a segmentation algorithm (we use a 6*4 grid to divide each image into 24 blocks). The next step is to extract features from these regions. Instead of considering regions as a set of pixels, we represent them as a set of visual descriptors. We extract the most important features (visual descriptors) from them. Color features (standard deviation and skewness of the RGB values, and standard deviation, skewness and average of the CIE-Lab values). Now we have a group of vectors, each corresponds to an image region. We use a fuzzy clustering algorithm (Fuzzy C-means) to cluster all the vectors into homogenous categories/blobs. Then, we build a model by looking at each blob *b* and estimating the probability that a given word *w* will appear in that blob, also we look at each word *w* and the probability that it occurs in blob b. The generated model is stored to be used by the online part, and the offline part role ends here. The online part (front-end) is the part including a graphical user interface that users interact with. The online part will then use the model generated by the offline part to assign labels to the unknown image. When first run, the user provides an image *I* without any annotations. The system will automatically annotate the given image *I*. First, the image will be segmented into regions, and then visual features will be extracted from it resulting in a group of vectors. It will find the closest blob to each vector (remember that each vector corresponds to a region). Now we will have a group of blobs $\{b_1, b_2, b_3, \ldots b_m\}$. For each blob *b* we find the probability of each word (using the model generated by the offline part) occurring in b. Finally, we take the words with the highest probabilities and assign it to the image *I*. Figure 1 shows an overview of the steps in both the offline and online part.

The system was implemented in MATLAB and Python. The obtained results show that the proposed approach outperforms the state-of-the-art method by achieving an f-score of 22.15%. This can be attributed to the fact that our approach exploits the fuzzy membership functions generated by the clustering step, and learns efficiently the association between image regions and labeling keywords.

Development of Smile Radar
Evaluation of emotion priming on driving behaviors

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Advisor: Dr. Jose Lopez Berengueres

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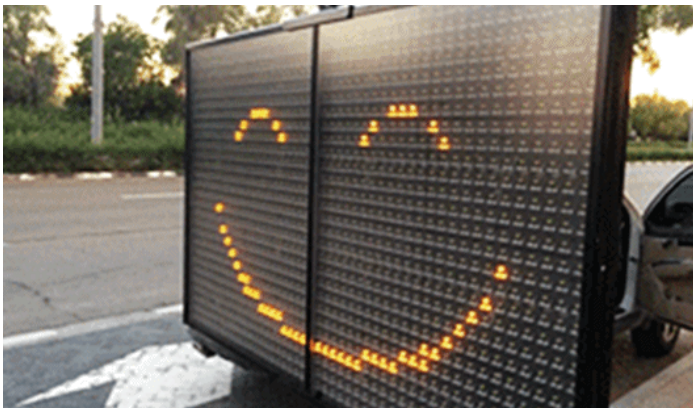
Alain, UAE

ABSTRACT

The United Arab Emirates has the eighth highest national accident rate among all the road traffic deaths that were recorded in 2012 around the world, with 37.1 killed in traffic deaths per 100,000 people per year, which is about five to ten times the rate of the developed world. While further investigations revealed that the World Health Organization (WHO) reports' has ranked roads in the UAE as some of the world's most dangerous. As a result of the data analysis and research, we – as Information Technology senior students- have decided to propose a solution to the mentioned problem that boils down to study the psychological effect of displaying a smiley face to the driver, and study how it is going to affect the UAE's traffic condition during the demonstration period.

A study was done in South London where the local authority roads set up SIDs in the form of LED panels that had a smiley built-in. They used the SIDs for three weeks in ten different sites on a carriageway which was suffering from a high rate of speed problems and collisions. The speed was recorded for six weeks at three points of time a week before. The speed was recorded by Automatic Traffic Counters (ATCs) which are pneumatic (transfer charge) road tubes positioned across the road and linked to a recorder box on the road side. During the three weeks of the SIDs operation the statistics show a reduction in exceeding the speed limit rate from 57% before its implementation to 45%. After removing the SIDs, the first week shows the same SIDs influence on the speed; however in the second week the speed started to rise again to the rates before the installation of the SIDs. The study suggested to keep using the SIDs for an extended period of time to get a better effect on the speed. Our project will use the concept of positive effect by display only smiley face in large clear panel. Also, our project will not use ATCs the program will calculate the speed.



The main parts of our system are video camera, laptop and VMS panel (Variable Message Sign). The camera that is connected to the laptop is placed 10 meters away from both the laptop and the VMS panel. The camera is programmed in a way that can detect the moving objects in general but we specified two rectangles with known distance between them. Whenever the car will pass by the first rectangle the program will record the time in seconds and after passing by the second rectangle it will calculate the time in seconds so the program will calculate automatically the speed based on the time and the defined distance. The program will compare the speed of the car based on the defined limit speed by the user. The result is then transmitted to the VMS panel; if the speed is lower than the limit, a smiley face will be displayed; however, if it's high, the result is going to be no face, which is a blank display, because in this project we are using only positive affirmations. At the end the program the results in fixed database.

QR Code Notification Calendar

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Supervised by
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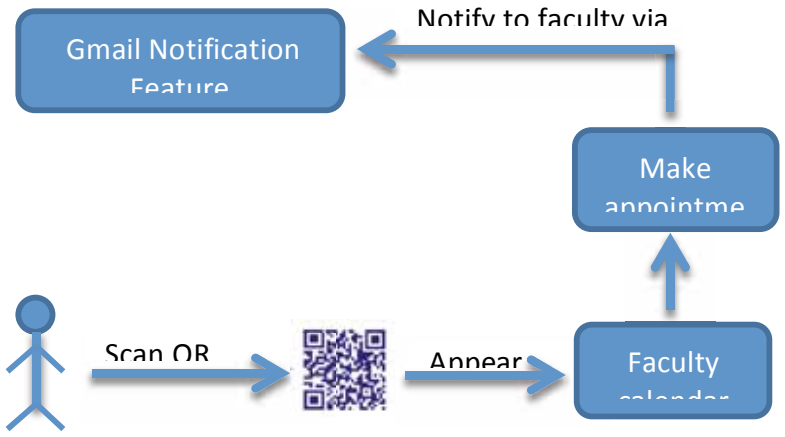
ABSTRACT

In our college, students face problems in communicating with staff and faculty members. In many times staff and faculty members are not available in their offices for face-to-face contact. Students usually had to visit there offices more than one time in order to get the chance to meet the concerned party. The use of email and phone calls does not work either because faculty members could be in lectures or involved in other duties within the campus.

To address this issue, we proposed to develop a mobile application that makes use of QR Code technique. Every staff or faculty members is requested to generate and print out a QR Code for their calendars including the free time and post it outside their office doors. Using a smart mobile phone, students can scan this QR Code to be automatically directed to member's calendar that allows the student to poke an appointment. Once the student poke the appointment, the program will notify the member that someone want to meet him/her at that time via email. Figure 1 below depicts the functionality of this application.



The college has adopted Google email and calendar solutions for internal and external communications. So, in our application we will make use of those existing systems to allow an efficient and modern channel of communication between students and faculty members. Google email provides some features in its calendar like slots and appointments that can be used to differentiate between the working hours and the free time of the faculty members. We have utilized these features in order to integrate QR Code scanning with the feature of calendar notification. A demonstration of the prototype has been approved by our college administration and our project is currently in the process of implementation.

This system also works as a record for the college in its effort to improve the quality of services it provides for both the students and employees and it raises the level of responsiveness from faculty members to student needs.

Real time Update Dynamic Advertising Banners

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Supervised by
Wrya Monnet
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ABSTRACT

Advertisement is the base for marketing and sale. The very well-known mediums for advertising are through TV, static banners, flyers etc. However, these mediums need a lot of preparation, design, edition and resources. Another, easy, fast and cheap way for advertising, in an urban area, is by using dynamic banners based on LEDs. In many cities the structural infrastructure for such kind of banners already exists and used for static advertising. The LED banners can be adapted to these structures in addition to a GSM receiver to transform it to a dynamic one.

In this work, we propose a real-time system for advertising using GSM technology and LED banners. Then the advertiser can send an SMS messages to a specific geographical position by choosing the right banner. The message will then be monitored on outdoor advertisement banners of standardized size (2-3 m2 of surface area). Before monitoring, the message will pass by a control center to prevent the malicious usage of this technique. The innovation in this work is the real-time aspect: whenever a customer wants to spread a message he/she will send it by an SMS through his/her mobile phone and will be transmitted to all, part or some specific banners distributed in the urban areas. Figure 1 shows the steps of the advertising process: Firstly the customer sends the message to the advertising company center to be checked. If it is validated, then, it will be sent to the banner through the GSM receiver. Finally, the desired message content would be published and shown up for the time limited by the advertiser and the price he/she will pay.

This way of advertising can be ideal for Municipalities, private sector, associations, individuals because it is fast, cheap and easy: no edition or design issues only a textual message. The other advantage of this system is that it can be easily installed in most urban areas because half of the infrastructure is already there: the fixed banners. Moreover, the LED banner is proposed because it is cheaper and easier to maintain.

Figure 1(Steps of the advertising process)

PRERO: an Educational Programming Application for Kids

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Supervised by
I.Nouf Rahimi

ABSTRACT

The importance of computer programming manifested in many aspects of life; learning, thinking, and morals. One of the most important factors that is affected by programming is the ability to learn; because when people learn how to code, they will gain the ability to learn in the right ways. In addition, people cannot learn programming as an abstract field, instead of that, they will learn about mathematical and computational concepts. Moreover, many useful skills will be acquired through learning programming such as solving problems and projects planning.

Based on this importance, several countries have begun to study proposals and implement plans to merge programming into curriculums of primary, elementary and secondary schools. In addition to that, a few educational applications where developed to teach programming concepts to children. There are several problems related to educational games and applications for children. First of all, shortage of educational programs which support Arabic language. Current programming teaching applications that support Arabic such as Alice 3 and Scratch (a web application, which means it requires an internet connection in order for the child to program), are complex for children. For instance, Scratch requires detaching all the blocks preceding a certain block in order to delete it or move it. Not to mention its slowness and difficulty to reset and re-run. Prero offers children the opportunity to see their program result on the ground by running it on an actual robotic ball called Shpero, this is a feature that no other application offers, not even scratch. Another problem is that other educational games and applications have many negative features that should be avoided when developing new games or applications. Such as forcing children to solve a problem or a challenge in one way without giving them a chance to find alternative creative solutions.

This project aims to design the first Arabic application to teach programming to children, through creating a structure consisting of several commands and properties (previously written by programming code). The application will be designed for Arabic children aged between six and twelve. It will enable children to program a robot by installing a structure consisting of several commands and characteristics. A child will drag and drop blocks of commands to create a robot capable of performing the required actions. Children can choose between running their code on a virtual robot on the screen (can choose between a boy and a girl robot) and between running the code on Shpero.

In this application, previous mistakes in the current educational games or applications are taken into account and are being avoided. This application will develop logical thinking for children and will give them the opportunity to enhance their problem solving skills through programming in a manner that helps them to innovate within their Arabic language.

The application is being developed for iPad devices using Objective-C programming language. About 80% of the implementation phase is done. The application will be tested on a random sample of 60 Elementary school students from all grades. Hopefully, the application will be expanded in the future for android and windows devices and it will support other languages such as English.

Since technology is relevant to everything in our daily lifestyles, and with the technical mutation expected to dominate our world in the future, a big gap will be formed between children and their lifestyles, which must be controlled by educating programming to them at early stages of their life.

Figure 1: An Illustrative Figure of the Application

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Introducing Dynamic Time Warping Algorithm to Activity Recognition in an Android Game Application

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ABSTRACT

Ever since the early evolution of technology and video games, especially in Smartphone, kids and teenagers are spending most of their free time playing games on their devices, spending less time doing physical exercises. Many studies and researches have been conducted addressing the impact of electronic games on children. Considering the physical impact, many kids and teenagers are suffering from obesity, indolence and sluggishness, which leads to serious diseases such as diabetes and heart diseases. In this paper we introduce a game application that recognizes the player's activity and implements it into the game. The application shall measure and calculate the footsteps and running pace of the player through build-in sensors in the Smartphone. Many algorithms can be used to enhance the sensors ability of measuring and reading the movement of the player. Our system shall implement a compatible algorithm for mobile devices in order to get fast and accurate measurements of the player's physical activity by reading his/her movement.

The game application is a race that implements the concept of physical activity in a form fits the majority of our target audience. The race follows treasure hunt concept. It consists of a number of routes; thus, the player must stop at each route to view a hint about the next route. Along the race the player is exposed to graphics and facts from the Islamic history of the Umayyad Caliphate in Al Andalus. Hints are represented in textual and graphical forms. Moreover, the reward at the finish line is a treasure of books where the player can explore more information about that era.

In order to figure the algorithm to use in activity detection we evaluated six project papers that describe methods of sensing and motion recognition. All of these projects used conventional classification methods such as decision trees, Logistic regression, k-Nearest Neighbor and Support Vector Machine [2][3][4][5][6][7]. The accuracy followed at a high rate. Two of the exanimated projects require external equipment, aside from the mobile phone, which is not convenient for practical use. Moreover, none of them targeted children in testing. In the light of the nature of data, Dynamic Time Warping is the best known solution for time series data [1]. The application uses DTW which is an algorithm that was initially developed to complete the assignment of figuring the similarities between two streams. Basically, it aims to map between two patterns regardless of their lengths. If it succeeds to map a pattern it means that the two sequences resemble each other if not then the patterns present different characteristics. In order to detect the player's activity, we compare between the player's detected movement and a running pattern. Two embedded sensors in the android devices that measure the device's acceleration are used in this project. First, the Accelerometer detects the device's acceleration; however, its readings are affected by the earth's gravity. Therefore, the second sensor the Gyroscope or Gyrometer is used to complement the accelerometer findings. Both sensors represent values in the X, Y and Z- axis. Initially, we attempt to advice players to place the phone in trousers front pocket for the swinging action will display significant values helping to classify the movement. The running pattern sums the running activity readings characteristics. It is configured through a real life study of a number of children participants whose running pattern is detected via an android application developed to complete the study. The data is collected and mapped together to find a pattern that sums up the running wave. In the final application, the player physical activity shall be recognized in the game allowing the player to proceed to complete the route in the game.

All in all, our project introduces the games application category to physical activity with an educational dimension to shed a light on that glorious era of the Muslims heritage in its golden age, with respect to gaming methodology. Most importantly this project focuses on applying DTW algorithm to android sensors to recognize and distinguish player's activity.

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Utilizing Gesture Based Computing in Education: The Case of Chemistry Virtual Laboratory

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ABSTRACT

Gesture Based Computing is the mathematical interpretation of a human motion by a computing device. It can be seen as a way to build new generation of intelligent machines that can understand human motions. In short, gesture based computing enables pointing a finger at computer screen to move the cursor accordingly. Also it can track your eyes movements and even recognizes your emotional state.

One of the newly established gesture recognition companies is Leap Motion. Leap motion device as it shown in figure 1is the next generation of multi-touch environments. The device is a USB port device that senses the hands, fingers and follows their movements. Without any physical contact the user can interact with objects on a screen. Using hands and fingers movement in the air the user can hold, drop, throw and move the objects easily. The leap motion device can be used to build applications in various fields such as games, art, edutainment, virtual laboratories, and more. In our project we will focus only on virtual laboratories applications.

Our system implements a chemistry virtual laboratory using gesture based computing which is a new technology that has not been implemented before. It provides a pleasant and useful learning environment for students from eight to fourteen years old and it fully supports the Arabic language. Also, it helps students to learn and understand chemistry basic concepts without using physical lab equipments and carrying out dangerous and/or expensive experiments.

Our standalone application is called CHEMOTION. It is a combination of virtual laboratory and gesture recognition in order to create a gesture based virtual chemistry laboratory application. It will have various categories and these categories consist of different experiments. If the user chooses a particular category, all experiments belonging to this category will be displayed along with lessons and a quiz. Each quiz has dynamic questions to test the user knowledge that have been taken from the experiments and lessons in a particular category. Also the system has tutorials which show to the user how to perform certain gesture in specific lab equipments. The lessons give a chemical background of some of experiments by describing the chemicals used in the experiment. While, the experiments are composed of different lab equipment and chemicals, the user can use the lab equipment to perform an experiment through his/her hand gestures. Moreover, the system includes Lab assistant using animated character to guide the student.

CHEMOTION has three main parts: the user, leap motion controller, and virtual laboratory. The Leap Motion will allow users to interact with the application through hand gestures. Our Future work is to test the system's usability, understandability and learn-ability on a sample of students.

Figure 1 System Overview

Private Datacenter: An approach towards Cloud Entrepreneur

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ABSTRACT

The term "cloud computing" is used to refer to the computing services that are delivered for clients over a network connection. Also cloud computing is like a shared pool of services either hardware or software that offer to clients over network. The idea of cloud computing is transforming the process and the storage to sharable servers. So this idea has translated from application to become as a service. This service allow the user to work with his application in everywhere without care about losing data or any other problems that could be face it because the data are saved in safety place on the internet. The concept of cloud computing become the most important subjects for discussion in this days. It is the primary key for opining wide area for companies to modify the interaction with clients and end-user.

There are many characteristics of cloud computing and the most important characteristics are remotely hosted so that means the data and services hosted in remote infrastructure. And the second characteristic is ubiquitous service so that the client can retrieve the data anytime, anyplace, any device and any communication. Cloud computing provide three basic types of services which are Software as a Service (SaaS), Infrastructure as a Service (IaaS) and Platform as a Service (PaaS).

The advantages of cloud computing are to improve performance by reduce the number of programs in computer memory and reduced software costs. In addition, cloud computing can improved document format compatibility. Another advantage to cloud computing is that offers virtually limitless storage and also increased data reliability.

On the other hand cloud computing's problems are constrain in providing in the internet especially in 3rd world. Also, servers' manager who responsible in cloud services can access to clients' data and he can see it. And user doesn't know the location of his data. Also, if the user deletes his files from cloud, they are no guaranty that files are deleted.

The aim of cloud computing is to offering large and wide areas of businesses. Actually, many clients and companies they do not know how to deal with some problems. However some of them do not have the require space on their machines to install the applications.

So this project will provide such easy solution by creating a cloud business using cloud computing so will help clients and companies. In order to do that, will using Ubuntu 11.04 server as the main server to offer cloud services. Dealing with Ubuntu server will give more secure services and more secure transactions. Also, the installation will performed in a virtual environment based on VMware Workstation 7 and Windows 7.

Other aspects such as user privilege and quota management are integrated and explained in the study using Linux operating system.

The project emulates cloud datacenter in a simulated form and gives an opportunity to start a new business. Also this research paves the way to create younger entrepreneur in the fast approaching technological world.

FreeCom Mobile Application

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ABSTRACT

Free Communication (FreeCom) is a mobile application which consists in using wireless technology for telephony. This application will be useful in places not covered by the usual mobile networks. It has also the advantage of providing a free telephony service in a local area network. This mobile application will be developed by programming voice transmission over a free wireless telecommunication technology. Also, develop a list of contacts for this purpose and friendly interface. This application will be developed for the use in a local area network.

FreeCom's goal is to provide telephony service for free by using a low cost, low power, short-range radio a Bluetooth technology. Facilitating people phone communication in a local area network (LAN). The main difference between our application and Wi-Fi applications; such as Skype, is that they need internet which has a cost but our application is free.

In favor of voice quality, reduction techniques are implemented in order to eliminate the noise and to provide effective and clear communication. Many applications provide telephony service over wireless or Bluetooth. However, there is a common limitation which is the voice noise and echo. Therefore, we intend to implement a high reduction algorithm.

Uncovered places where no mobile service is provided suffer from the problem that people could not contact each other even if they are in the same place. Also, despite of being in the same place people should pay expensively their phone calls. As a result, people, organizations and the environments all benefit from using a FreeCom mobile application. For users, the application helps them to communicate in places which are not covered by telecom providers or the expensive cost for the Wi-Fi service by using a free telecommunication Bluetooth technology. Moreover, the users for this application would be familiar with their existing neighbors. In order to satisfy voice quality, technique and algorithm will be implemented to eliminate noise and amplification of voice.

This application focuses on transfer voice over free telecommunication technology. The work is intended to highlight the suitability of the technology to transfer voice over Bluetooth and it would impact positively and usefully for employee in any organization that is not covered by the usual mobile networks providers.

Live tracking vehicle via Arduino

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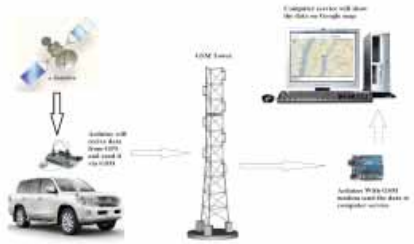
ABSTRACT

This project is a state-of-art automatic location system that will track vehicles in real time. The system is based on two parts, a tracker or sender part and the receiver part. The first part contains an Arduino Uno integrated with GPS and GSM module. The GPS will receive the signals form the satellite (longitude and latitude). The Arduino will send the data by GSM server to the receiver part which it is also an Arduino device that integrated with GSM modem and a computer.



The Arduino will read the message and send the data to computer. The computer will analyze the data and show the location of the vehicle on Google map. This system can easily be applied in rural and suburban areas on every vehicle. This will help in many ways to avoid any problem or to make the accident that caused by vehicles become less and control the movement of vehicles in rural and suburban areas. The system also has many features, such as to improve the performance of the system to become more effective. The system has a database which records the locations of the vehicles and the location data can be tracked in case the real time system is not functioning. This will help companies or government for their security and to “watch” their vehicle if they were stolen. Furthermore, this system can contain SD card to record the position points on the Arduino if the vehicle go through a dead zone. The SD card will record all the position that were not sent and the Arduino will send them later as soon as the wireless mobile communication is available.

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Al-Haram Guide Application: *A Mobile Application That Serve As an Always-On Guide.*

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ABSTRACT

The Holy Mosque of Makkah covers an area of 400,000 square meters. This significant size of Al-Haram makes it impossible for the visitors to locate the different facilities and services. Thus, various mobile applications were provided to serve Al-Haram visitors in different ways. For example, Al-Mutawef, Al-Haramain, Holy Mosque Visitor Guide, and Pilgrimage's Compass. Nevertheless, in comparison with our proposed system they don't cover: dynamic maps, interaction with other users, location of Al-Haram facilities, routing paths, directions, facility updates, and under expansion areas localization.

Figure 1. High fidelity prototype of Al-Haram Guide's main screen

Our senior project is a mobile application that is dedicated to serve the visitors of the Holy mosque of Makkah. The application will work as a guide to Al-Haram landmarks using geographical location techniques and routing algorithm. Through the application, the visitors will geographically locate Al-Haram facilities (Gates, Tawaf, Mas'aa, Maqam, Stairs, Elevators, Escalators, Wheelchairs, Canopies, Prayer areas for women and men,etc) and Al-Haram services (Water cycles, Red Crescent, Lost & Found, Helpdesks and Security Guards). The application will also allow the users to send their current locations to their companions in case of getting lost and it will permit the users to take appropriate precautions regarding the crowd level in the holy mosque areas based in real-time information delivered by the users, or gained from available sensors in Al-Haram that will be distributed at the main gates. In addition Al-Haram guide application will allow the visitors to interact with each other to generate feedbacks about the crowd level and possible updates in Al-Haram facilities. What also makes Al-Haram Guide an intelligent application is that it provides routing from the current position to the intended destination by showing the optimal path on a map taking into consideration the crowd level, under expansion areas and available paths. Al-Haram Guide will also provide the users with the necessary information regarding emergency contact (Red Crescent, Civil Defense, Police, etc.).

We aim to help Muslims all over the world and facilitate their experience of visiting Al-Haram. Thus we focused on making the user-interface colorful and user friendly, it will also be introduced in English as it is an international language understandable by many people in the world. Moreover, the application will use symbols and graphical illustrations that are known to all Muslims on the map to overcome the language barrier.

The project is implemented in sequential manner. It started with the analysis phase where a questionnaire along with an interview with the representative of The General Presidency of The Two Holy Mosques Affairs. Also, different UML diagrams were structured to provide an overview of the system. In the design phase, the routing algorithm along with the database design and the application's interface were developed. Since Al-Haram is conceptually divided into areas (Mataf, Massa, Water Cycles, women Prayer area, etc), the routing algorithm that we have designed calculates the optimal path between areas considering the crowd level and the distance. The interface was designed using justinmind prototyper to provide an overview of the application and how the user would communicates with it, Figure 1 shows the high fidelity prototype of Al-Haram Guide's main screen. The final phases are the implementation and testing.

At the present, the group is working on developing the screens (UI), integrating the map with the application, configuring the symbolic pins that will represent the facilities on the map, proposing a theoretical model for sensors distribution in Al-Haram that will efficiently allow the sensors to cover all the populated areas, generating models and tables that suite the application scenarios, coming up with a routing algorithm, generating the routing code, creating a routing test example. The application will be ready for testing at the end of April, 2014.

Accessing Mobile phones using Iris Recognition

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ABSTRACT

As Smart phones have become a very important technology in a person`s life, with increased functionalities and abilities, the importance to improve their security level has risen in order to protect the user information and personal data stored in them. The most common methods used to lock a smart phone are passwords, PINs, and patterns. Unfortunately, the weakness of these methods have been increasing rapidly and it has become an issue with high fidelity data.

The best well known solution is the use of Biometrics technologies in Identifying and Verifying the mobile user, such as a finger print scanning or voice recognition, as biometrics are unique, distinguishable, and hard to fake. This project aims to develop and build a mobile phone application that allow access for the mobile user using one of their biometric. Therefore, at first the project presents a comparison between three types of biometrics that are commonly used in the security field. It also include our choice and point of interest, which is Iris Recognition, based on that study to employ and build an application for accessing mobile phones that operate on android operating system depending on that biometric.

In addition, our project will follow the Waterfall model methodology. We set the system requirements, system design and prototype according to the data we have gathered. The system has four stages that illustrated as a block diagram in figure 1 that follow the same strategy set for any biometric based security system. The first stage would be image capturing of the eye using the mobile camera. The second one is preprocessing, which is divided into segmentation and normalization. Segmentation is to find an iris in an image, detect the upper and lower eyelid boundaries if they were bar, and detect and exclude any superimposed eyelashes or the reflection from the cornea or eyeglasses. for this stage the , Hough Transform algorithm will be used. Normalization is the stage where the segmented iris image is prepared for the process of feature extraction. That is, the image will be transformed to have fixed dimensions in order to allow comparison. and the used algorithm for this stage will be Daughman's Rubber Sheet Model. The third stage is feature extraction using Gabor filters, it means to convert the features of the image into binary patterns known as the iris code. Finally, the matching stage using Hamming Distance algorithm to compare between two iris codes to determine if they belong to the same iris in order to allow the mobile access.

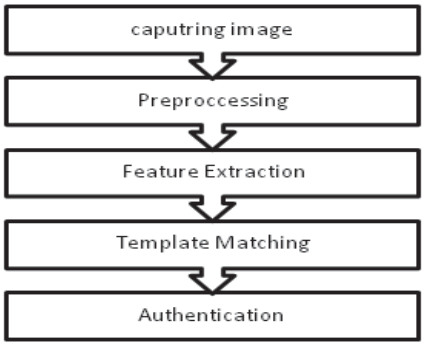

Figure 1: Access control block diagram

Integrated Smart System for Efficient Energy Management in Standalone Renewable Energy Systems

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ABSTRACT

In the last decade, the performance of energy management systems is enhanced by improving their abilities to accurately measure, record, and analyze data. Although home energy management systems, renewable energy management systems, and smart energy management systems were successfully introduced, energy management systems' ability to be efficiently integrated and to be upgraded, are still representing limitations to be overcome. Future energy management systems must be able to be easily applied anywhere and anytime with minimum cost and best quality. The previous goals are steadily achieved by the continuous research efforts to enhance the performance of sensors, to improve the capabilities of wired and wireless communication network, and to develop more efficient data monitoring and management systems to remotely monitor system variables and control system operation. In the present work we present a smart integrated wireless sensor network and real time energy monitoring and management system for standalone photovoltaic systems is designed and implemented.

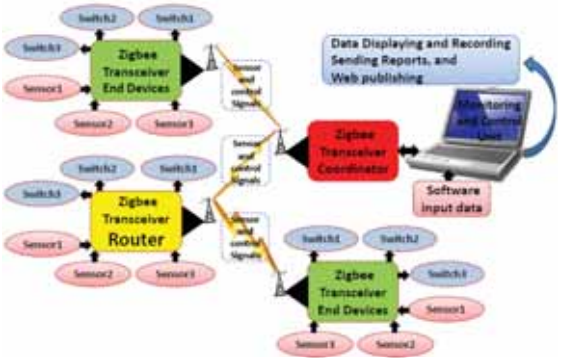

Fig.1 A block diagram of the smart integrated energy management system

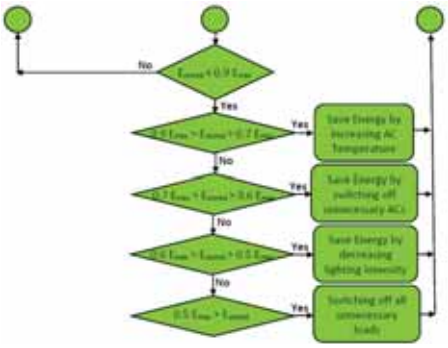

Fig.2 Suggested energy management system scheme

The system consists of the monitoring and control unit, the wireless network, the sensors and the loads. The main functions of the monitoring and control unit are to monitor the system performance and to accurately control the energy consumption form the photovoltaic storage. The control of the energy consumption is based on accurate determination of the periods of times at which the loads are required to be operated and on continuous calculating and recording of the energy consumed by the loads and generated energy from the PV system. These requirements are fully fulfilled using an accurate and efficient programming environment. Initially, the program is fed with the details load usage time table and with the signals from different sensors. The program automatically reads the date and time from the controlling computer internal clock and the controlling signals from the different sensors are also considered to operate the required loads based on users' requirements. The controlling signals are generated and send to the load driving circuits through the wireless communication network. Loads are the last step of the proposed system. Each load connected with the network must have a switching circuit to turn it On\ OFF. The status of each load is monitored and Based on the knowledge of the switched on loads and the time periods at which these loads are operated, and based on the signals received from monitoring sensors, the energy consumed by the loads are continuously monitored and compared with the energy generated from the PV modules at the same time. Based on the previous data, the energy level in the storage units are determined and further decisions and/or actions, like reduction of loads, are taken as shown in fig.2.

The system functionality is tested and the controlling signals and monitored data are regularly send and received without errors. All data are recorded with an advanced archiving file system with dynamic auto saved name and based on customer setting. The efficient programming environment which is used in our system allows continuous monitoring of the measured quantities and also allows specific choices of the generated reports and destinations. The wireless part of the system has been implemented by using Zigbee RF modules. Hence, the system is highly efficient and it consumes low power. Using internet communication networks, alarm messages, report summaries, and full detailed reports can be generated over any specific period of time and to any specific destination. In addition to all of the above features, we believe that our carful design of the hardware and software system components allows the fulfillment of any further requirement of any user, ensures the required upgradability to have enhanced performance, and achieves the minimum system cost without scarifying accuracy.

Mobile Healthcare : A Wireless Healthcare Monitoring System Using Smart Mobile Devices

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ABSTRACT

In the last decade, the performance of healthcare monitoring networks is enhanced by improving their abilities to accurately measure, record, and analyze data. On the other hand, healthcare monitoring network problems became more complicated due to the increasing number of people who still need healthcare services. This makes the development of a reliable healthcare monitoring system which is able to deliver services to anyone, anywhere and anytime with minimum cost and best quality a must. The previous goals are steadily achieved by the continuous research efforts to enhance the performance healthcare sensors, to improve the capabilities of wired and wireless communication network, and to develop more efficient data monitoring and management systems. In today's healthcare practitioners, doctors need to monitor patients who are either hospitalized or executing their normal daily activities at home or at work but in need of persistent medical care. With the ascent and improvement of wireless technologies, wireless monitoring systems can widely increase our ability to monitor situations of patients in healthcare area, to improve the comfort of patients, to eliminate many medical errors, to increase the efficiency of hospital staff by diminishing their workload to exert their time more on other important affairs.

In the present work we present a mobile healthcare monitoring system, which is based on wireless smart mobile devices, to provide real time online information about medical status of the patients.

The system manly consists of sensors, the data acquisition card which is connected to the smart mobile monitoring unit, the programming environment which display, record, and send data over wireless communication and internet networks (fig.1). The sensors transform the changes in the required physical quantities into electrical changes that can be measured and recorded. Any transformation function which describes the sensor behavior can be accurately included in our system. The patient's temperature, heart beat rate, and ECG signals are the parameters which are monitored with our present system (fig.2). Based on the customer requirement, the system hardware can be easily modified to accept any number of inputs from different sensor circuits and the transfer data from the sensor circuits to the local monitoring unit is decided to take place over wired or wireless channels. The flexibility of our programming environment allows the implementation of any monitoring and processing feature on the required measured data. Our system is designed to efficiently use mobile communication networking and internet networking facilities to have a low cost networking infrastructure for our global communication channels. In addition to all of the above features, we believe that our careful design of the hardware and software system components allows the fulfillment of any further requirement of any user.

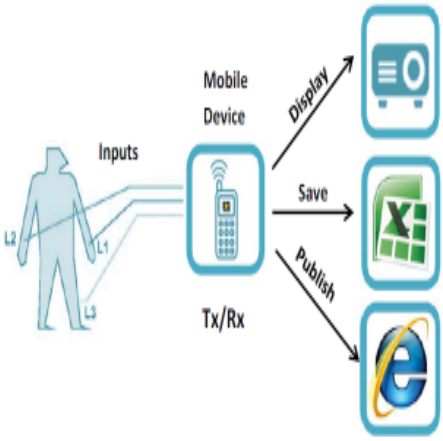

Fig.1 Mobile healthcare system block diagram

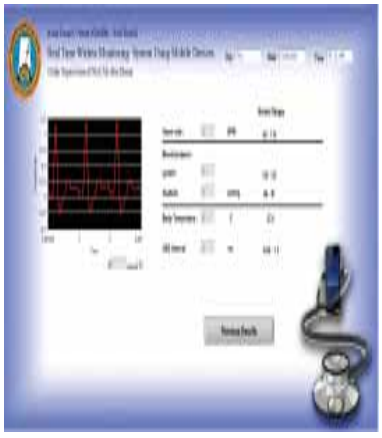

Fig.2 The mobile healthcare system front panel

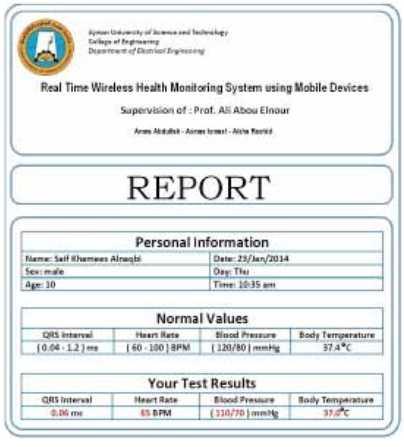

Fig.3 A sample of the system generated reports

It has to be mentioned that our proposed system is designed to have the ability to be extended to monitor all important medical quantities to accurately describe the status of the patients' health and fitness (fig.3). In addition to the previous advantages, alarming and reminding signals about the patient status can also be send by text message or email report to patient mentors to take decision if necessary.

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Design and Implementation of an Efficient Renewable Energy Water Pumping System

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ABSTRACT

In addition to the increased demand for renewable energies there is also a continual demand for fresh water. Although there are verity of technologies that are designed to pump water from underground to above grounds when a fresh water source is located a long distance from a desired delivery site, but they have the disadvantages of high cast owning it and it requires a high amount of energy. Also the cleaning and maintenance process must be done by specialists.

The concept of this project is very simple and, yet very efficient. The only equipment's needed are a solar panel, an air compressor, a long tube and 2 tanks, one is filled with water indicating the well and the other one is an empty one indicating the storage tank. Also a battery is needed for power supplying at night and a charge controller to stop charging the battery when it's fully charged. The air compressor is connected to a wire that is put inside the tube, which in turns is put inside the tank (the well). When turning on the air compressor that would be supplied by the solar energy, an amount of air will go through the tube causing the water in the tank (well) to be pushed from the underground to the storage tank that is located above the ground. (Fig. 1).

The designing of an efficient system requires few parameters to be taken into consideration. Those parameters are the depth of the well that is planned to take water from which in turns determines the length of the tube used. The deeper the well the longer the tube is and the greater the diameter of the tube would be. The second parameter is the capacity of the air compressor. The capacity of the air compressor must be high so there would be enough air to push the water through the chosen tube, so the longer the tube is the higher the capacity of the used air compressor should be. The last parameter is the amount of power needed to run the air compressor; which in turns determines the size and the total power supplied by the solar panel.

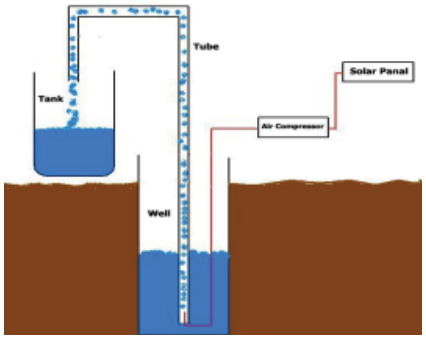

Fig. 1 The Proposed Renewable Energy Water Pumping System

To design an efficient pumping system, one should know the amount of water needed daily and the depth of the well (h) that water would be pumped from. The energy needed to lift that amount of water per day is approximately given by the multiplication of the mass of that water (m), gravitational acceleration (g) and the depth of the well. Then the energy needed from the solar photovoltaic module to lift that water per day would be equal to the division of the calculated energy needed to lift the water per day and the efficiency of the lifting system; which is in this case is the efficiency of the air compressor.

The amount of the energy supplied by the solar system per day is then equal to the calculated energy needed from the solar photovoltaic module to lift the water per day divided by the efficiency of the solar module. Finally the area of the solar module that would supply the air compressor to pump water efficiently is equal to the calculated amount of the energy supplied by the solar system per day divided by the average solar insulation in the area in which the system will be installed in, and the resultant is divided by the average number of sun shine.

The proposed system is implemented considering a solar photovoltaic module of an area of 2000 cm^2, insulation of 800 $watt/m^2$ and an efficiency of 15%, an air compressor of efficiency of 20% and a total air lifting system of 10% efficiency; the power received from the solar photovoltaic module would be equal to 24 watt and the effective power results from the air compressor would be equal to 4.8 watt. This means that only 0.48 watt of equivalent power would be available to left the water. Converting that power into joules per minute would be equal to 28.8 J/Min. The energy of 28.8 J/Min is used to lift a mass of water (m) form a depth of (h) (28.8 J/Min = mgh). If g=9.81 m/sec^2 and h=1 meter; that is the depth of the well, then the mass of the lifted water would be 2.93 liter/min. It has to be mentioned that the main advantages of the presented system is that it's environmental friendly; because there are no energy cost to pump the water; since all the energy needed to turn the air compressor on is coming from the solar panel and that it can be used remotely, since the tube is not exclusive for a specific well so it can be implemented anywhere and anytime with no complication. The economic cost of the system is be comparable or lower in price than other water pumping options; so it can be owned easily by anyone. The stored water can be used in many various ways; like irrigation, livestock watering and water supplying for remote homes and villages.

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An Effective Framework for Evaluating Academic Process (EVAP) of Dentistry Colleges

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Supervised by
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ABSTRACT

Manual evaluation process had always been an obstacle in dentistry colleges. Although Faculty of Dentistry at King Abdulaziz University has an efficient evaluation plan, they yet suffer from many problems in the administrative process. One of the most important problems is the manual administrative work of students' progress evaluation. This process is highly centralized and highly unsustainable, as a lot of paper-based calculations and document circulation are conducted by students, instructors and course directors.

Extensive paper-based evaluations add extra burden to the instructors in evaluating students. Instructors start by distributing the rubric to students to inform them about the objectives of the procedure. They also distribute the self-evaluation forms to students. Then, forms are collected and handed back to the course director to render grades. Finally, administration hand out forms back to students to monitor their own progress. Handling huge amounts of papers is exhausting and time-consuming process. Moreover, papers may get lost, which increases the risk of errors in student's grades. Also, data retrieval in this kind of process is very inefficient and sometimes an impossible task to perform. This inefficiency is hindering faculty and staff performance and their academic productivity, as well as taxing the time needed for actual teaching and research.

The proposed solution, An Effective Framework for Evaluating Academic Process (EVAP), is web-based platform for continuous evaluation in academic learning process in dental colleges. It provides a user-friendly and interactive automated system for students and instructors to communicate with each other. EVAP provides a decentralized and sustainable system designed to match the environment of dental colleges.

This system is empowered with statistical operations and decision support systems (DSS) to improve the learning process. They are visualized in simple way using diagrams. EVAP system provides customizable learning for each student with the help of DSS and statistics.

The system has renewed content. The course director (admin) can create the course, and divide the course into skills. Each skill has forms, a rubric and an exam. The admin inserts the content of the rubric, exam, and continuous evaluation forms, where students can re-evaluate themselves for an infinite number of times. Admin invites students and instructors to the course. Admin can also advise students by sending SMSs or emails based on results of the reports generated by the system. Moreover, EVAP allows students' involvement in the academic process. They can comment on the evaluation forms, report problems, write questions and answers on the course discussion pages shared with all course members. The flexibility of the system allows multiple instructors per course. Admin approves instructor to each skill of the course. Then, an instructor can assign an approved instructor to be an assistant. This type of expertise exchange would enrich the students learning outcome.

The sophisticated requirements brought a challenge to EVAP developers. Initially, developers constructed a prototyping methodology to ensure that the system is tailored around user needs by providing an instant method to measure user-satisfaction and gain their feedback. This step has been iterated until users were satisfied and their needs were defined. EVAP gain the acceptance from dental college in KAU from the header of accreditation Dr.sahar. Also the system satisfies the requirements of other colleges like ibn sena and dental college in abha. EVAP now do almost of the work explained in the previous, And now we work on the representation of the results.

The proposed automated solution (EVAP) is to be used by the College of Dental Medicine to perform all the administrative processes of monitoring students' grades and tracking their performance throughout the semester in order to facilitate the learning process and evaluation by faculty members. In contrast to the manual process, EVAP will provide a flexible, sustainable, user-friendly, and a decentralized alternative.

My Doctor: An easy and simple way to find your health service provider

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Supervised by
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ABSTRACT

My Doctor is an intelligent mobile application that eases the way people can use and follow to get the right health quality services using their smart phones only. My Doctor is an application that enables users to perform various tasks, which include, searching for any government hospital in the area and finding the necessary information such as the phone number and location. In addition, the application offers is the ability to book a medical appointment with different hospitals and specializations, by choosing the right date and time based on the doctor's availability. The booking can be done either in person or virtually using the camera integrated in the mobile device itself. Moreover, My Doctor application provides the users with an updated list of the international visiting consultants to UAE and enables them to book an appointment directly with the specific doctor based on their medical needs. The application interfaces with a main database constructed by the integration with the service providers' database, in order to provide the required information to the end users. The database is scalable and flexible; it means the service providers can edit their content whenever it is needed. The application is designed to work in any interface available. It is also bilingual.

Figure 1: Home screen of the application.

During the application development process, the project went through several stages:

- Stage one: identified the problem that needs to be addressed by this application.
- Stage two: identified the application's main modules and features.
- Stage three: Developed two prototypes and conducted a usability test to choose the most effective GUI design for the application.
- Stage four: implemented the design using GUI components.
- Stage five: Created a video to show the user interaction with the application features and functionalities.

Various technologies (tools) were used in implementing the application, and this includes:

- HTML5
- JQuery
- Photoshop
- Flash

Fig: 1 shows the home screen of the application. It contains the application's logo and the main menu that contains three main functions serve the user's needs. The functions are:

- The main menu
- Appointments
- Visiting Doctors.

Brain-Computer Interface for Controlling Wheelchair of Quadriplegia Patients

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ABSTRACT

Handicapped persons, especially quadriplegia patients, who have partially or totally lost the ability to use their limbs and torso due to illness or injury in the spinal cord are unable to use the conventional joystick of an electric wheelchair. Since for such persons the sensory and cognitive brain functions are still intact, their brain signals can be utilized to provide limited number of commands to control the motion of an electric wheelchair. For this purpose, brain-computer interface based on electroencephalography (EEG) can be employed to detect user's thoughts, feelings, and expressions and accordingly issue appropriate commands to the electric wheelchair motor controller. In other words, non-invasive brain-computer interface (BCI) technique can be utilized to provide direct interface between brain and computer in order to control the motion of the wheelchair as desired by the user.

The brain-controlled wheelchair system reported in this paper comprises of four main sub-units; brain signals detector or harvester, laptop, electric wheelchair and an interface unit, as shown in the block diagram of Fig. 1. The brain signals harvester consists of electrodes that are placed on the patients scalp and connected to signal processing circuits. In this project, we have used Emotiv EEG Neuroheadset with multiple electrodes. Data acquired by the brain signals harvester is filtered, amplified, and converted to digital form. The digital data is processed by laptop using special software. After processing the data, specific features are extracted and classified to determine the desired direction of motion. The command related to the desired direction of motion is then sent to the interface through a USB- serial RS232 port. The interface, equipped with Arduino microcontroller, receives the command from the laptop, interprets it and sends the appropriate signal to the wheelchair motor controller which in turn provides the right amount of power from the battery to each motor to produce the desired motion. Another important feature of this system is an Android App developed for automatic transmission of messages to the mobile phone of an assistant or relative to alert them about some difficulties faced by the user such as low-battery of wheelchair and significant displacement of brain signals detector. Furthermore, the user has the flexibility to remotely control the operation of lights and doors inside his/her home while sitting on the wheelchair. This feature is implemented wirelessly using two Xbee Modules. The system has been implemented successfully and has been tested under various operating conditions. The electric wheelchair used in this project was provided by Al Thiqah Club for Handicapped in Sharjah, UAE. However, the system can also be implemented with other types of electric wheelchairs. We are currently enhancing the capabilities of this system by using various types of motion and proximity sensors to provide feedback to the wheelchair system regarding its surroundings and thus the ability to avoid obstacles in the direction of motion.

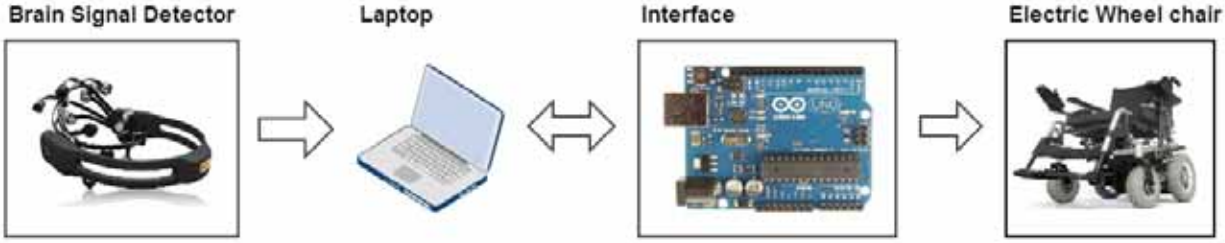

Figure 1: Block diagram of brain-controlled wheelchair system

xQuad : 3G Controlled Quadcopter

Mjd Odeh and Ala'a Waked

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Supervisor:
Dr. Mahmoud Al-Ayyoub

ABSTRACT

Nowadays, security and safety are top priorities for most people. For tasks requiring inspection or monitoring of areas that are not "human-friendly," robots present an appealing solution. 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. In this project, we propose to build a system that uses unmanned aerial vehicles (UAV; also known as drones) to perform the monitoring tasks. The control and coordination between these components will be handled by humans thousands of miles away using easy-to-use smart phone applications. The system we are proposing will be capable of monitoring large hazardous regions with minimal risk, cost and human effort.

The general goal of this project 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 UAVs, 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.

In this project, we focus on semi-autonomous systems that are very useful for certain tasks such as the scanning of (urban or rural) hostile regions, urban search and rescue missions (especially after natural disasters that render the environment not suitable for humans such as volcanoes), monitoring of large rural areas such as vast forests or long shore lines, inspection of industrial locations (especially nuclear plants) etc.

At the end of this project, we are expected to have fully-functioning UAVs. These vehicles will be equipped with the required hardware to complete their tasks. The following list contains the most important hardware we are using in this project are as follows.

- X550 Glass Quadcopter Frame 550 mm.
- MultiWii PRO Flight Controller w/MTK GPS Module.
- 4 Turnigy D2836/11 750KV Brushless Outrunner Motors.
- Turnigy MultiStar 30 Amp Multi-rotor Brushless ESC 2-4S.
- Turnigy 2200mah 3 Cells Battery.
- Power Distribution Board Lite.
- Arduino UNO board.
- Smart phone running the Android OS.

The users will be able to control these vehicles using easy-to-use smart phone applications.

EVote System: An Interactive Classroom

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ABSTRACT

Education is one of life's core bases. It is the most important concept to raise nations, also an essential requirement for economic and social success for societies all over the world. With the increasing presence of technology in our life, and the comfort of students using technology, it becomes essential to integrate technology with classrooms. Information and communication technology (ICT) is one of the ways which help to take the education to the next level, which we can call interactive level.

In traditional classroom, the communication between the lecturer and students is usually in one direction from lecturer to students. This lack of student participation results from several issues like the limited time provided for the lecture, the difficulty to interrupt the lecturer, the fact that many students would feel shy or unconfident about their answers. This passive learning would result in a difficulty in understanding many topics and that many students get bored and uninterested in the topic. Our project aims to simplify the communication between lecturer and students and enable the lecturers to follow up their students' understanding using simple individual assessment to monitor student's progress.

According to that, we have chosen to develop a voting system "e-vote". Voting systems are popular and powerful interactive teaching aid for use in all levels of education. They can make an excellent addition to the classroom learning experience, making learning fun, interactive, measurable and recordable. Classroom voting enables the lecturers assessing the impact of each lesson on both the individual and the group immediately and autonomously which enhance the education process and add many benefits.

In This Project we have developed an "e-vote" system: a web based application designed for academic use that creates an interactive e-learning environment in classrooms. The students can access the system via their laptops, tablets, or their mobiles inside the classroom, to cover all the activities which may happen during the lecture.

E-vote system is a web based application thus it can run on any operating system platform. The system has been developed using the .NET framework. It consists of two different interfaces for the lecturers and students. Some functions of the system are:

- The lecturer can upload the list of students in his class
- The lecturer can prepare online surveys and/or quizzes.
- The lecturer can use the system in real-time during the lecture to post questions to students and receive answers and feedback from students.
- The lecturer can use the system to monitor student progress and to receive the students' marks on a specific quiz and/or reports about students' activities during the whole semester.
- The students can use the system to answer a specific question and /or to send a message or feedback to the lecturer during the lecture anonymously.
- The students can fill surveys and see the results as graphs instantaneously.

E-vote system allows both students and teachers to exchange the feedback or comment for any lesson or activity in the classroom. The system mainly aims to break communication barriers between the teachers and students, increase the productivity and participation of the students and decrease the time and the effort required by lecturers.

We have tested the system using unit, integration and regression testing; and evaluated its performance using an online tool called "Kingdom". Overall the response time and the speed for the application are acceptable. We also evaluated the user satisfaction using a questionnaire that has been filled by students and instructors after using the system. Overall, the system achieves high satisfaction rate of both users.

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Health Social Network (HSN)

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ABSTRACT

In this project we intend to expand the concept of social networking and attach it with information retrieval (IR) and content based image retrieval (CBIR) so it includes the health and nutrition matters. The work in this project aims to build a network that is fully capable of providing nourishment advice to help people with certain chronic diseases take the right decisions when it comes to their health.
The propagation of Mobile devices and Web Services coupled with ubiquitous Internet connectivity lays down a strong foundation for the development of smart applications that facilitate our daily life.
The work in this project shows promising and exciting area to work in; as using a social network in health care is a hot spot with growing importance each day.

It is essential for people who suffer from certain chronic diseases like High blood pressure and Diabetes to carefully choose what they eat; so they will not have to face any kind of health disturbances. Nowadays, people depend on their smart phones in almost every aspect in their lives. Our project aims to engage the use of smart phones with a revolutionary application that is based on Content Based Image Retrieval (CBIR) and therefore acts as a mobile nutritionist to help them choose what is best for their health.
In CBIR various low-level features such as color, texture, shape, etc. are used for dis-similarity distance calculation. Low-level visual features (descriptors) are extracted from the images and stored in a database. Using such features, query by example (QBE) based retrieval performs relatively well for images.
With the help of camera in mobile device users can capture an image and perform content-based query operation virtually from anywhere.

People with sensitive chronic diseases like HBP and Diabetes need a minute by minute monitor in order to avoid any problematic kind of foods; as diabetics have to avoid certain foods with relatively high amount of sugar, and people who suffer from HBP need to avoid salty foods. Not forget to mention people who wish to avoid those kinds of diseases.

The idea of our application is based on using the camera of the mobile phone in hand to take a picture of the contents (ingredients) of a certain kind of food, and then using image processing techniques and the labeled images stored in database using CBIR, all the needed nutrition facts will be displayed to the user in order to help him/her choose what best suites their health condition. The problem arises when the patient is not sure of the amount of food allowed to be taken in every meal, along with deciding whether this particular kind of food is suitable for his/her health condition, and if so what is the right amount he/she has to take without worrying of the consequences.

Our application is an Android application that depends on image processing data mining tools to extract the desired information. Information retrieval is based on a large dataset that contains labeled images which can be extracted based on their content. The system is based on image processing techniques. The user will use the built-in camera in his/her smart phone to capture the ingredients of the meal being prepared or the meals listed in the menu in any restaurant (if there provided a description of ingredients) and the application must be able to process the image or the text available and provide a full description about the meal with all the needed nutritional information (e.g. calories, fat, carbohydrates, cholesterol, dietary fiber, sugar).

The system shall be able to cover all the process from the instant of capturing the image of the foods' ingredients till the user receives the nutritional information needed and be connected to the physician and nutrition responsible.

Processes include logging in, image or text processing; maintaining the user's needs based on certain information provided by the user, all the nutritional updates and all the recommendations needed.

Medical Smart Card

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Supervised by Dr. Lamia Berriche

ABSTRACT

Health care system is one of the important sectors in any country for its national interest. Saudi Arabia has spent billions of dollars in improving the quality of its health care. However, it still suffers from several problems especially in electronic patient records managing. Health care providers in Saudi Arabia have different information systems for keeping and managing patients records. As a result of this variation, patient medical records have become scattered in different medical centers with no one provider having the complete patient record which is a problem. Due to the significant role that smart cards are playing in medical record keeping and managing we decided to develop a Medical Smart Card (MSC) for maintaining patient medical record.

With the MSC, patient medical record can be retrieved at any time which reduce the long procedures of finding and checking the patients file while moving from one medical center to another. MSC encompasses patient personal information such as name, age, gender, and blood type as well as emergency information such as allergic, chronic diseases, emergency contacts..etc. Patient medical and personal information are secured with PIN while emergency information is accessible by everyone. The MSC system has two parts both are implemented. The first part is smart card programs, these programs are used to initialize the smart card to be function as a doctor or patient card. The second part is terminals (desktop applications), we have developed two terminals issuer terminal and doctor/patient terminal. Issuer terminal is used to personalize patient and doctor cards. Doctor/Patient terminal allows patients to access their medical record, modify their information, schedule appointments..etc. Also, it allows doctors to access and modify patients' medical record easily. Figure 1 shows the interaction between MSC subsystems.

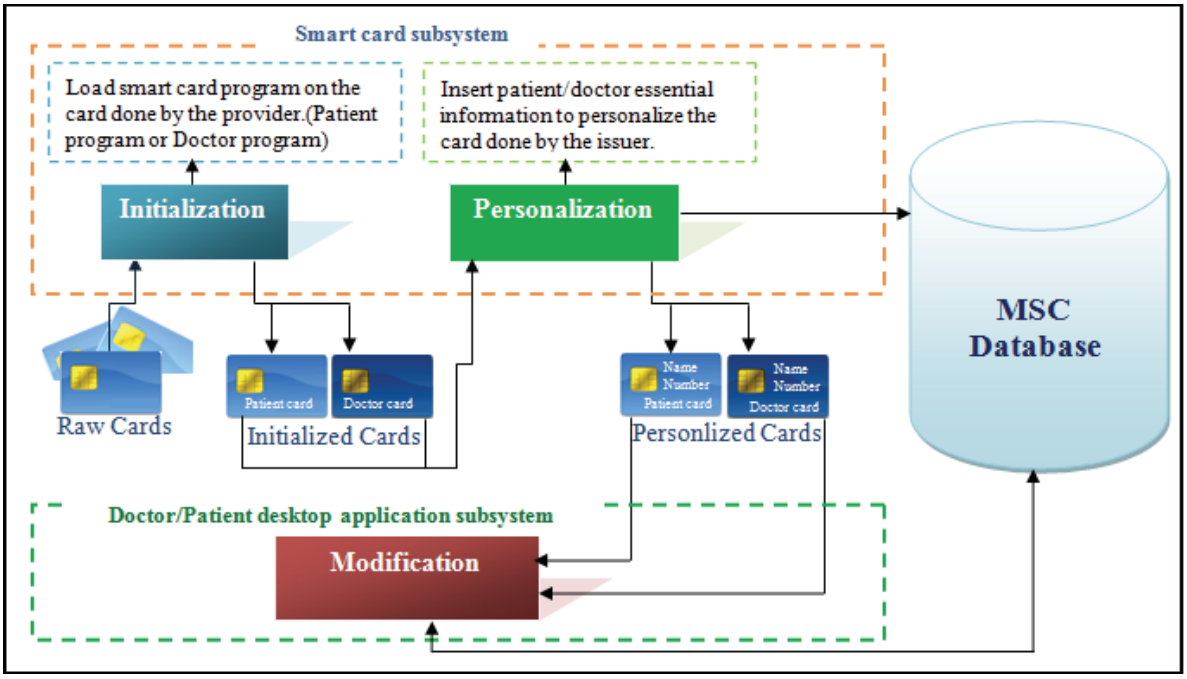

Figure 1: Subsystems interaction

MSC will be useful in many situations especially in emergency situation when the patient is unable to answer the doctor's questions for whatever reason then the MSC could be a life saving. MSC allows best use of technology

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Virtual Lost and Found Box

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Supervised By :
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idea by: Ms. Noura AlOmar and Ms. Wee'am AlRashid
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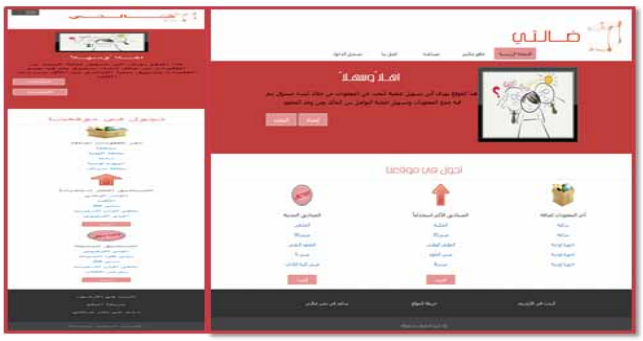
ABSTRACT

Nowadays, the Internet plays a large role in our lives to facilitate the communication processes between people. It became necessary to integrate the needs with the possibilities offered by the Internet. This possibility is the base idea of "Virtual Lost and Found Box" where the site is intended to facilitate the communication between the finder and the person who lost the item. Our system will also provide a means of facilitating the creation of custom Lost and Found Boxes that are relevant in certain context or during a specific event. The system will also build an archive of unclaimed items that is searchable using several relevant criteria. Finders can submit the items they have found and claimer can search for found yet unclaimed items and claim them. It also gives box creator the ability to build and publish a virtual lost and found box specific to a certain location or event. It will also give the chance of users to claim items, ensuring they really own the item, and communicating with the item finder. When we search for similar systems in Arabic language, we found a very limited number of websites that support Arabic. Also, there are a very limited number of lost and found boxes that provide security to the finders by hiding their information. In other cases, the website allows the finder to post the picture of the found item that will enable anyone to claim the found item even falsely.

Our system is as a rich internet application that employs many advanced web technologies including HTML5, CSS3, Ajax, PHP, and so on. In addition to a user-friendly interface, our website boasts a Responsive Web Design that makes it accessible through both desktop computers and mobile phones.



The system will give Multiple Choice questions and the user will choose the model answer. If the item does not belong to any box, the user has to sign up and create L&F box. Afterwards, when a user searches for a lost in the Lost and Found box by keyword or the nearest box, when they find a similar item to what they've lost, they are requested to answer the questions in the quiz. If they answer all questions correctly, they will be provided by a contact form that enables the user to contact the item finder without knowing the email and/or mobile phone number. Using this way, we ensure they communicate without disclosing any vital information of both parties. When a lost item exceeds 3 months without being claimed, the item will be archived.
The system shall be able to run fast which means the response time must be short to ensure quick access to the system, will provide roll-back technique if a process was interrupted, and will have its own security settings.

Usability Framework for Universities Websites

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ABSTRACT

This paper proposed a usability framework of universities' websites. The framework comes from an in-depth analysis of top ten universal universities' websites and the worst ten universities' websites plus previous research about usability tests and standards for websites. The framework has been applied to websites for two famous Universities. The results showed that the universities' websites has some problems in usability, which affects the communication between universities' staff.

Usability is quite an important and hot issue in Internet technology. This importance is obvious in the universities' websites. If a university website is usable to both students and staff, it becomes an effective communication tool between them. This will enhance students' performance as it reduces the waiting time for a teacher's response or answers to students' queries. Also, the high usability will save the teacher's time interacting with students physically, raising productivity in preparing and producing effective lectures. In other words, enhancing usability will have a positive impact on both students and teacher satisfaction.

The framework built to introduce website usability guidelines contains eight main usability guidelines; homepage, color, links, graphics, navigation, match between system and real word, help users recognize, diagnose and recover from errors, visibility of system status. Where under each main guideline there are specific guidelines.

After applying the usability guidelines for both universities website, results showed that both universities are not applying all standard usability guidelines because they suffer from bad practices of design, which affects the usability and accessibility for them. Thus, Website usability is a very important issue that must be taken into account in the web design process.

RFID Electronic Inspection System

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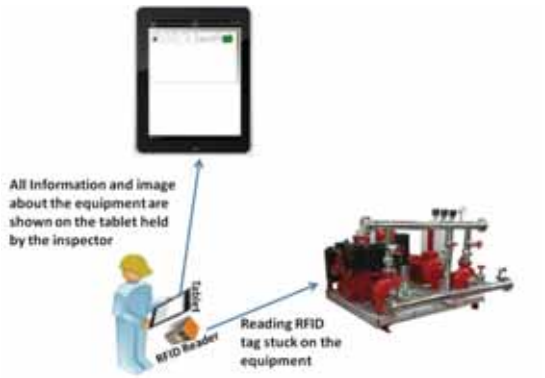
ABSTRACT

Inspection has become an essential part of many entities whether in private or governmental sectors. It is the means of rejecting nonconformities and assuring good quality products. In some entities such as civil defense and ministry of health there are some types of inspection that checks the installed equipment to make sure that the installed equipment are the certified ones by these entities, usually this type of inspection is a manual and traditional process, which take long time and needs big numbers of inspectors to finish the required job.

Traditional approach used Labour-intensive methods that resulted in the increase of productivity lead time and cost. Moreover, there is a significant delay in detecting an out of control limit. Thus the products that are not conforming to the specified standards accrue to the harmful results, especially in the case of medical equipment , or firefighting equipment. The advent of technologically updated inspection equipment helped to overcome the problems associated with traditional approaches.

The proposed system for such problem is an electronic inspection system using tablet and Bluetooth Mobile RFID Reader. The entities who perform the inspection will supply RFID tag to the certified suppliers to be stuck on the certified products, these tags will be registered on the entity's database portal and each tag will have all information about the certified products, its image and any other required information.

Once the equipment installed, the inspector will visit the site for inspection and read the RFID tags stuck on the equipment by the mobile RFID reader, once the tag is read the information of the product will be retrieved from the database of the entity conforming to the RFID tag serial number to be shown on the tablet, these information will be as example (the name of the supplier, the location where the equipment supposed be installed, the specification of the installed product, image of the product, is it new reading or duplicated reading, if it is duplicated reading, then where it has been read before. After the approval, the inspector will electronically certify the product(s).



The system has been tested successfully and found to be efficient in speeding up the inspection process, time required for inspection and accordingly reducing inspector numbers and costs. The RFID reader can detect equipment's installed in high or critical locations up to the distance of 5 meters. Moreover increasing the number of visited sites in shorter time with paperless environment. However, RFID reading range depends on the environment, It is difficult for an RFID reader to read the information in case of RFID tags installed in liquids and metal products. The problem is that the liquid and metal surfaces tend to reflect the radio waves, which makes the tags unreadable. The tags have to be placed in various alignments and angles for taking proper reading. This is a tedious task when the work involves big entities. Also, ceramic tags can be used but it's expensive and it will result in increasing the cost. Moreover the inspector has to point and align the reader toward the tag to avoid more than one tag respond at the same time.

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Mobile DAD (Depression and Anxiety Disorders) Tracker

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Supervised by
Dr. Lamia Ketari

ABSTRACT

Recent studies reported that mental illnesses are widespread all over the world, and some of them found that the Middle East, including Saudi Arabia, has high rates of depression and anxiety disorders. The most common mental diseases are anxiety and depression. Many studies showed that these two mental disorders have a significant negative impact on a person's family and social life, learning progress, and career performance. Unfortunately, most of mental illnesses are under-treated in Arabic countries because of the lack of awareness of mental illnesses. Also, the sigma against people with mental illness is extremely common in Arabic culture. These two facts constitute the most important obstacles that lead to late diagnosis of these diseases, hence requiring therapeutic intervention with medication.

Since "prevention is better than cure", we propose to develop a user-friendly Android mobile application, DAD (Depression and Anxiety Disorders) Tracker, that will act as an early warning system for users who show persistent symptoms of depression and anxiety diseases.

DAD Tracker targets native Arabic speaker users (adults) with different knowledge levels. Data is collected while monitoring the user's mental health on a regular basis (2 weeks). The user should fill two questionnaires, PHQ-9[1] and GAD-7[2] used by professionals that respectively measure the anxiety and depression symptoms. Based on the user's answers, two scores will be calculated: one to measure depression and and the second to measure anxiety. The scores are then analyzed, according to standards used by professionals, to evaluate the user' mental well-being by determining the anxiety/depression disorders severity levels. Results will be displayed as graphics and/or charts that show different changes in the user's mood over the time.

The software technologies used for the implementation include the Java language, Android SDK, and SQLite for the database. DAD Tracker is currently under development and the results so far are very promising. It will be evaluated by real cases and monitored by professionals to make sure that the application achieves its objectives, and it is free from errors and bugs.

We hope that DAD tracker will greatly contribute to raising awareness of the importance of mental health among the population in the Kingdom of Saudi Arabia, and the Arab World in general, as well as enriching the Arabic content by providing a mobile application with Arabic interface.

[1] The Patient Health Questionnaire (PHQ-9), [Online]. Available at: http://www.cqaimh.org/pdf/tool_phq9.pdf. Accessed March 2014.
[2] Generalized Anxiety Disorder GAD-7[Online]. Available at : http://www.gpscbc.ca/system/files/MH_GAD-7_screening.pdf. Accessed March 2014.

Global Village e-Rental System

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Dubai, UAE

Supervised by:
Dr. Jehad Alnihoud and Dr. Ahmed Al-Gindy
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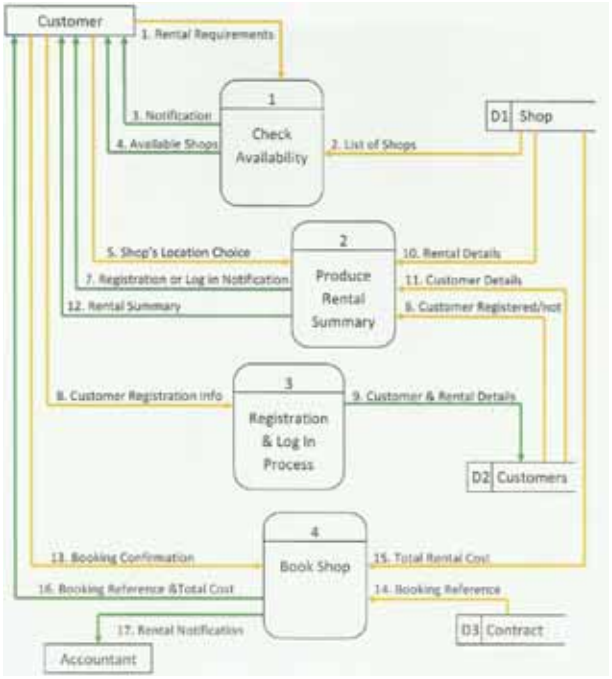
ABSTRACT

Global Village is Dubai's most exciting and unique annual tourism and cultural destination. It offers a vast selection of multicultural entertainment and retail options. It is the region's leading family outdoor entertainment destination. The theme park offers a vast selection of multicultural retail options represented in 38 different pavilions which gathered heritage, excitement and unforgettable shopping experience to millions of visitors.

The proposed system helps customers to be a part of the rapidly developing technologies, where they can find the desired retail shops, register information, and submit request forms with the necessary requirements without the need to physically approach the company premise which consumes time, effort and resources. Customers will have all relevant options of booking, payment, cancellation & many other facilities online.

Customer enters their retail shop specifications with required location, estimated size and expected period**,** therefore the website will respond with either entered criteria is not found or with the list of other available shops indicating the cost price and available duration. Customer chooses from the given list and confirms reservation by providing personal information to complete the registration process. Booking reference number will be provided to customer to proceed with payment procedures. After completion of rental process, a rental notification is created to both ends customer & global village authorities.

A prototype of the proposed system has been implemented and tested successfully, four pavilions have been used in our prototype in order to make the coding & testing processes easier and also to overcome the time constraints which may occur. The proposed system provides flexible retail shops checking options, easy reservations as well as advanced tracking options available 24/7. 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.



6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

CCIS-R: College of Computer and Information Sciences Academic Research Repository

Doaa Al-Hakami, Rasha Al-Qahtani, Afnan Al-Drees, Sua'ad Alain, Lamyaa Al-Tuwairqi

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Supervised by
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ABSTRACT

Higher education institutions play an important role in building a knowledge society and local economic development. Research has equal importance as academics to the mission of an institution. The College of Computer and Information Science (CCIS) at King Saud University (KSU) aspires to achieve excellence, creativity and innovation in education and research. To meet its goals as a research institution, CCIS founded 6 research groups, on different areas of knowledge, to promote collaborative work and research activities among its 4 departments: Information technology (IS), Computer Science (CS), Software Engineering (SE), and Information Systems (IS). The research groups are: Software and Knowledge Engineering Research Group (SKERG), Communications and Networks Research Group (CNRG), Computational Intelligence Research Group (CIRG), Data and Knowledge Management Research Group (DME), and Islamic Applications, Web Technologies, Arabic NLP (IWAN), and Bioinformatics Research Group (BioIng). By placing annually hundreds of scholarly papers at reputable conferences and journals, faculty members contribute significantly in promoting CCIS efforts to provide excellence in academic research.

To increase the local and global visibility of CCIS research groups and their achievements, we propose an Academic Research Repository (ARR: R) that promotes the research activity of CCIS faculty members, research groups, departments, and the College as a whole. Mainly, the system will provide the following features:

Centralized storage: A central database will store all faculty members' research publications based on their affiliation (department and research group). Faculty members will be able to input their research publications, upload full or partial (abstract) content of their papers depending on the publisher agreements, and keep their publications up-to-date.

Easy Access: CCIS-R will provide access to publications lists for each researcher, making it easier not only for external visitors to gain access to information about CCIS researchers and their scholarly outputs, but also for all CCIS faculty members. Publications can be browsed by department, research group, and publication details.

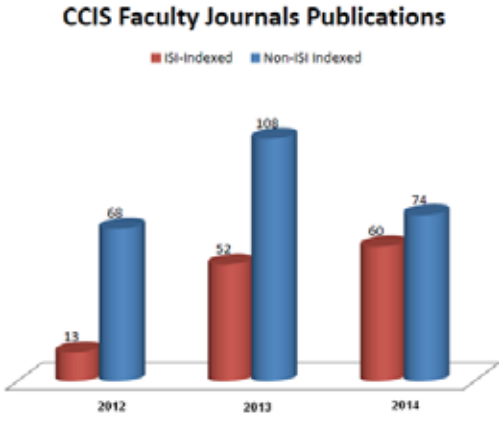

Figure 1: Sample of CCIS-R System Statistics

Reports generation: The system will generate reports to provide some statistics (Figure 1) about the most active researcher/department in publishing papers, and number of papers published in conferences or journals for a specific year. Also, the system should allow the generation of the annual magazine of faculty members publications.

Local and global visibility: CCIS-R will provide a mutual publications visibility between researchers that belong to different departments, which is not the case currently. Providing an open access to the global academic community leads to increased local and global visibility of the research being carried out at CCIS, KSU.

The software technologies used to implement the system include Apache Web Server, MySQL, and PHP. CCIS-R system is currently under development.

We hope that CCIS-R will greatly reflect a positive image and reputation of King Saud University and its educational and research activities while providing the local and global community with an enriching experience.

Automated Parking System

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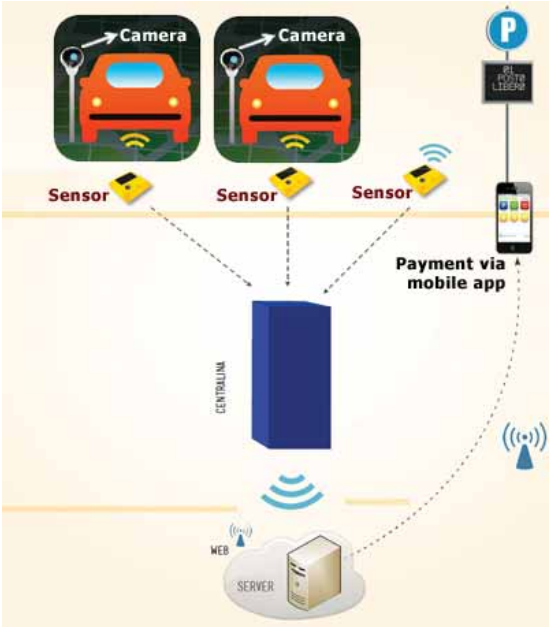
ABSTRACT

Paid parking in the country is based on manual and traditional inspection process where the inspectors have to visit the parking area and check all parking spots one by one to give fines for violators. Inspectors may not cover all the assigned areas which leads to drivers paying for first hour and then stay more than one hour without payment or even not paying at all.

Moreover the payment process for those parking areas are impractical, where the driver should walk for a distance to the payment machine in order to get a ticket. Drivers might face technical problems with the payment machines such as missing cash box or running out of coins which sometimes happen to all of us. Add to this the crowded areas or the only available parking spot where they cannot move the car to somewhere else to avoid those technical problems. Likewise using SMS for payment will require the driver to visit the payment machine for area code.

The proposed system "Automated Parking System" consists of two parts. Application for driver's smart phones here denoted by software application and sensor with camera connected to each parking spot here denoted by hardware system. Each parking spot will have its unique number, the sensor will detect if the spot is occupied and accordingly the camera will capture the car plate. The hardware system communicate with an application that connect directly to a centralized database to verify whether the payment has been made or not for the concerned parking spot. The drivers have to use the software application in their smart phones for payment. The software application can locate the parking area where the driver parked the car, and read the estimated required number of hours entered by the driver to help other drivers in crowded areas to locate the empty parking spot.

For Example, The driver will park the car in parking No. 12 at area No A205, the sensor will detect the car and the initial time will be registered and stored in the centralized database as "car in" equal 05:20. Accordingly, the camera will capture the car plate to be also stored in the database. The software application in the driver's smart phone will locate the parking spot via GPS. Once the driver wants to leave, the application will calculate the time, and show the due amount that the driver should pay. Also the new system will give option later payment with a certain time.



Code Smart "Web Intelligence"

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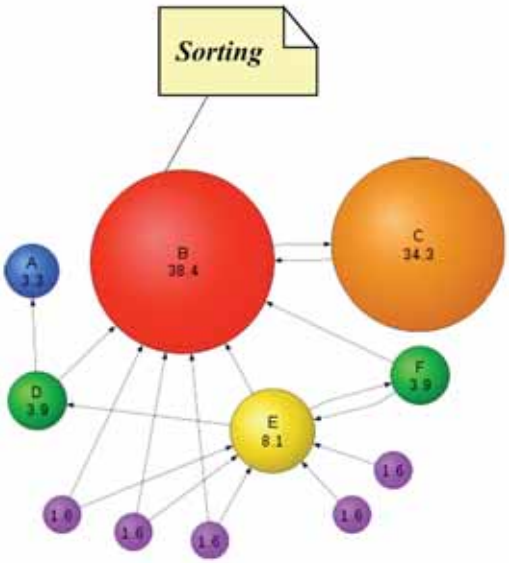
Supervised by :
Dr. Mostafa A.Salama, TA. Noha Hesham

ABSTRACT

Code Smart proposes code for a search engine that would assist developers to retrieve data related to wide range of programming languages. The main characteristic of this engine is its ability to accept and search for an uploaded code snippets on web. Moreover, it detects and enables the user to select the programming language of these code snippets. Current engine may fall in the retrieval of semantically unrelated code snippets to the required problem or the required programming language. The project idea was inspired by the fact that developers experience a hard time when searching for a specific code or resolving errors. Moreover, the results of any general purpose search engine are not precise, trusted or reliable, which are features that are associated with Code Smart. Code Smart is intended to provide developers with a set of hyperlinks that are considered to be the most relevant based on the search results and as such optimize each search to the best possible ranking and trusted website by assigning the top view for the specific search given.

The crawler in the Code-Smart engine searches for the title, description and other different attributes in each retrieved link. The links will be categorized according to the language used in each page and according to the domain problem. For example a link may contain a java language program that implements the heap sort algorithm. This will ensure the efficiency in retrieval time and will ensure the accuracy of retrieval of relevant links. The links in the data base will be saved in this categorized form and ready for retrieval. Since it is likely that more than one page contains the searched string, so the search engine starts calculating the relevancy of each of the pages in its index to the search string. In each category, the links will be ranked according to the number of visits and according degree of the relevance of the page to the problem and the language. Figure 1 shows the categorized links {Category A, B, C, ... } and the correlation between each category. The ratio of the number keywords related to the language and the domain problem to the total number of words in the page is calculated. The relevance of the links to the language and the domain problem is measured through this is measured ratio.



The last step in the search engine activities is retrieving the best matched results. In this step, the Euclidian distance between the terms in the user's query and the stored terms in each link is calculated. The links with the shortest distance is retrieved. The stored terms for each link are the keywords for the categorized language and domain problem. Finally, the highly related and retrieved links are displayed to the user. The Code smart web site membership saves the user searching profile, this to increase usability and flexibility for in-depth locating of the required code snippets. For example, php-web developers are always looking for php-codes and templates. Also php-web developers who are working in the marketing fields may search for code snippets related to marketing like predicting the user's needs of specific goods.

Finally, the retrieved code snippets are like any retrieved documents from any search engine where the possibility of plagiarism exists. Except the fact of adding on the existing code snippets and developing extra feature from different places around the world is a requirement in the programming field.

Augmented Reality Piano

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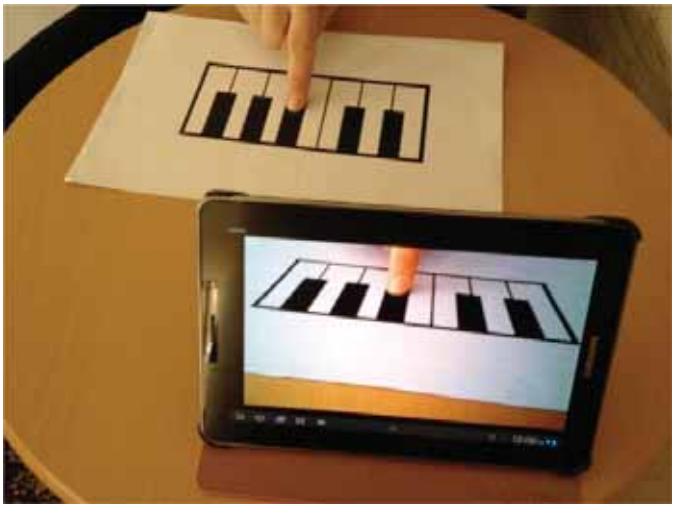
ABSTRACT

Augmented Reality Piano is an Android mobile application that utilizes real-time image processing and pattern recognition to provide simulated functionality to a hand drawing of piano keys that is made with a typical marker. A piano keyboard is drawn with a thick marker on paper, and the mobile phone is set in an angle that gives optimum view of the piano when the camera is turned on. When the app is started, a camera shot of the piano, without the presence of hands or fingers in the view, is taken. The user can then start playing on his drawn piano. The app detects keystrokes, decides which key was pressed, and plays the corresponding tone.



Musical applications on mobile devices are often hampered by limited screen sizes, which can only allow a small number of keys and a similarly small space for playing them. The inclusion of an externally connected keyboard allows for a more convenient and ergonomic input peripheral for the musical piece to be played, along with an increased space for keys. In light of this, and to maintain the mobility associated with the devices in question, a paper keyboard can prove to be adequate, as it can be easily carried around and even redrawn if needed, and no charging, wired connections or internet access is required.

This project aims to allow mobile devices to make use of paper keyboards as alternative input devices by utilizing image processing techniques such as border following techniques and skin detection to recognize paper keyboards and user keystrokes. The application captures frames and detects the piano keys by thresholding the frame to separate white and black objects and check for polygonal shapes that resemble a key. After the keys are detected skin detection is applied to the frames to detect the presence of fingers and which key it overlays. A set of fingertip location comparison rules determines if the key is being pressed, and when it is, a note is played. Currently, only a single key-press at a time is detected, as support for simultaneous key-presses is still under development.

The application makes use of the OpenCV library, which is employed for the image processing and computer vision tasks. Since the application targets the Android platform, a Java program is used to port the C++ code to Android. The application proved that it can work with very good performance; correctly identifying the keys and playing the notes in a variety of conditions. The implementation of skin detection techniques helps discard shadows casted on the piano by differentiating between skin and shadow colors, thus improving the accuracy of key-press detection.

The E-Announcement

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Supervised by
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ABSTRACT

Nowadays, communication is growing so fast and enabling spread of information through networks in a very fast trend. However, in some cases the current communication methods may not be sufficient. For example, if a user needs to send a message to the guests who will come to visit his office while he is away. What if he cannot leave a prior message on his office door or he suddenly wants to change such message?

Here comes the importance of The E-Announcement project. This project combines an Arduino platform with a GSM shield, LCD screen, camera, microphone, and a mobile device. The user will be able to send a message from his mobile using developed android software to the Arduino through an embedded GSM shield. The received message will be then displayed on the screen attached to his office's door enabling a real-time delivery. The camera and the microphone that are attached to the same screen will help any guest (i.e., the guest who come to the user's office and didn't find but the screen attached to the door) to leave a message too. So if the guest wants to leave a message that he passed by, he will simply push a button and look to the camera to record his message, which will be then sent to the user directly through the GSM shield as a video message.

The main aim of the project is to enable an announcement system that is really practical, effective, and supportive in our daily basis. This project will be very helpful to the users, whose mobile number are confidential and can't share their number with all people. In addition, using internet to announce something is not always useful unless all the expected receivers have internet enabled devices at the moment.

In our proposed project, the Arduino Mega 2560 is the main component of the project acting as the brain, which has the micro controller and the rest of the components are connected to it. GSM shield is placed on top of the Arduino board covering its left half. The rest of the components are connected to the other pins of Arduino board through a breadboard. Away of these components, we have developed a mobile application, through which the user types his message and then send it. The GSM shield receives this message and the Arduino Mega displays it on LCD screen. Finally, if the guest wants to leave a message too, he will simply press a button and record the message, which will be sent back directly as a video message to the user.

The main advantage of the project is its ability to deliver real-time messages from the users in an easy and effective way to the known and unknown guests that may visit his office while keeping the user updated with any feedback from them.

French Class: A Language Assistant

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Supervised by
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ABSTRACT

Nowadays, learning new languages is not luxury anymore; in fact it becomes a mandatory and necessary skill in any developed community. We are here focusing on the French language, which is one of the hardest languages to learn especially for the primary stage school students. This challenge becomes more sever for those students who do not have parents aware of this language. They face problems in grammar, vocabulary, pronunciation, dictation, comprehensions, in fact everything.

On the other hand, everything we use in our daily life is electronic. We contact each other through e-mail, texting, video calling, we read the paper on tablets, books are e-books, we play games on computers and mobile phone and specially that google claimed a year ago that people activated half a billion Android devices. Young generations become more and more familiar to such devices. The idea of using tablets, tabs, and mobiles become more attractive to learn and study new languages. Current applications like “Duolingo” and “Babbel” are mainly designed for adults helping them to learn some words in specific situations. These applications have aren’t strong enough to help someone to speak in a conversation or to deal with grammar or developing the writing skill.

Here, we are developing a new android application called French Class to help student to learn French. In our proposed project we develop a new tablet-based application to assist the student to enjoy learning French through helping him to learn grammar rules and exceptions easily through examples and videos. The application pronounces vocabularies and helps the students to grasp right accent. It also provides dictation electronic environment, where the dictation is cited through clear controllable voice, while the student types the words in an edit box using the keyboard. The dictation is then corrected through the application. The application also helps the student in comprehension and teaches him through many practical examples. We are using the official school’s primary level French curriculum into our application to provide a real help to the students in learning their courses and providing an interactive way to study their lessons. It is worth to note that even adult people can uses our application to learn French from scratch. The proposed tablet-based application promises to turn French education into an interesting activity and resulting in a better use of recent technology in modern education.

Mobile Controlled Bomb Detection Robot

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Supervised by
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ABSTRACT

Nowadays, the number of security threats is increasing exponentially imposing a real challenge on the whole community. Explosions at security check points become a particular general incidence. In these check points the problem of smuggling bombs, weapon, and other illegal materials impose a real danger to the lives of the security team and all the people around. Currently, security team member simply utilize mirrors, dogs and electronic devices to detect and alert at the presence of bombs and illegal materials. In fact, this scenario put the life of the security members and everybody around into a great danger. What if we can invent a method to help the security team to do their check remotely, safely and easily?

By using modern open source tools and circuits to operate remotely, we propose in an Android based controlled car for bomb detection. The proposed project promises to minimize the risk factor to its minimum value by enabling the detection of bomb remotely through a robot vehicle controlled by a mobile device. The robot is also equipped by smoke detector microphone, and camera for real-time video streaming, which will give the security team a full capability to analyze critical situations without imposing lives to real danger.

The robot is fully controlled through an android-based application hosted on a fast processor mobile device that can receive a real-time video stream from the robot in addition to the ability to receive smoke signal. Nevertheless, the robot will be able to detect bombs through the special dedicated sensor adopted on its board. The robot combines Arduino mega programmable microcontroller, a 4 wheel motors car, driver for four motors and two ultrasonic sensors for obstacle detection. The robot is built upon an open architecture that can host other detectors like metal detector for mine sensing. The developed robot will not only emerge in the daily security dangerous routines, but will also safe lives.

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Selective security architecture For Mobile device and it's implementation over SSL

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Supervised by
Dr. Abdullah M. Almuhaideb

ABSTRACT

The advanced capabilities of mobile devices (MD) allow mobile users to pay for products, surf the internet, buy and sell stocks, transfer money and manage bank accounts on the move without being restricted to a specific location. However, mobile security is still a challenge, as most of the security approaches are designed for the desktop computers using wired network, and afterwards they are employed in securing wireless communication without taking in to account the mobile device (limited power supply) and wireless systems (lower bandwidth and the less reliability compared to wired networks) limitations. This research project first identify challenges in mobile environment research and then proposes practical solution to maintain the balance between efficiency and protection to secure mobile communication.

The Mobile Device challenges and limitation can be classified into four different categories. First and second challenges are mobile devices and wireless systems as they inherit some limitations that threaten the information protection system. The third challenge comes from some security protocols such as the popular network layer protocol IPSec and the transport layer TLS/SSL protocol. As they are designed for wired network and afterwards they are employed in securing wireless communication without taking in to account the MD and wireless systems limitations. The fourth category is about the recipient, which is the server that does not provide a mode or a proxy for connection that is designed for mobile devices display. These challenges should be considered in designing MD security protocols for a better security performance.

The proposed architecture balances the security with the performance via the objectives of sensitivity and performance awareness. The solution can be integrated into security protocols to provide an efficient and secure mobile communication. Applications are provided with an interface for selectively securing information at different levels of protection. Our architecture makes use of both the information sensitivity and MD capabilities performance levels classifications in making a intelligence tradeoff between security and performance. The proposed technique meets strong security requirements for more sensitive information, while trading off security for better performance for less critical information.

In order to realise the architecture, as a possible application, we outline the integration over SSL protocol to demonstrate the flexibility features that improves the protocol security performance. The proposed architecture adds more flexibility to security protocols; hence it can better satisfy diverse security requirements in different application scenarios, especially for emerging mobile applications.

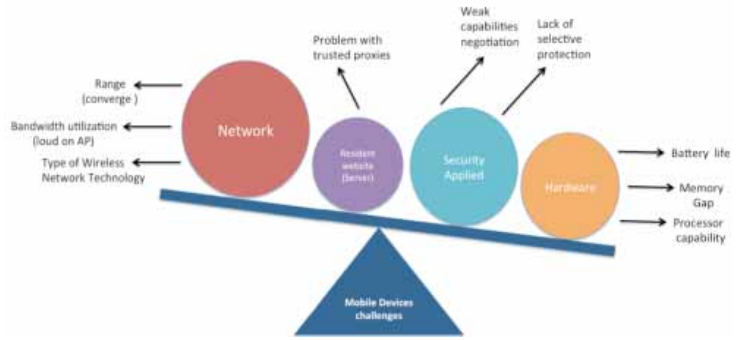

Figure 1. Illustrates MD challenges.

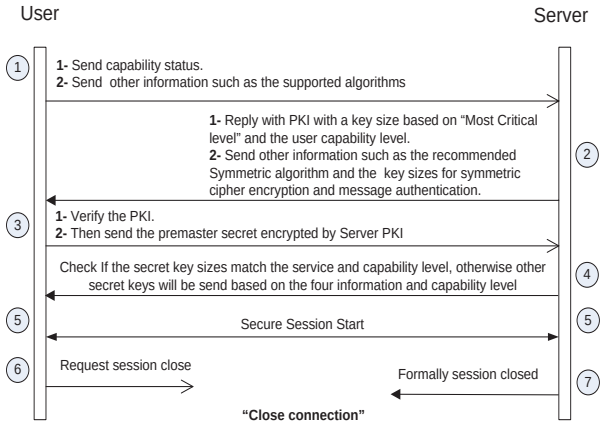

Figure 2. Illustrate the design implementation over TLS/SSL Protocol.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Developing Interactive Applications for Autistic Children Using Humanoid Robots

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ABSTRACT

Autism is well-known for being a neural development disability that affects the ability of communication, the ability of understanding and expressing emotions and the ability of interaction socially and physically with others. It has a highly genetic basis and no known cure exists for the disease. The main goals when treating children with autism are to lessen family distress and to improve quality of life and functional independence.

Autistic children interact more with technology and humanoid robots. On the other hand, autism specialists have difficulties in keeping autistic children motivated and focused. Using humanoid robots, autistic children are motivated to communicate more and express themselves more freely. The Aldebaran NAO, a humanoid robot, is the perfect means to bridge the communication gap that hinder the life of autistic children. Through application development, NAO robots can give children and families a more autonomous, and thus better, life. Specifically, the NAO humanoid robot has been shown to increase comfort levels in class and produce positive social interactions[1]. In this paper, an interactive learning system for autistic children is proposed. All interactive applications are developed for the NAO H25 robot. More specifically, six different applications are developed: NAO Says, Eye Colors, Guess my limb, Guess the sport, Learn the card and Find the card. These applications were developed with the consideration of user friendliness, being educational and interactive and being intuitive and responsive. More specifically, the project aims at developing an interactive learning system that can be used in autism treatment with a core focus on the Aldebaran NAO humanoid robot. The robot selection is mainly motivated by the robot advanced capabilities including a variety of programming languages that can be used to program the humanoid robot along with a rich API library that supports facial recognition, text-to-speech, speech recognition (with support for both Arabic and English languages) and motion control libraries. All these features helped in building very sophisticated applications that offer a rich experience to the children. Moreover, the system can remember any child by their face and can associate a name with that face. This functionality allows it to create experiences tailored to the needs of specific children. Additionally, the system can use its ability to recognize individual children to help them communicate with their care takers via communication cards. When a child displays a communication card to the robot (such as a bathroom card), the system can notify the care taker to the need of the child both verbally and electronically. This project is considered to be the first of its kind in the region; especially that it is targeting the region by supporting the Arabic language. It can be fully utilized in educational institutions and care centers as a treatment and assistant to the teachers in those centers. This project has truly revolutionary implications in improving the well-being and life quality of autistic children.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

An Academic Planner Mobile Application

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ABSTRACT

This report discusses the design and implementation of a mobile phone application, known as the **StudentAssistant**, which helps students to organize their per-semester activity schedules and estimate the academic performance required (in terms of grades) to achieve a specific *cumulative grade point average* (CGPA) at any given stage of their program of study.

This project was undertaken as a result of a survey carried out among AlGhurair University (AGU) students to identify any difficulties they may have in terms of managing their academic progress. Apart from the need for greater flexibility in *timetable customization* (which the **StudentAssistant** can assist in providing), the results of this survey also revealed that – in the majority of cases – students were not familiar with the procedures for calculating CGPA scores based on the grades received for the courses they have completed. Due to this lack of familiarity with CGPA scoring protocols, a large number of the survey respondents indicated that they lacked the necessary resources to [i] verify the accuracy of the CGPA scores listed on their official transcripts and [ii] determine the grade profile needed to reach or maintain a specific CGPA score. The current implementation of the **StudentAssistant** – which has been specifically configured for AGU undergraduate students – allows the user to download a copy of his/her transcript from the university's online database and then modify this locally-stored copy in order to predict changes in CGPA scores given a projected performance for some future semester. The screen shots in Figure 1 illustrate a typical scenario whereby the application calculates the solution (i.e. change in CGPA score) for the "what-if" scenario in which the user plans to get a "B" grade in a specific course in a coming semester.

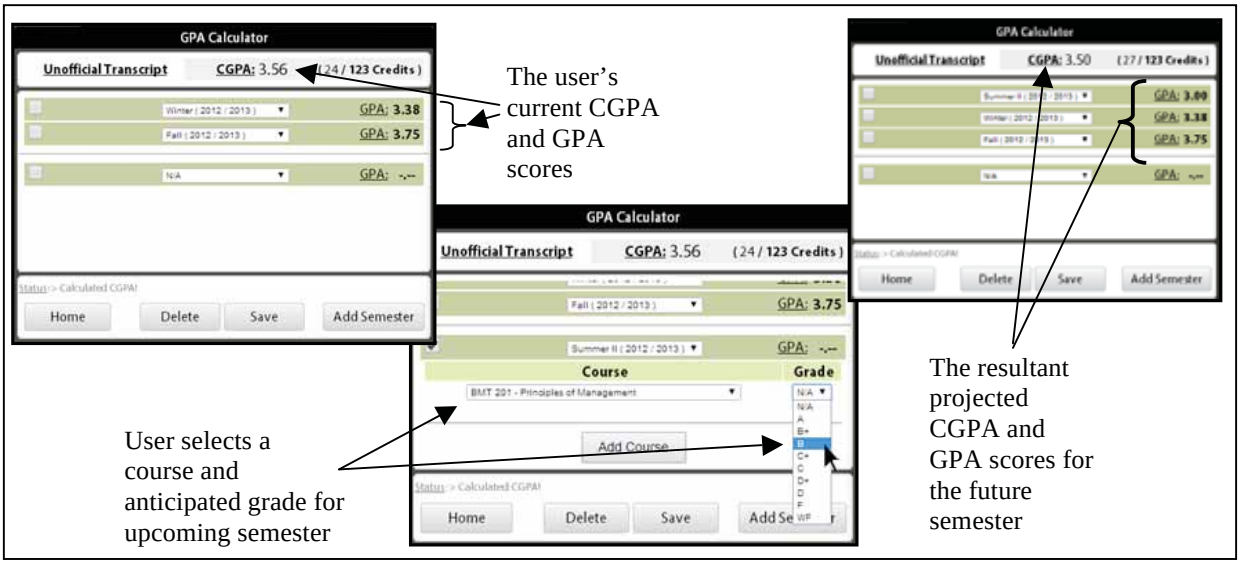

Figure 1: "What-if" Scenario CGPA Grade Projection

It is to be noted that the **StudentAssistant** application – by displaying for selection only those courses that are in the user's study plan and for which all prerequisite requirements have been fulfilled – prevents the user from making inappropriate choices. This input validation functionality proved a very useful attribute and during usability testing field trials, 84% of the respondents reported that they used the **StudentAssistant** to help them actually select courses during the registration process for the Winter 2013-14 semester. Furthermore, 16% of the respondents reported that the **StudentAssistant** was responsible for alerting them to the presence of inappropriate course options appearing in the online course offerings posted on the AlGhurair University's student web portal during registration week for the Winter 2013-14 semester. In essence, therefore, this error detection capability elevates the application to the level of a virtual academic advisor.

Although currently configured for the academic credit system and CGPA scoring protocols used at AlGhurair University, the **StudentAssistant** application is scalable and can accommodate the academic assessment criteria of any educational institution using the grade point average method to measure scholastic achievement.

Course Planning System

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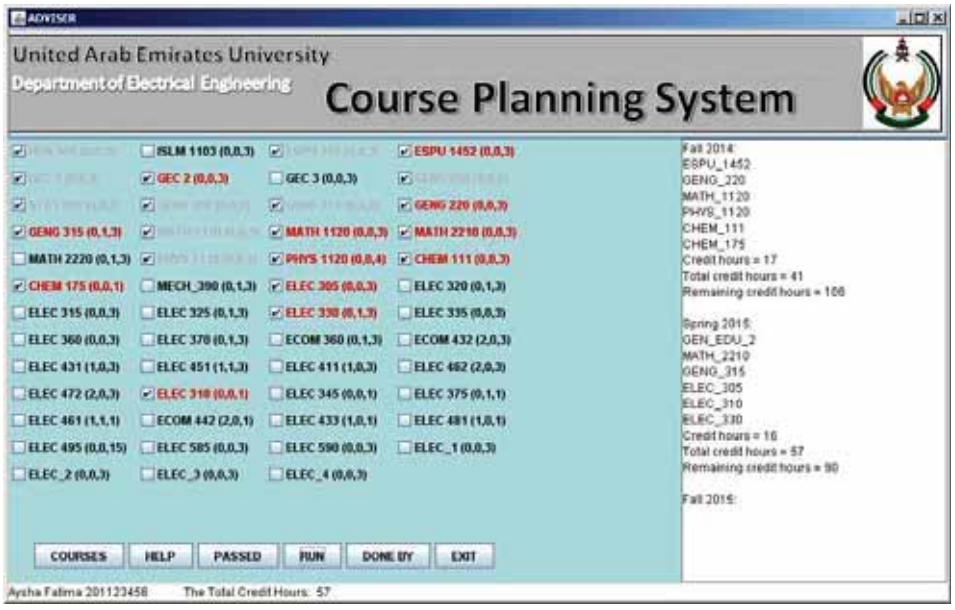
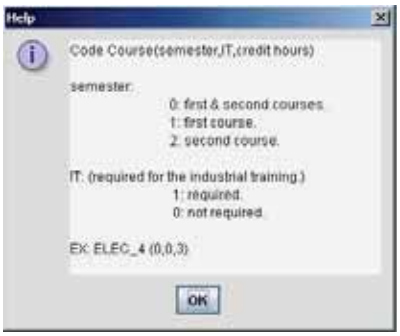
Supervised by
Dr. M. S. Laghari

ABSTRACT

Electrical Engineering Department at the United Arab Emirates University *(UAEU)* is one such department where students have faced advising and registration problems depending on number of factors which may include; a lack of a proper advising system, advisers and students ability to give and seek good advice, etc. Students not advised properly may endure with lose time in selecting unnecessary and wrong courses. Students usually suffer with problems, which may include missing necessary courses for specific semesters, selecting too many or less courses, etc. A Course Planning System *(CPS)* is devised for students to plan course selection on a prioritized based for subsequent semesters. The result of the course planning and selection procedure makes it easier for students to plan their courses in terms of a complete typical plan viewed on the display, and stored in a file. The software package is designed by using the Java programming language.





The course-planning package consists of the interface as shown in above Figure. The package display consists of a course selections area, selected courses text column, and a set of interactive buttons. The course selection area consists of all courses of the department. A typical planning session starts with a student's information queries such as student name, student id, course plan staring semester (Fall or Spring), and the year. The student is then asked to select all the past and current semester courses to be displayed on the right side of package and then saved in a file by clicking the 'Passed' button. These courses are then dimmed in the course selection area to avoid any confusion of reselection.

Student can now select courses of next semester by clicking the course checkboxes. These courses are also displayed in the text column. The course selection is based on the knowledge area associated with each course. The attached three digits of each course are described in the above right Figure. The first digit of '0' indicates that this course is offered in both semesters. A '1' in place of second digit indicates that this course is required for Industrial Training and '0' otherwise. The third digit indicates the course credit hours. This displayed course selection is saved in a file by clicking the 'Run' interactive button. The selected courses for the next semester are displayed in red color in the course selection area to avoid confusion. The student is now ready to select courses for the subsequent and remaining semesters.

The saved file shows a complete plan starting from the entry date until the last semester of graduation. The information saved is in the form semester, year, courses, current semester credit hours, total credit hours, and remaining credit hours.

Smart Mobile Assisted Parking System (SMAPS)

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ABSTRACT

Mobile applications provide intelligent solutions that facilitate some daily tasks in different fields such as education, health and transportation. One of the fields that require an intelligent solution is the gated parking areas since the majority of them still depends on traditional methods that are based on paper tickets issuing. These conventional methods have several limitations including congestion at the entrance or leaving gates because the issuing tickets and payment processes take time. There are existing automated solutions for gated parking such as the Radio Frequency Identification method (RFID) based one, which is considered faster than the conventional method, however, it cannot support payment systems, therefore this method can be implemented only in private parking for a company or an authority. Another limitation in the RFID method is that if a person has two cars, he/she must buy two tags for his/her cars.

The major aim of this project is to develop a mobile application based system for gated parking. The system is based on Bluetooth short range communication technology that enables driver to process their entry and exit to gated parking lots in a very short time while paying using their smart phones. The system implementation includes a web based server, a microcontroller, and a mobile application. The server obtains the status of the parking lots from a microcontroller which contains sensors that detect cars in the parking lots. This enables users to view a map that shows the available parking lots using this smart application and provides smart feedback to direct them according to their preference.

The system solves the limitations of the existing methods such as reducing the required time to enter or exit from the parking area, which reduces the air pollution in the parking lots, in addition, it provides a convenient way to process ticketing issues and provide users with feedback according to their preference. Several software platforms have been used in the implementation of the system, including Java, PHP, MySQL and Apache Web Server. The smart application is developed for android smart phones, and we intend to extend it for other platforms. Moreover, a prototype has been built in order to demonstrate the feasibility of the entire system. Figure 1 illustrates the system architecture of the project.

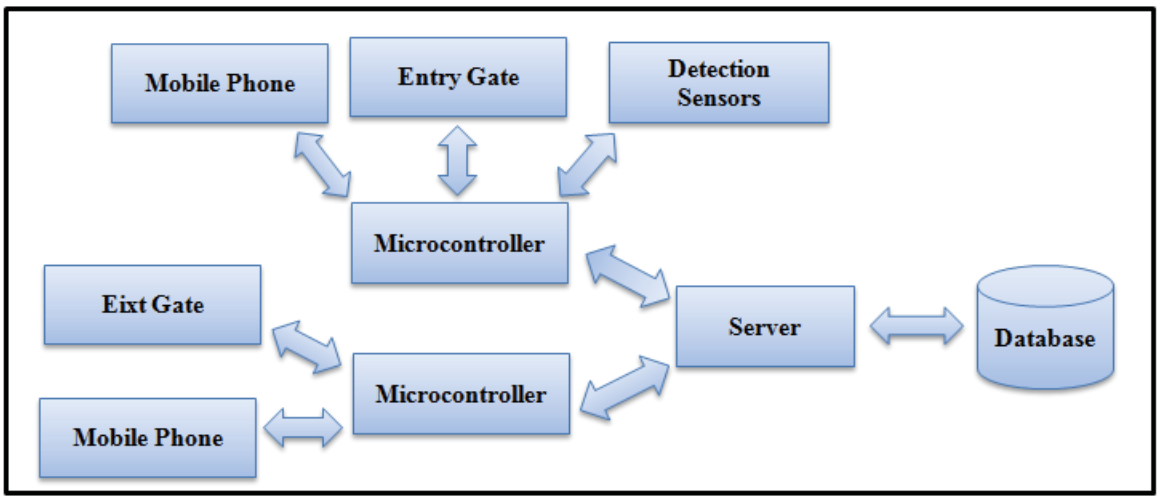

Figure 1: System Architecture of Smart Mobile Assisted Parking System

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Universal Robotic Expedition Radio Controlled Car

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ABSTRACT

Robotic system employed in exploration, observation, rescuing and helping are in great demand. The advantages of using a robot system instead of human are to extend human capabilities and serve their purposes, explore zones where a human cannot access, explore places where it is too dangerous for a human, and most importantly help in reducing the time it takes to do the work comparing to the work done. A typical explorer robot is described as a compact autonomous remote controlled wireless object such as car, drone or rover, with a wide variety of sensors equipped with a wireless A/V camera. The idea of this project is to design a low budget universal expedition car to explore or observe the environment of the surrounding areas, to move into dangerous or small, narrow places where a human cannot access. We want to control this car through a radio frequency wireless connection transmitter with a laptop and as alternative with an android device through a Bluetooth transmitter. To make this happen we use the Arduino Mega2560 Microcontroller and program it with Arduino IDE (Integrated Development Environment), as shown in Figure 1. The reason why we use Arduino Mega2560 is because it uses an AVR CPU which works at 5V which we need for our sensor (sensor works only at 5V). For the interfaces on Laptop and Android device we use Visual Basic and Android SDK. This car will be equipped e.g. with some sensors such as distance sensor, metal detection sensor, rain sensor, flame sensor, sound sensor, body heat sensor etc. and a camera (vertically and horizontally rotation). Sensors can be added or removed according to user requirement and according to circumstances. This assures us to use this robotic car universally, for instances, the military can detect landmines with it, a natural scientist can observe threatened species or a geologist can observe small caves and from the data it receives from the distance sensor, a third party application can create 3D surrounding map of the inside of the caves. Many third party applications can be used for each of these sensors.

Its environmental friendliness helps substantially in reduction of emission, because it works with a battery. This prototype of this project uses a RC car which is modified in a way that the project uses its own battery, remote controller and a Microcontroller with all sensors it needs and functioning in a way that every component harmonizes together.

While still in many areas humans are used or assigned to do risky missions and observe dangerous areas we could decrease the risk, increase and ensure the safety of those people by using a machine such as our represented robotic car.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Multi-level Encryption Algorithm with Key Strength Detection

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Supervised by
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ABSTRACT

Nowadays, internet users are targeted by advertisements companies everywhere. They usually offer free services to internet users that end up collecting their personal information which is breach of privacy. Instant messaging and email services are used for private and confidential information exchange. People can encrypt their messages, but nowadays there are numerous approaches to break almost all of known encryption algorithms. In this work, we developed a multilevel private key encryption algorithm that uses three encryption techniques; Zigzag, shifting up and down, and reversing strings.

Multiple encryption or multi-level encryption algorithm encrypts a given plaintext with different encryption algorithms to provide added safety margin. There are numerous ways to multi encrypt, but the general and most commonly used approach is

$$MultiEncrypt(K_a, K_b,\ldots..K_n, P) = EncryptA(K_a, (EncryptB\ (K_b, (\ldots\ldots\ldots(EncryptN(K_n, P)))))$$

This technique of multi-level encryption is also referred to as a cascade. It is critical that the keys K_a, K_b and K_n are independently-generated. Given this definition, if either EncryptA or EncryptB is 'semantically secure' which implies that they are indistinguishable under chosen-plaintext attack, then so is the cascade of the two or more. A cascade algorithm for encryption is based on the strength of one of its encryption algorithm. If there is a breaking algorithm that hacks the combined construction of the multi-level encryption, then we can use that algorithm to attack either of the underlying algorithms by simply picking our own key for the consecutive algorithm and simulating the multiple encryption on its cipher texts. This indicates that an attack on the combination is an attack on the underlying schemes and if one is secure, that indicates that the text is secure.

In this research, we made use of mathematical and logical operations to manipulate strings. Our encryption scheme uses a 16-bit representation for each character with total characters of 65,536. We performed different multiple operations on each character. The user can choose between 1,000,000,000 keys to encrypt the message. We tested the algorithm to encrypt and decrypt all the characters in the English keyboards and tested all possible keys. We hence proved that our algorithm always retrieves the plain text from the cipher text properly. One limitation of our approach is that there is more than one password that can decrypt the same cipher test which is rare. All keys that are palindromes and has ((key)+(65536 * n)) that is also a palindrome, can decrypt the same message, where n is any positive integer. We simulated the algorithm to identify all passwords that can have more than one key that can decrypt the same message. For all numbers between 0 and 999,999,999, we found only 81, 638 instances of same-key decryption. In order to circumvent this limitation, we added a strength detection feature that tests the strength of the keys and shows number of other keys that can decrypt the same message. A strength of the key is based on the above-mentioned calculation.

We plan to further test the algorithm to identify the threshold value that can be used for strength based on the number of other keys that can decrypt the same message. In future, we plan to use the approach of encryption key strength detection for other well-known encryption algorithms. Most forms on the Web these days have a strength detector, its high time that encryption algorithms such as for WiFi can use this feature.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Smart Irrigation Control Application for Farmers

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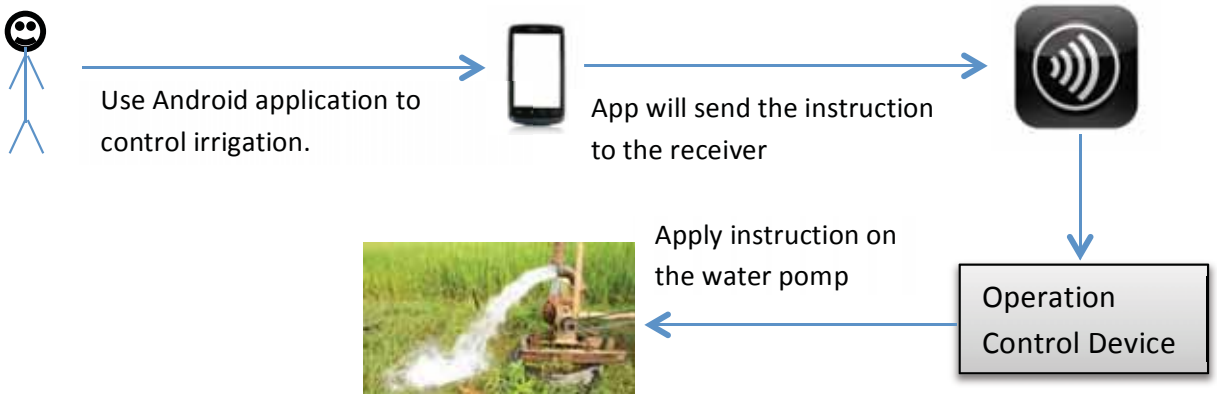
ABSTRACT

Nowadays the Technology has a huge revolution in the world trying to create simplicity and increase speed while doing our daily tasks. Great application depends on great ideas and great ideas can transfer the impossible to be possible. The huge benefit of new technologies in our life has become transferred to a new level. Smart mobile phones are the one of the trends of people that takes their attention in last few years. Mobile applications are helping people to do their tasks easily and it is fulfilling the purpose of their daily life. It could help even farmers if we thing positively to help them out.

This project pin point farmers and the use of smart phone application to irrigate their crops regularly during their busy schedule. The farmers need a way to control the irrigation remotely through their smart phones. By this way they do not have to visit their farms regularly. The Mobile App will provide technique for farmers to operate, schedule and stop the irrigation. And also it will provide those reports of irrigation for each month. This project will help especially the farms that are located far from the owner home.



The project needs to use different application software to control the devices. The first device will be a smart phone that includes the Irrigation Control Applications. The application will be initially tested based on Android but later it could provide services to other mobile OSs such as IOS and Widows Phones. In the other hand we need a receiver that receives instructions from the Irrigation Control Applications and send it to the operation controls to the irrigation system in the farm. It might use the existing irrigating structure to implement the applications. This experiment is aiming to increase the interest to take care of the abandoned farms because of the changes in the life style and jobs pressure.

With the smart irrigation application the farmers will be able to send a signal to the water pump through their smart phones. The water pump will run after receiving that signal. After a while the farmer should send another signal to stop through his smart phone to stop pumping the water. Using automatic schedule farmers will be able to control time of running water pump. We provide this solution to motivate owners to look after their farms even if they are busy. This system will also decrease the number of workers in any farm. This system would help to save water and allow the farmers to irrigate using smart application user control. Also for further monitoring we can add IP cameras to monitor the irrigation system widely.

Incorporation of human personality types (based on MBTI) in web user interface designs using genetic algorithm

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Dr. Oras F. Baker

ABSTRACT

Hafez is a mobile application that rewards safe and responsible drivers with white points, encouraging them to adhere to the speed limits. By using positive reinforcement rather than punishment as in black points, continuous feedback, Hafez aims to change risky driving behavior and encourage positive and safe driving attitude. The application takes periodic measurements of the driver's speed and compares it with the speed limit of the street and calculates whether and how much the driver is exceeding the speed limit. Over a sustained period, drivers who observe speed limits are rewarded with white points.

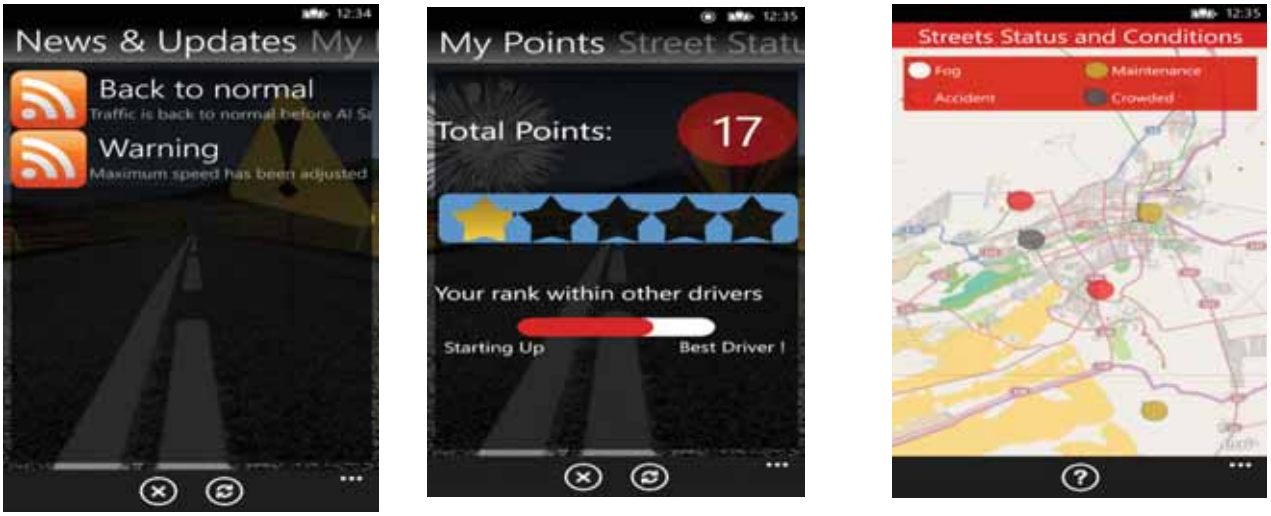
The more observant the driver, the more white points he or she will earn. Factors such as the duration of driving and the amount by which drivers exceed the speed limits are taken into consideration. For example, drivers who maintain a safe driving speed over longer period of driving time are rewarded with more points than those who sustain it for a shorter period.

The application regularly sends the collected white points to a central server and multiple phones can be linked to the same account to accommodate switching phones without losing points. Moreover, the server can be owned by an official traffic authority (interior ministry or RTA in UAE) to order to create campaigns and programs to reward safe drivers. For example, the official body can run a campaign each month whereby drivers with highest points get prizes or enter a drawing for prizes. It is critical that users know that Hafez only sends white points to the server and not their speed measurements or any information that can violate their privacy. All data used to assess driver's eligibility for points are stored locally on the phone.

Hafez can be also used by the official body as invaluable communication platform by which connect with drivers, for example sending warnings to drivers about the road and weather conditions like wet roads or fog. The official body can also make announcements concerning winners' stories or general statistics.

We acknowledge that speed is not the only indicator of safe driving; however it is the main cause of traffic accidents in UAE. By not only monitoring speed but rewarding people to adherence to speed limit we aim to balance the black-point punishment system and positively reform UAE driving culture.

So far, Hafez is fully implemented on windows phone 8.0 and it features open streets map for viewing the streets conditions. More versions of Hafez that support other operating system will be available in the near future.



Three Screenshots of HAFEZ that show street conditions on the map (right), the total number of points acquired by the user (middle), and the news and updates (left)

Tawajdi

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Supervised by
Dr. Muawya Aldalaien, Ned Nedumaran and Rajavelu Loganathan

ABSTRACT

Mobile application become a part of every successful communication, the UAE Ministry of Foreign Affairs (MOFA) needs to communicate with emirate's while they are out of the country, especially in crises and emergency cases and to ensure their safety. MOFA proposed Tawajdi service as web application to achieve this purpose. Since the service is an optional service very few people are registering for Tawajdi.

In this project we proposed a mobile application for Tawajdi service. The proposed solution aims to increase the number of UAE citizens who are registering in Tawajdi, where the application will help to protect the citizens from danger when they are travelling overseas. Citizens abroad can use their cell phones to locate or call the nearest embassy and they can communicate with the Ministry of Foreign Affairs by sending video and voice messages for emergency cases. Tawajdi mobile application will make travelling overseas safer for UAE citizens by providing "on the move" solution for emergency services abroad.

This proposal introduced a mobile solution with process re-engineering, where users can register for Tawajdi service with minimal effort and time. In the current system, UAE citizens need to fill online form with many fields and questions to complete the registration in Tawajdi service, and there is no communication channel between the citizen and the Ministry of Foreign Affairs, embassies and the representative missions.

Application is piloted in 21 citizens, As a result, citizens show that the app is very easy to use. And will reduce the number of kidnappings and other crimes that must be handled quickly. This will also help in cases where medical attention is needed quickly.

Zakati – Smart Solution for Zakat Fund

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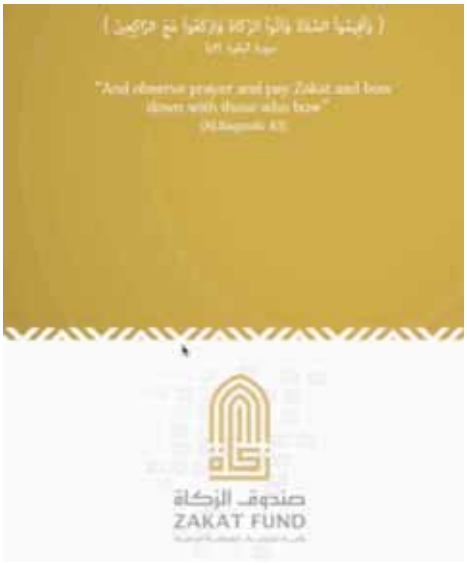
ABSTRACT

Zakati is a smart solution proposal for Zakat Fund, which is one of the federal entities in the UAE. The project was part of the smart government initiative in UAE. The project started after H.H. Sheikh Mohammed bin Rashid Al Maktoom call for moving all e-government services to smart services that allow customers to access governmental services through their mobile devices. Zakati mobile application has been proposed based on the requirements from Zakat Fund in UAE



Zakati is a mobile application that has been proposed to solve the problem of zakat calculation and payment. There are many apps that were developed before but only to calculate zakat in a basic way. Zakati application aims to solve this issue by making it easier for users to calculate and pay zakat in quick and simple way. This application will serve all Muslims who own financial means. Zakat is the third pillar of Islam, and the concept behind Zakat in Islam is giving the poor people and covers their needs from the rich people in society.

In this mobile application authors proposed a mobile application to calculate the five different types of zakat which are: money, gold, silver, livestock and crops & fruits. The application will allow users to pay zakat amount using one of three payment methods: credit card, phone balance or E-Dirham. Also the proposed mobile application will have a section for Zakat beneficiaries (e.g. special need people, elderly needed, widows or divorced women) where they can apply for the Zakat. Zakat beneficiaries can use the application to send the required documents to Zakat Fund database for review.

The authors implemented a prototype for the proposed mobile solution using PhoneGap, which is an open source framework for developing mobile apps using web technologies. xCode IDE was used for development. The developed prototype included all the interfaces the payer needs for calculating Zakat. Also the prototype included interfaces for Zakat beneficiaries to allow them to apply for Zakat. Other screens have been developed as well, for example: About Us screen that show brief information about Zakat Fund, the Guide screen shows a video on how to use the application, and Map screen where the user can locate the Zakat ATMs around Abu Dhabi with a map.

Screenshots for Zakati Application

IDE for mLearning Object Creation & Delivery

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Under Supervision of:
Dr. Loay Ismail and Dr. Mohammed Samaka

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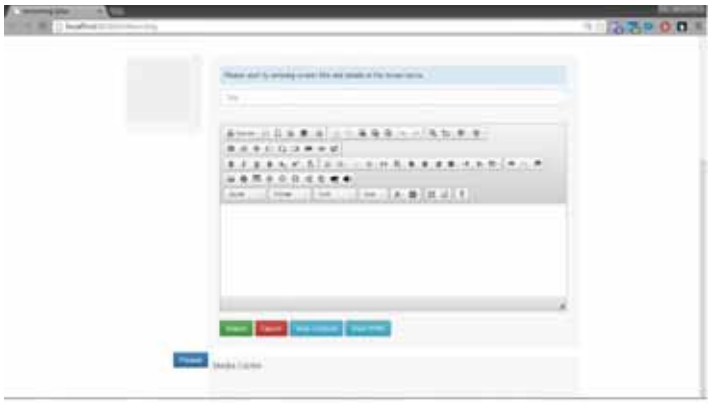
ABSTRACT

We live in a new era where education is not restricted anymore to feeding information to individuals; it is the same era where we can deal with our handheld devices more than any other human interaction. Why then don't we implement a new "environment" to deliver education to our handheld devices that we hold and interact with? We need to free the process of education from physical presence to "virtual" presence through the power of the Internet, and this is the motivation driving us forward. We approach the new paradigm of the World Wide Web to have a web-based application for the instructor to access to be able to create and edit mLearning objects and upload them to an assigned database, where the learner is notified for new objects "courses" to download to their handheld client application to learn and be assessed in. Previous technologies have been patented and applications have been done to solve the same problem, but we stand with the advantage of web-availability. The sole purpose of our work presented in our document is to revolutionize the process of education into an unprecedented step towards humankind's evolution.

Our target is an Integrated Development Environment for mLearning creation and delivery. A full platform of integrated web tools that could allow any instructor of any background (whether technical or non-technical) to create mLearning objects related to a certain educational field and customize them fully in order to deliver them to the learner's handheld device to study and learn. Achievement of "Blended Learning" is possible because the instructors can teach whatever they need to teach in mornings at classrooms, and then customize the objects (with a wide range of content editing and multimedia editing tools), so that learners can quickly study the objects to follow up and achieve higher in their learning streak.



The platform is aimed to be fully web-based, with a bundle of web APIs that are to simulate a desktop environment in its smoothness and availability anytime, anywhere. In addition, a web-based platform will allow the instructor to access the authoring tool from anywhere, and at any time. Sessions will be applied to aid the instructor (with the help of the previous point) to allow incremental development of the mLearning and multimedia objects, to allow full customization to the instructors needs and will.

Accomplishments to the project until now are high-level architecture diagrams; Class Diagram, Architecture Diagram, along with functional and non-functional requirements. On the practical level: a main interface has been created with the ability to create, edit and delete learning objects details (we call them units in this project as they can be grouped to form a whole course) along with their content (in the form of HTML based slides) and save them in the server to be retrieved later for further editing.

Education is starting to become too traditional to the point that it is starting to lose its mission. The spice of Technology will help in the trend of "Blended Learning" that aims to join the pros of brick-and-mortar learning with Online learning to allow educational systems, through their students, to achieve better country future and prosperity.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Scan Dictionary

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Supervised by
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ABSTRACT

At home, on the road, at work, and everywhere we are using our mobile devices. The usage for those devices varies from standard use such as phone calls and SMSs to more advance usage and utilization of mobile features such as location service, camera, internet and much more. In this project we proposed a mobile application that employs those features to introduce a new solution for mobile users. Scan Dictionary is a mobile application that translates text images from/to any language. Users can use their mobile device camera to scan any word or sentence and get the translation immediately. Scan dictionary is a ubiquitous translator for mobile users.

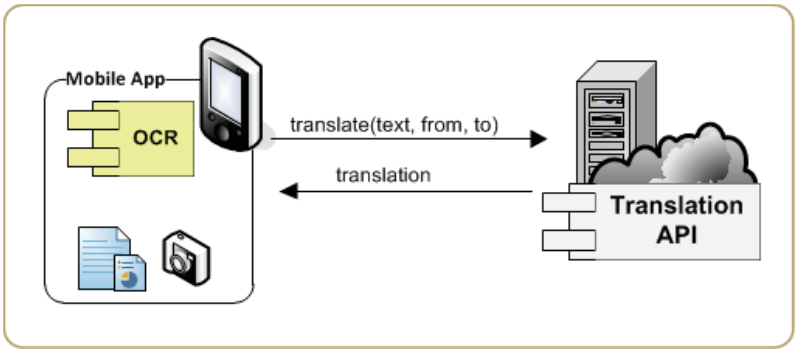

Figure 1: Architectural diagram for Scan Dictionary

The idea of the proposed application is covered in two main processes which are:

- Convert image to text
  The user will capture or scan the words using the camera in the mobile device. Then the application will convert the captured image to text in order to send it for translation.
- Translate text
  The text captured by the user will be sent to a cloud translation service.

A prototype for the proposed system has been developed for Android devices. In this prototype the authors defined from/to languages to be English/Arabic. The authors used OCR libraries to convert images captured by mobile camera to text. For cloud translation service the authors used Microsoft Translator. The authors were able to accomplish the goals of the proposed translation solution in their developed prototype. The prototype can be easily extended to include other languages or to use other translation APIs such as Google Translator.

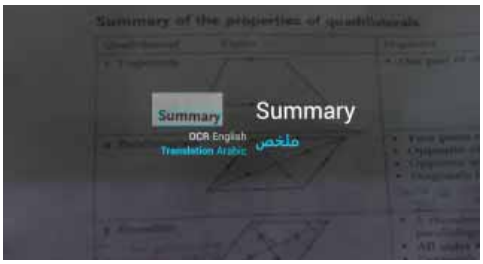

Figure 2: Prototype for the proposed solution

Scan Dictionary mobile application provides a simple and easy to use solution for mobile users from all ages and with different backgrounds. Scan Dictionary aims to save reader's time and efforts and to encourage reading and learning anytime and anywhere. The real motivation for the authors was to develop a portable translation solution for students to help them in their studies and encourage them to learn new vocabs while they are on the move.

Through this application, authors seek to provide a new movement in translation world, make it a target humanly for the development cognitive and academic in campus and a bridge with foreign cultures. Authors aim to benefit all mobile users, and specifically students to help them in their learning and in their life.

Cloud-Compose: A User-Edited Book Library

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Supervised by
Dr. Mohammed Misbhauddin

ABSTRACT

Publishing a book is not an easy task, ask an author who had to go through a lot of rejections, numerous cycles of corrections and lost opportunities. Editors base their opinion about a manuscript on the reviews of a subset of the so-called experts. The past is flooded with stories of how an innovative publication, rejected by one editor, won the noble prize or other prestigious publication deal. Cloud-Compose is a web-based platform that allows users to compose their books online. The composing engine allows them to typeset their documents, plan their book and finally publish it to a categorically organized library. Alternatively, users can also upload their work as word or pdf.

The innovation in this idea is social reviews. One thing we have seen in recent times is the use of social media to get feedback. Whether it is about pictures on Facebook or Instagram, quality of posts on Twitter or self-written blogs on Tumblr, feedback plays an essential role in shaping ones mindset. Cloud-Compose goes ahead in its endeavor to disrupt the publishing industry by allowing the whole world to act as reviewers rather than those hand-picked by editors to judge life's work of someone. This review mechanism is integrated into the proposed platform by using Gamification. Readers can provide feedback on books through comments, ratings, and recommendations and so on. These factors will also be used to drive a powerful search-engine whose rank algorithm depends on the popularity-factor of a book and tags assigned to it by the writer. It also provides the author with insight about his manuscript so that it can be improved for better.

A supplementary feature of the proposed system is its application for schools and universities all around the world. Formatting and organization of student reports, final projects and even submission to undergraduate conferences is a time-consuming task and many students not experienced with these issues end up creating low-quality poorly formatted reports. Since aesthetics are important to comprehend content, cloud-compose allows teachers and instructors to compose templates that can be edited online by students. Progress of the students work are reviewed and real-time comments provided to increase efficiency and overall work quality. Cloud-compose allows writers to compose both private and public books. Private books are only shared among trusted colleagues and readers. The system will enhance writer's experience by allowing them to compose a template which can be used by other writers to compose their manuscripts. This feature, as mentioned above, is highly usable in a university setting, where instructors can compose a report template which can be used consistently by all students to produce a good quality report.

An important aspect of designing web-based applications for the Web 2.0 era is enhancing usability and user interaction experience. Web 2.0 is about revolutionary new ways of creating, collaborating, editing and sharing user-generated content online. Technology has never been easier or more accessible to all. In this proposed project, we plan to used advanced features provided by front-end web authoring languages such as HTML5, CSS3 and JavaScript. After carefully studying usability and user-needs, we plan to use a front-end framework coupled with Flat UI design. JQuery plugins will be used extensively to provide high level of user interaction such as on-page editing, flip-book effect for the physical book experience, auto-bookmarking for handling connectivity issues. PHP along with the most popular back-end framework, Laravel, will be used to program the back-end portion of the web application. This framework not only allows the flexibility of using object-oriented nature of the scripting language for increased maintainability but will also allow the application to be deployed as a web service so that a user can access the services through a RESTful API web-service.

Automatic Diagnosis of Prostate Cancer from Microscopic Images

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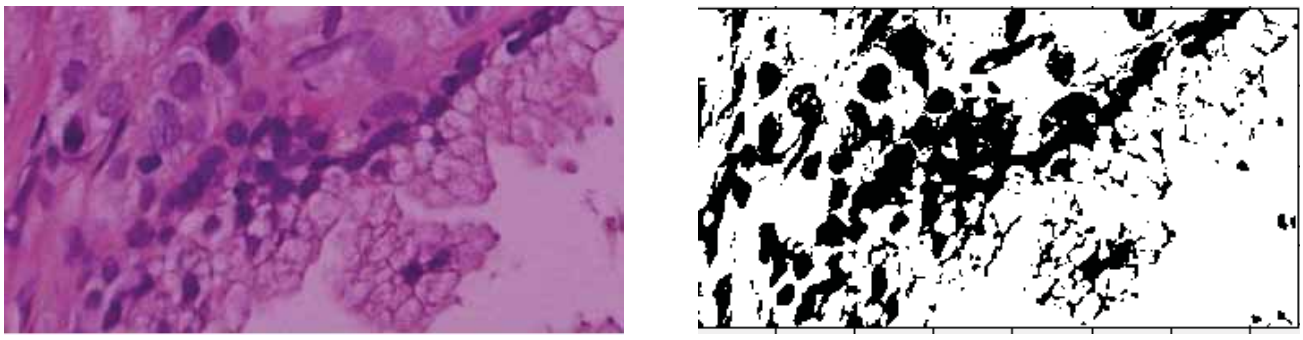
Jordan University of Science and Technology
Irbid, Jordan

Supervisor:
Dr. Mahmoud Al-Ayyoub

ABSTRACT

Prostate cancer is one of most common and lethal types of cancer for men throughout the world [1]. What makes it so dangerous is the difficulty of its detection due to the lack of early symptoms [2]. Several tests can be used to diagnose prostate cancer; however, biopsy is only method to confirm its existence by collecting samples of the prostate tissues and examining them under the microscope (See Figure 1). To determine the severity of the cancer and thus help in choosing the best treatment method, a scoring system (known as the Gleason scoring system) was devised depending only on the architectural patterns of the tumor [3]. Since the Gleason system uses only visual features, a computer-aided diagnosis (CAD) system that relies on techniques from images processing and machine learning will be efficient in determining the Gleason score of any tissue. This is exactly the aim of this project.

The phases of this project are as follows. The first phase is to collect a large enough corpus of microscopic images depicting different stages of prostate cancer (Figure 1 shows one example). We then apply different preprocessing techniques on the images such as contrast stretching. We extract different color layers from the mages (see Figure 1) and compute distinguishing features from the original images as well as the different color layers of each image. At the end of this phase, the dataset is ready for the classification phase, in which we exploit the large number of options offered by the Weka data mining tool to determine the best classifier for the problem at hand. Examples of the classifiers that are known to do well on similar problems include: decision trees, support vector machines, neural networks, etc. To evaluate the performance of these classifiers, the standard testing technique of cross validation is employed. The preliminary results obtained so far are encouraging.



(a) (b)

Figure 1. A microscopic image of prostate tissue with cancer.

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Very Fast Food Delivery for Restaurant Chains

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ABSTRACT

With what the world is witnessing in terms of the rapid technological development in most areas, people have started to develop many ways to make their lives easier and faster. Moreover, with pervasive use of portable laptops and smart phones, people are getting used to finding everything they want on the Internet including online services. Many economic sectors are benefiting from this situation including the fast food industry, which capitalizes on online services such as targeted advertisement and online ordering. Any improvement on such issues is of great and obvious importance. This project aims to improve the online ordering system by optimizing the delivery system to ensure the best utilization of the available resources as well as the highest customer satisfaction.

At the core of the proposed system is a *dispatcher* module. The dispatcher is responsible for collecting all necessary information from the different agents in the environment and determining the best solution for the home delivery problem. To facilitate the communication between the dispatcher and the other agents, a smart phone application is designed with different interface for each different agent type. The agent types considered here are the branches of the restaurant chain,[1] the delivery vehicles, and the customers. We will now explain how each agent uses the system. Customers place orders via the dispatcher's web interface or the smart phone application. In addition to the food items and quantities, the customers must provide the location for the delivery, which can be optionally obtained from the GPS location of the smart phone. Obviously, the customer might specify a set of candidate branches to service his/her order. Upon receiving an order, the dispatcher queries all candidate branches asking for how long it will take to prepare the order. It also queries all vehicles to determine their current locations on the map. To determine which branch to prepare the order and which vehicle to deliver it, the dispatcher uses a brute-force algorithm which takes into account every possible option (including re-routing the vehicles already on their way to deliver other orders) and chooses the one that guarantees the fastest delivery of the order without greatly affecting the other orders. In addition to computing the shortest routes, the proposed system takes into account the waiting times at the branches in case the delivery vehicle reaches the branch before the order is ready. Also, the system takes the starvation problem into account by setting an upper limit on the time to deliver any order and if this time cannot be met, the customer is given the option to wait or cancel the order. Because of its high computational demands, the dispatcher is run on a dedicated server or on a cloud platform. The choice of the brute-force approach is just an initial one as we plan on improving the system by using memorization similar to how dynamic programming is usually implemented.

Xbox Game for Nutritional hearing: Using speech detection to strengthen hearing and speaking language

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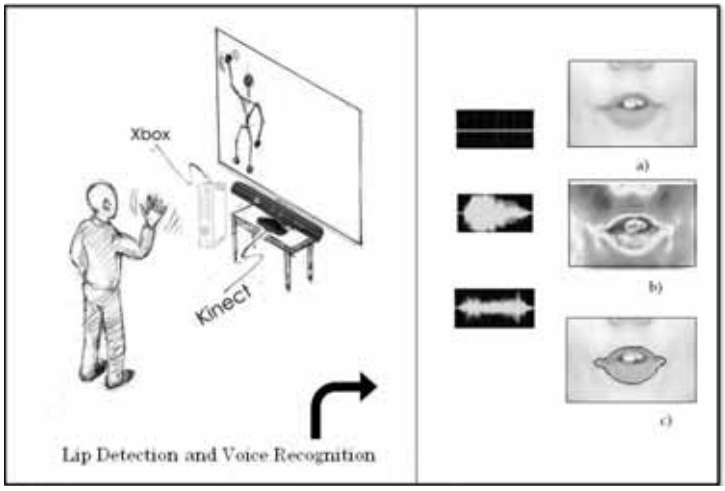
ABSTRACT

In the technical field, it is remarkable to see that technology is devoid of programs or gadgets that are allocated exclusively to interact with children who are mute and hearing impaired. Children start to lose their communication ability with others because of hearing loss: they are not able to express themselves fully, so they cannot interact with their family or even get themselves involved with other children, who do not have impaired hearing. As a result, they tend to be isolated and withdrawn from the society to avoid the misunderstanding occurring due to the lack of communication ability. The general public needs to take a look at these children's needs and problems, educational requirements and the required communication tools.

Performing intensive training on hearing and speaking skills of the children can greatly improve their quality of life. Unfortunately, such training is only available in specialized centers which are few in number. By creating a functional system or a game for the training program, children will be able to access the training from the comfort of their home. In addition, such a game would allow the family of the child to participate in her/his development.



This invention, a game called Xbox. Xbox console beside and Kinect camera will be used to display voices and words to the child and make it tries to speak it. Kinect camera contain sensors used for catching the child's lip movement and his/her voice, store it in data base of the system and analyzing it. If the child pronunciation were correct around 40% and above, then the child will be upgraded to a higher level. If it is lower than 40%, the child has to repeat the same word or choose another one until producing them correctly. Also it say the voices by a creative repetitive way that make the child keep training on listing as long as he play. This system is designed specifically for children with hearing loss from 1 to 6 years old to prepare them and make them qualified for joining the school afterwards, children with cochlear, and adults with new cochlear, who are treated like children because they are not exposed to life, as normal people, due to their hearing impairment.

The main goal from this program is to find an alternative method, rather than sign language, to make those children more secure thereby more productive and more effective in their society. The reason for why we assume that sign language is less effective is that it is not a global language, which means it differs from country to another. Furthermore, sign language makes the person or the child who has hearing loss depends on his eyes all the time, which leads to eye fatigue. We hope this proposal be a step forward to make communication easier for those children.

Vernam cipher's Mobile Application

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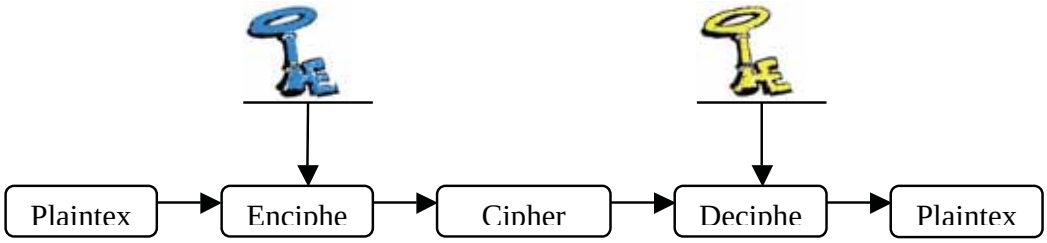
ABSTRACT

Cryptography, the art and science of using mathematics to encrypt and decrypt information to keep messages secure, as long as there is communication, people practice the cryptography to make their transaction more secure.
Cryptography enables you to store sensitive information or transmit them across secure networks so the information can't be read by anyone except the intended recipient.
Nowadays the use of cryptography is in cell phones, emails, computers, banks. The paper deals with generating the source code for Veram algorithm and apply it to two different platforms, IOS and Android. The application will be tested using the two platforms to send and receive text as well as images after they have been encrypted using Vernam algorithm. As mentioned, this will enhance the security for the users.

This paper deals with encrypt and decrypt text and picture by using the Vernam algorithm. Since the Vernam cipher is part of cryptography, initially we describe some of the keyword in cryptography. Then we explain and analyze the Vernam cipher's and implement it on text and picture and we write the algorithm for them with some examples. We used Xamarin compiler as a programming language.



In the Vernam cipher if the key is not repeated it's called one-time pad cipher.
But in the computer science, it's not particularly or useful to make the length of the key as long as the length of plaintext without repeated even though it was useful in the past.
The one-time pad cipher cannot be cracked by the FBI or NSA – or by anyone because of using a random key is that as long as the message. The first one-time pad system (Vernam cipher) was electrical in 1917. Each character in a message was electrically combined with a character on a paper tape key.

Fall detection system for elderly care

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ABSTRACT

Injuries caused by falls are a major concern for the elderly community and those who are suffering from bone diseases. Hence, it is vital for us as engineers to create a device that would aid in this matter. Therefore, we have decided to create a fall detection system that would be easy to set up and does not cause the user any discomfort. The system we are working on consists of a basic computer and a camera. Falls would be detected using the camera, and that is by using OpenCV libraries in order to make the computer understand when a fall has occurred. We are also exploring the same idea using matlab and are getting great results. Currently our system is in its early stages so it does not detect the fall yet. However, our system tracks the desired object (the elderly) through the use of background subtraction and edge point detection. Our system also draws shapes (squares and ellipses) around the desired object which will be used in the final stage which is the fall detection. We are currently working on detecting the fall, for that we are exploring various features such as aspect ratio and velocity. The hardware we are working on is a Raspberry microcontroller. Current solutions that are available in the market require the user to be wearing them in order for them to detect a fall. Hence, our final goal is to have a prototype ready which successfully detects falls with high accuracy without having the user to wear any device on them.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Intelligent Internet navigation system based on the semantic of hyperlinks

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ABSTRACT

Our system of intelligent Internet navigation, based on the formalized semantic of hyperlinks, is a prototype model to enter, exploit, and visualize semantics of hyperlinks. This intelligent navigation system aims at providing users with the formalized semantic of hyperlinks, which facilitates their navigation and provide them with new information that may interest them. Indeed, this semantic information about hyperlinks is an interested resource to help users to decide, during their navigation, which link is to be selected when they are faced with a number of links in one webpage, and when the information on this webpage is too big that the user could be overloaded. Indeed, our system presents to users information about what is behind the links (as a simple set of keywords from the target of the hyperlink), and what is around the link (also as a simple set of keywords from the source of the hyperlink) and finally about the relationship(s) between the two entities (behind and around the link), each relationship simply connects a keyword on one entity to a keyword on the other entity. We make the hypothesis that this set of relationships is behind the creation of the link by the webpage author.

In order to validate our system, we decided to test it on a set of websites dealing with biography of famous people. As we are in the domain of semantic web, we should have ontology or knowledge bases about specified domain. We analyzed the semantic of a set of hyperlinks by defining for each link keywords on what is around it and what is behind it and relationships between keywords from each side. After this analysis we defined the ontology of the domain. We decided to represent this ontology via a database, which should map all concepts and relations that cover the ontology. We decided also to create rules about certain relations in order to have an intelligent system. First, we have downloaded locally all the selected websites from the Web, using website aspiration tools. Then, we analyzed documents of these websites to have only relevant content that may interest users, i.e. only webpage content about personal information except all menus, header and footer. In order to visualize semantic information about links, they are processed so that a popup window is visualized each time the mouse hovers a link. Users can also add semantic information about links via the same popup window; other users can visualize information about this semantic, once validated by the moderator. The role of the latter is to monitor all entered semantic information by users as well as providing the system with new semantic information and modifying or removing some semantic information. Our system permits also the calculation of new links giving defined rules on relationships in a database. Consider the biography webpage of Almutannabi and another one dealing with the Andalusia literature, giving that our system has learned that Almutannabi is inspired by Andalusia literature. Since Almutannabi is a keyword on the biography webpage and Andalusia literature is a composed keyword about the other page, our system can infer a new link between these two pages. New links are shown to users beside the page that they are browsing.

In this project, we test a prototype for a specialized database in a specific domain. Our methodology aims at an advanced system that use plug-ins on browser. All webpage processing stages can be done on the fly when a user opens the specified webpage. All information can be added virtually one the webpage; a popup window is displayed when links are hovered by mouse and when there are new calculated links. This plugin should contain the required information to establish connection with the database in order to add, or modify and remove when the moderator is involved, or simply request information from it.

An Educational Security Awareness Video Game

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ABSTRACT

Problem and Motivation: -
Video games provide a safe and entertaining environment to simulate real world scenarios while teaching and reinforcing video game concepts. At Zayed University, we are creating several modules to teach video games through security. This abstract will focus on the module that I am directly responsible for: Security Awareness emphasizing on e-mail security. E-mail exchange has become the preferred method of communication between teachers and their students, governmental entities and any business enterprise. Thus, it is important to highlight the security risk that is e-mail attacks that are the most common type of cyber attack because of their simplicity and the ability to spread easily.

Background and Related Literature: -
We researched and discussed many video games that teach security. My advisors also encouraged me to register for the intercollegiate cyber security championship held at Zayed University to gain more knowledge in security and I was a member of the winning team. Most video games that we researched lack a friendly user-interface and focus on hacking instead of ethics. Cisco video game was focused exclusively on a specific product as one might expect. I also looked at a few prototypes that had been developed at Zayed. Each of these video games provided insights. Since spam and phishing e-mails aren't exclusively sent to enterprises, I retrieved many samples of this type of e-mails from my personal e-mail to properly analyze the recurring patterns and such.

Methodology: -
Our project's first three phases included studying existing literature of video games related to security, study existing tools to create video games and defining the content of our game. Each member chose a single aspect of security to work with in greater detail. Meanwhile, our system is more focus on giving students specific scenarios where they have to make the decision if they encounter situations where they would be targeted by such attacks or if they were on the team that assesses the risk of such threats and how to mitigate them when specific events occur. To obtain the scenarios, I interviewed security administrators and participants of security competitions. Information was also gathered by reviewing recently released e-mail security related videos. I also approached Du to get their point of view over the matter as a service provider and how this kind of situation affects them on a global scale and the kind of solutions they have implemented. The game will challenge the players by introducing them to different kinds of e-mail scams and attacks and measure their knowledge based on the actions they proceed with. For example, when given e-mail with a malicious link in it, the player's knowledge is tested according to which action they take to counter this attack.

- ✓ Game's examples of Events-actions are:
  - Event: Received spear phishing e-mail
  - Possible Wrong Actions: Do nothing, deleting the e-mail, forwarding the e-mail as a joke
  - Correct Action: Forwarding the e-mail to IT Department.

After designing these steps, I started building a prototype that will be tested with the help of some of my fellow students. The prototype is being done in game maker and the second/final version will be done in Unity to have the professional feel and will be integrated with all of the features we've envisioned for the final product. With Unity, we can deploy the software to mobile devices if needed in the futures. The reason we preferred java to flash was because Adobe has discontinued Flash's development for mobile devices.

Results: -
We completed a few scenarios that we think will be the most useful and relevant when it comes to our educational purpose. As we add more scenarios, the prototype/finished game will be very useful for undergraduate and graduate students to learn and apply security when it comes to e-mail. The game can also be used in awareness programs for enterprises and governmental entities.

A Video Game To Teach Database Security

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Zayed University
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Supervised by
Mario A.M. Guimaraes and Huwida Said

ABSTRACT

Video games can simulate a real world environment to teach security, providing practical scenarios where players have to make real time decisions. Unfortunately, most video games to teach security are focused on hacking and entertainment instead of education. CISCO developed video games for training, but these are tailored to CISCO's certification exams.

This research will describe an on-going project at Zayed University that received a Research Incentive Grant. Several prototypes were implemented. Our design and implementation is basically bottom-up. The game in construction has different modules and levels. Each module corresponds to a different topic and there may be multiple levels with each module. The main focus of the presentation will be on the Database Security module.

The presentation will describe the database security module of our project to teach security through video games. To develop the software, we used a game design template, story boarding and an objects events/action table for each level. To test the usability, we are using Tobii eye-tracker.

The player takes the role of the Database Administrator. Initially, the player is told to install the Apache Web-Server and Database Management System (DBMS), as well as to create the database. After installing and setting up the database, the player will receive e-mails requiring them to take action. E-mails may be related to a virus or simply actions to keep the database running efficiently. The player should set all default user accounts inactive, install the DBMS in a port other than the default, and create users with the minimum privileges, e.g. After installing the DBMS, the user will receive a serious of e-mails that they will have to take action.

This module has two levels. In the first level, players install Apache Web Server, the Data Management System (DBMS) and Database Applications. Players need to install the database and the web-server and the DBMS in a port different than their default port, disable default user accounts and passwords, create a database and create users. The player is requested to create users that do different tasks. It is important that users are not given more privilege than the necessary.

At the second level, the player receives e-mails (events). These e-mails may be attacks or they may be regular tasks the DBA needs to do. These events will occur at random. For each event, the player needs to take the best action to obtain the most points possible. For example, player may *receive an e-mail saying an employee is leaving the firm*. The player will need to disable the user. Dropping the user or taking no action will cause the player to lose points. Another event is *the request for players to create a user to perform a specific test*. To earn maximum points, players should grant the minimum privileges necessary for the new user to do the task. A third event is the notification that the database is extremely slow. In this scenario, one application is consuming all the resources, but there are too many applications and user to check, so the player needs to limit everyone's resource in the profile.

Traffic Tickets Recording System (TTRS)

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Supervisor:
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ABSTRACT

The main goal of the application is to assist the policeman's task when he documents the details of the driver and the car information. This application can make the process of giving tickets for illegal drivers more faster and with an efficient way also, with less effort and time efficiency. The app will connect with the police database to see information about a driver to complete the presages to give ticket for illegal driver.

What this App Accomplishes?

First thing the policemen have to sign in be entering their ID so all the fees will be under his name in the system. This app help the policeman to take the drivers information when they want to issue a fine by just scanning the barcode in license and all the data will appear in the screen and after this screen. The police also must scan the vehicle ID and the application will join and merge the information of the license ID and vehicle ID.

From this scanning the application will know the type of the vehicle for example if its heavy or light and the application will show the fees for the specific situation also you will see Red Alerts incase the vehicle ID or license ID are expired.

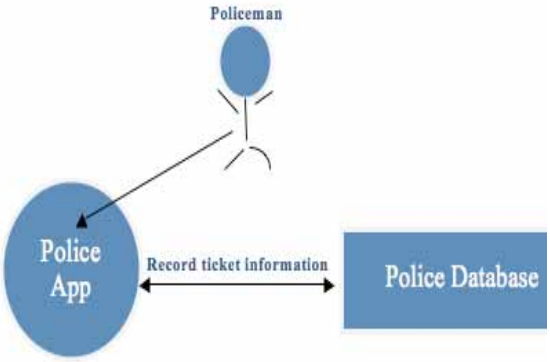
Policeman will be able to see a screen that show all the type of Traffic Tickets fees in a checklist form so the policeman can do the entire Traffic Tickets Recording with the help of technology.

How it works?

The policeman will just have to log in and scan the two ID's (Vehicle ID, License ID) and check the boxes from the checklist in a very simple way.

From this App we can:

- Sign In for every policeman so the system knows the information and data.
- Accomplish the task in very fast and efficiency in timing.
- Taking the document in a technical way by license barcode with no mistake instead of writing.
- Take the vehicle information fast and with no mistake instead of writing.
- Save the environment be reducing the use of paper.
- Send the Ticket Records info or data that we collected to the system directly so this will help the employees. (Policemen don't need to copy Tickets data or information from paper to the Database or system.



This app well make the Traffic Tickets Recording reach a new method and will make policemen job more easy and efficient with accurate and reliable information. This will also assist Abu Dhabi police reach a high level of development and sophistication in their traffic ticketing procedures and would make the Abu Dhabi police more reliable.

Tablet Computers as a Revolutionary Device and its Current and Future Impact

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ABSTRACT

The advancement of technology has greatly contributed to the world's development. We witness the substitution of technologies throughout each decade. For example, DVDs substituted floppy disks, and DVDs were substituted by e-commerce; since users would prefer to stream a video, while sitting at their current location than physically purchasing it.

This research paper is based on the tablet computers as a revolutionary device and focuses on its current and future impact. The tablet computers have existed since the mid 1990's. Although, the greater impact was during 2010 when the first iPad was first released. The tablet computer as a whole is suspected to be slowly substituting laptops in the long run. Tablet computers provide more flexibility and less complex usage to the extent that it has greatly aided with the development of educational facilities and personal productivity. According to Barclays Bank, Apple has shipped 25% more iPads than the largest vendor shipped PCs. Also, shipments of tablets has increased by 70.1%, whereas, the shipment of PCs has decreased by 11%. Since this is the current standing of the tablet computers, we can only expect it to go further in the future. It currently has helped several aspects of education facilities, and can assist the development of other facilities.

A survey is conducted to students of Zayed University and the American International School of Abu Dhabi. The survey mainly asks about the participants experience with their thoughts and opinion about the substation, their experience with productivity between tablet computer and PCs, and where do they think the tablet computers would be in future terms. This research paper would give us an idea on the current impact of tablet computers on our world development, and predict the impact in future terms. We can only understand that this is just the beginning for this revolutionary device.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Eye Gaze Tracking System

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Supervised by
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ABSTRACT

Eye gaze tracking is a new technology that would be useful in numerous applications such as marketing analysis through the retrieval of user's reaction to a product, assisting tools for disabled people lacking certain ways of communication, and intuitive interfaces for human computer interaction (HCI).

Such systems are usually head-mounted and often incorporated into glasses or headsets. In this work, we propose eye gaze algorithm to improve the availability, accuracy and the usability of such systems using only a camera.

We used (Open CV Viola-Jones Face Detection) for face detection and computer vision toolbox from Matlab® for eye detection. We used the pupil center cornea reflection (PCCR) technique for eye tracking. The angle of the visual axis is calculated by tracking the relative position of the pupil center and a speck of light reflected from the cornea, technically known as the "glint". We have successfully implement our proposed first algorithm to estimate the pupil coordinates (Figure 1).

Figure 1. Eye detection

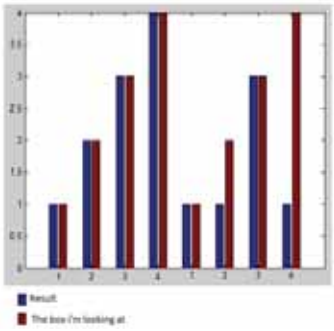

Figure 2. Mapping accuracy

In order to find the gazed screen coordinates, a mapping between the pupil coordinates obtained from proposed algorithm and the coordinates of points on the screen is obtained using a classification algorithm (Figure 2).

As an application, we have developed a system to help disabled people controlling their environment. The screen is divided into four areas and each area is mapped to a function to control devices in a room with the eye gaze. First, the user has to calibrate the system by looking at specified area. After that he can start using the system. When the user looks at an area for three seconds, the function mapped with this area will be turned on. When the user wants to turn off the function, he has to look at the same area again for three seconds (Figure 3).

Figure 3. Controlling a room

On the Application of Genetic Algorithm in the Intelligent aCademic aDvising System (ICD)

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ABSTRACT

In Recent years, educational institutions, including colleges and universities, seek to apply new technology for academic advising as a purpose to promote the learning method for each of the faculties and students. Such new technology can enhance the development of students by identifying and achieving their academic goals. This means the perspective of academic society toward academic advising must be improved by adopting an intelligent system as a priority for the development of students. In this vein, the present paper tries to find good solutions to the academic advising system by proposing a new intelligence system titled Intelligent aCademic aDvising (ICD). ICD is an intelligent web-based advising system for helping, notifying and providing some advices and directions to the students in a way that help them to meet a good performance in their study life. Indeed, ICD will overcome the manual academic advising system problems by proposing some intelligent tools that will help both the students and advisors in developing a precise short–term curricular schedule. However, ICD will save the time and the effort of the advisors and helps them to do their work efficiently. It will provide some intelligent functions that will help the advisors to take the decisions and give some advices to their students. Above of that, the ICD provides the advisors with some services that facilitate them to see the status of their student and receiving some notifications. Therefore, it will help them to keep track their students easily and they will be able to manage some meetings with their students.

ICD system is consisting of three main units: User unit, Grading unit and Course Announcement unit. Each of these units is responsible to provide services for each of the advisors and students. Nevertheless, to reach a degree of automatic advising by the ICD system, GA mechanism is adopted in the suggested units. GA is biologically inspired and has many mechanisms inspired by natural evolution. Because of its parallel mechanism with high-dimensional space, GA is proposed here to resolve the problem of academic advising. The aim of using GA with ICD is to provide the student and advisor with an automated semester plan that best fits his/her study plan. The GA also helps the ICD system to provide the student with a reasonable recommendation to his\her marks in the current registered semester if he/she is under probation proration.

In addition to the suggested main units, ICD able to displays the number of the completed credits, GPA, the study plan and the courses that they don't completed. All these features of ICD make the advisor a useful system for those under proportion students.

ICD is developed with two databases: the administrative database and the student database. Both databases are built within web applications employing Apache Web Server, MySQL, Java Server Pages and NetBeans. The performance of ICD in the college of applied science has been evaluated during an experiment with experienced advisors and 5 students of this college.

An Immersive Bilingual Dictionary

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ABSTRACT

Bilingualism, specifically Arabic-English, is prevalent in local universities. We address some of the difficulties University students experience with the general and technical vocabulary by developing an immersive bilingual dictionary. We elaborated a framework and implemented a mobile application to support students in their endeavors to acquire and learn more vocabulary. Besides the typical functionality of e-dictionaries, our application provides several features, such as pictures, animation, and pronunciation, to positively stimulate the learning experience.

Keywords— Arabic-English dictionary; bilingualism; translation; vocabulary selection; immersive dictionary.

6th Annual Undergraduate Research Conference on Applied Computing (URC 2014)

Using Mobile Augmented Reality Technology in Historical Recreation: A Case Study in Dar Al-Saraya Museum

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Supervisor:
Mostafa Z.Ali

ABSTRACT

Archeological heritage is at the heart of each country's national pride. Moreover, it could develop into a source of national income. However, heritage management requires socially-responsible marking that achieves high visitor satisfaction while maintaining high site conservation. Despite its richness in archeological sites, Jordan's number of tourists (around 3,022,000 tourists) is well below achievable targets. One possible explanation of this low achievement is the failure of current heritage management practices in creating rich perception of the archeological sites within the cognition of the tourists.

Site interpretation is an essential component of heritage management. This component is a set of activities that are adopted to realize high public awareness, to facilitate easy understanding of heritage sites and to enrich the visitor's experience. The traditional toolkit for site interpretation includes but is not restricted to informational panels, signage, and guided tours. Fortunately, information technology (IT) has been investigated for interpretation improvement purposes. The applications showed positive results.

This research is a continuation of IT applications in site interpretation. We are proposing an application of Augmented Reality (AR) technology. AR technology is a cutting-edge technology that allows for a digitally enhanced view of a real-world environment, allowing combining seamlessly physical world and virtual information. We propose to deploy AR in the cultural heritage management of Dar Al-Saraya museum in the city of Irbid. Our solution is based on an Android smartphone application designed to enhance the visitor's experience while touring the museum. The application is a collection of recreated models of some exhibited artifacts.

One artifact model provides the user with the ability to manipulate and interact with the artifact in a 3D view. The smartphone's camera is able to detect the tourist's fingers allowing him/her to examine the artifact from any angle by finger movement. Other models are used in developed animations which when triggered will play on the Smartphone screen providing the user with an illustration on how an artifact was anciently manufactured or used or traded, etc. Finally, some models will represent a restoration of damaged artifacts. The restoration process handles several types of damages from missing parts to faded colors.

Besides its interpretation-oriented features, our solution includes tourist navigation features. Using Google maps, the tourist's smartphone could guide the tourist to the museum site within the city. When the tourist's smartphone camera identifies the front view of the museum, the screen will display a line-model of the Museum building with information on the location of museum halls with distances and directions. Internal navigation could even guide the tourist to the location of a desired artifact.

[Figure 1: shows cultural restoration of the museum by Augmenting the missing part of the Mosaic]

[Figure 2: display the main Hall of the museum as pins on the screen.]

Evaluation of Proximity Service Protocol in 3GPP LTE Device-to-Device Discovery and Communication

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ABSTRACT

3GPP LTE Release 12 has devoted specific working group efforts for studying Device to device (D2D) communication and Proximity Services (ProSe) that may improve spectrum usage efficiency and will optimize the tradeoff between throughput and energy consumption. The target use cases are related mainly to the public safety networks, which have to operate under challenging conditions, which could involve partially damaged or non-existent terrestrial infrastructure. In LTE standardization two basic modes for D2D have been under investigation: D2D discovery and D2D communication. With D2D discovery a user may identify other proximal users via the LTE radio interface. On the other hand, D2D communication involves the actual link between proximal users via the LTE radio interface. The notion of proximity may involve -apart from physical distance- other criteria such as received signal strength, SINR, channel gains and / or network load. The proposed work will investigate the design aspects of both D2D discovery and communication and will perform an extensive survey or the relevant standardization documents issued by the respective 3GPP working groups. It will focus on the related mechanisms and protocols that have to be implemented (above and beyond those currently specified in LTE) in order to support D2D communications without affecting other existing eNodeB-user connections. These mechanisms are related to the functionalities described within the **ProSe discovery and communication setup.** This procedure is employed by a ProSe-enabled UE to discover other ProSe-enabled UEs in its vicinity by using only the capabilities of the two UEs with rel.12 E-UTRA technology and to initiate peer-peer communication. The assessment of the abovementioned protocol and of their related mechanisms will be performed by simulation using the NS-2 system simulation package. The proposed work will also closely monitor the work performed within 3GPP and specifically on the following work items: Proximity-based Services Specification (ProSe) and Group Communication System Enablers for LTE (GCSE_LTE). Both these items are targeted to be included in the 3GPP Release 12, which is currently under development. The outcomes of this work will be used as a basis for further testing and implementation on open-source hardware/software development platforms such as the OpenAirInterface that will enable the real-time assessment of the developed protocols based on significant amounts of measurement data and their subsequent analysis.

We started out project with a background study about the D2D communication, radio environment and the 3GPP work plan for protocol standardization. Second, we analyzed the protocol specification and designed a scenario from the specification as well as determined the parameters. Currently, we are implementing the scenario according to the specification and finally we are going to graph and compare the result of our implementation with two other papers before we report the result, bugs and recommendations.

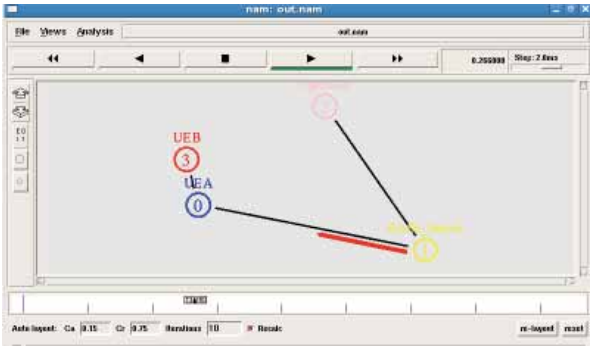

Figure 1: Simulation of D2D direct communication – Discoverability in public safety

Sehha Appointment Application "Mowa'aed"

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ABSTRACT

Nowadays smartphones are the most popular devices around the world, so they can be very helpful for the whole community. This kind of solutions has come up in our minds after we faced a problem in taking appointments through the 'paid' telephone line, because always in Sehha all of their workers in the call center are busy for a long time. Furthermore, sometimes it will cost you more from your phone credit balance and very long time before you reserve your appointment.

Our idea is that anyone who wants to reserve an appointment in Sehha authority, instead of waiting a lot of time in the phone or driving the whole way to the hospital just to take an appointment, with this application it will be more easier and faster to take appointment in just few seconds.

Mowa'aed application works with the newest way of optical machine-readable, so the application will ask the user to scan the barcode from the medical ID card to register his/her medical information. Then the user will have three main options:

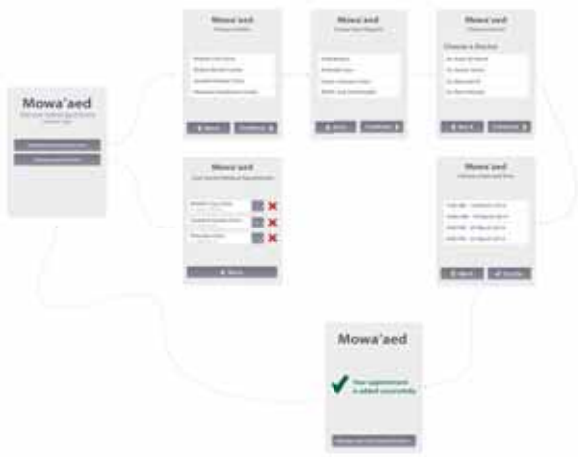
1. Reserve new appointment
2. Change appointment
3. Cancel appointment

Additional Services

In addition, we think it will be possible to let the user get his test results via the application, such as; blood test results and the necessary medicine description.

Application Prototype

Here is the prototype of application to let you know how the application will work virtually (Picture the on right):



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