8th Annual Undergraduate Research Conference on Applied Computing

"Today's Researchers and Readers, Tomorrow's Innovators and Leaders"



URC 2016

April 27 – 28, 2015 | Zayed University | Dubai, United Arab Emirates

Book of Abstracts

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8th Annual Undergraduate Research Conference on Applied Computing (URC 2016)

COLLEGE OF TECHNOLOGICAL INNOVATION
ZAYED UNIVERSITY
UNITED ARAB EMIRATES

April 27 - 28, 2016

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CULTURE & ARTS

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Message from
CONFERENCE CHAIRS

Welcome to the 8th Annual Undergraduate Research Conference on Applied Computing (URC 2016). The objective of this conference is to promote undergraduate research activity at educational institutions across the Arab world, by providing a forum for undergraduate students to present their research projects, share ideas and interact with other young researchers, faculty members, and technology leaders from the region.

Contained in this eBook, you'll find 156 abstracts representing undergraduate student research projects from many universities in the Arab world. The topics covered reflect the multidisciplinary character and wide spectrum of emerging technologies. The research projects will be presented, in live demos, lightning and poster presentation styles, by undergraduate students from 24 educational institutions in 10 countries, namely: Bahrain, Egypt, Iraq, Jordan, Kuwait, Oman, Palestine, Qatar, Saudi Arabia, and 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 sponsor, Zayed University Office of Research, for their continued commitment and contributions that help make this conference a reality. Thank you!

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

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

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



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Interim Dean, College of Tech Innovation
Zayed University, UAE



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



Dr. May AlTaei
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Zayed University,UAE

8TH ANNUAL
UNDERGRADUATE
RESEARCH CONFERENCE
ON APPLIED
COMPUTING

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HTCC: Haskell to Handel-C Hardware Compiler

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ABSTRACT

Field Programmable Gate Arrays (FPGAs) are famous and widely used reconfigurable computing (RC) systems. FPGAs have become very popular in research and industrial applications in different fields, such as, security, signal processing etc. FPGAs evolved from being limited in functionality and speed to become high-performance processors. Example FPGAs include STRATIX from Altera and VIRTEX from Xilinx.

Recently, there has been considerable focus on the development of high-level synthesis (HLS) and rapid prototyping hardware/software co-design tools. The targets of co-design tools are high design productivity, simplicity, reduced time-to-prototype, correctness, to name a few. Co-design tools include converting algorithmic behaviors into digital circuits that can map onto FPGAs. High-level co-design tools are currently beyond behavioral VHDL (a hardware description language) and the other standard tools. The area witnessed the emergence of tools such as Handel-C, SystemC, Matlab HDL Coder, LabVIEW, etc. All the modern co-design tools enable the integration and partitioning of computations into communicating hardware and software subsystems.

Handel-C is high-level language with hardware output. Handel-C is based on ANSI C; it is extended to the theory of communication sequential processes (CSP) and the concurrent programming language (OCCAM). Moreover, Handel-C has the ability to provide both parallel and sequential implementations. Handel-C can target different FPGA types. Recent research effort has been on automating hardware generation to target Handel-C and hardware in general starting from functional specifications, such as, Haskell.

HTCC is an Integrated Development Environment (IDE) that is capable to compile a subset of Haskell to Handel-C, in addition to, automatically generating VHDL, Verilog, EDIF, and SystemC (See Figure 1). The design of HTCC compiler includes lexical, syntax and semantic analyzers. The compiler is generated from ANTLR tool by providing a subset of Haskell grammar based on an Abstract Syntax Tree (AST). The AST is generated from the equivalent parse tree and a tree-walker. The developed IDE supports parallel and sequential generations and produces a variety of analysis and schematic files. HTCC successfully connects to external tools, such as, DK Design Suite, Altera Quartus, and ModelSim. The developed compiler targets an Altera DE2-70 Board with its CYCLONE II FPGA and an Altera DE4 Board with its STRATIX IV FPGA. The targeted area of application is cryptography, namely, the XTEA and AES ciphers. Figure 2 demonstrates a single round of XTEA. Future work includes adding verification option that enables the reduction of Haskell functions. Future work also includes expanding the area of application and widening the pool of implemented Haskell syntax.

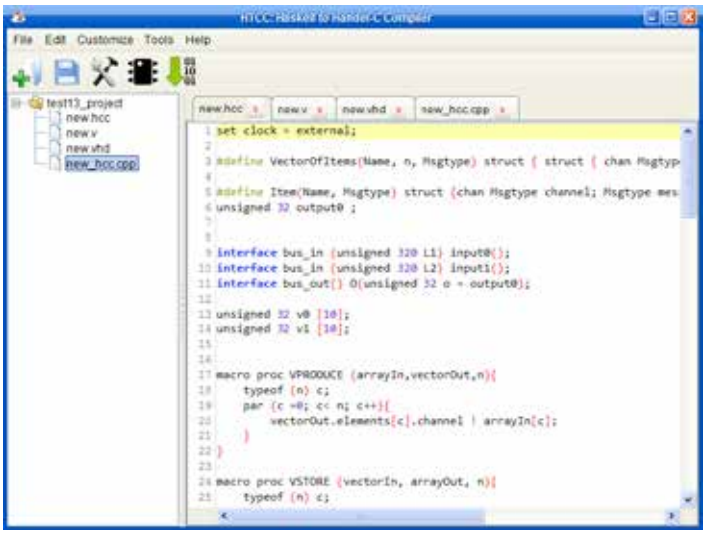


Figure 1: HTCC IDE

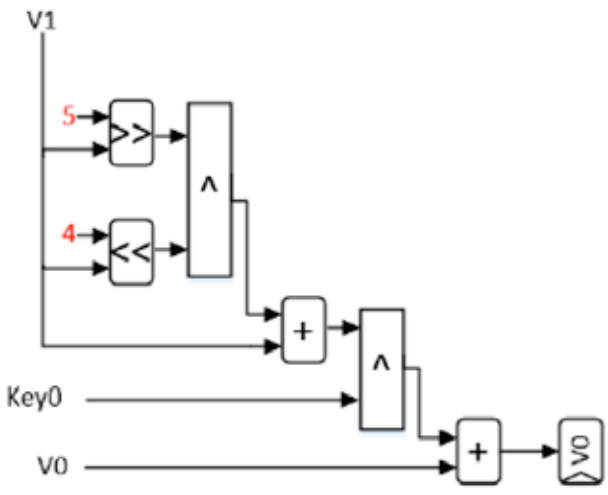


Figure 2: Single Round XTEA

The Little Programmer

Learning Mobile Application to Teach Children How to Program

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ABSTRACT

Until the last few decades, education focused on skills called the Rs – reading, writing and arithmetic, but now technology has changed everything. Understanding the technology requires a new skill called coding or computer programming. Although coding is emerging as a critical skill, it is not usually taught until high school in Saudi Arabia. It is introduced briefly to high school students and intensively for computing and engineering faculty's students. The idea behind this project is to develop a learning interactive mobile application to introduce programming basic concepts to children, providing them the opportunity to practice programming at a young ages in Arabic language. The Little Programmer mobile application is being developed following the Agile-Mobile-D methodology; it takes in consideration the rapid change that happens in software development, support small releases, risk handling, user involvement, and continuous updating. The Little Programmer mobile application is developed on Android platform and architected based on Model-View-Controller model.

The Little Programmer mobile application got an international inspiration from President Barack Obama's speech [1], in which he asked America's youth to adopt computer programing:

"*Do not just buy a new video game, make one. Do not just download the latest app, help design it. Do not just play on your phone, program it*".

From a local prospective, Pentecostal tenth plan of development in Saudi Arabia [2], was a big inspiration in which proper education is considered one of the pillars of the information society that the government is aiming to achieve. The Mohammad Bin Rashid Smart Learning Program [3] that offers a modern way of teaching through the integration of technology to the education system was another inspiration.

The Little Programmer mobile application aims to create an interactive e-learning environment for elementary school children aged 8-12 years-old to allow them to understand the programming concepts that use Arabic language to explain different knowledge, changing their perspective about technology, let them think out of the box and solve problems.

Hoping the children get benefit from this mobile application and be their starting point to the programming world.

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Analysis of a Cyber Physical System

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ABSTRACT

The new paradigms and tremendous advances in computing, communications and control have provided and supported a wide range of applications in all domains of life, in particular, bridging the physical components of life and the cyber space leading to the Cyber Physical Systems (CPS). The notion of CPS is to use recent computing, communication, and control methods to design and operate intelligent and autonomous systems that can provide using cutting edge technologies. This requires the use of computing resources for sensing, processing, analyzing, predicting, understanding of data, communicating resources for interaction, intervening interfacing management, and finally providing control for systems so that they can inter-operate, evolve, and run in a stable evidence-based environment. CPS has extraordinary significance for the future of several industrial domains hence, it is expected that the complexity in CPS will continue to increase due to the integration of cyber components with physical and industrial systems.

A collection of several control, communication, and computing paradigms are used to provide the CPS central host and operator terminal application, support the communications system, monitor and control remotely located field data interface devices. Therefore, verifying that CPS actually achieves the desired control and monitoring objective is not easy for many reasons. Firstly, because of the inherent complexity of interconnected CPS systems. Secondly, there are many unconstrained behaviors of the system being monitored. Finally, there many ambiguities about understanding the interactions between CPS components which arise due to the informal description of the system as the only available specification. CPS are widely used in several types of systems such as power systems to maintain and control their operation. A high level of reliability of such systems is required by providing efficient means to detect any problems in their operation and the integration between the physical parts and the cyber parts. However, failure of the any part of the system can result in severe and costly consequences. For instance, the monitoring and controlling of complete grid and complex power generation plants is achieved by SCADA system; however, there were many major power-system blackouts, such as the major black outs that took place in 2003 in the US-Canada, Italy, and Sweden-Denmark, and another recent black outs occurred in Brazil-Paraguay in 2009 and in India in 2012, that affected millions of people , such as three major black outs that took place in 2003 in the US-Canada, Italy, and Sweden-Denmark, and another recent black outs occurred in Brazil-Paraguay in 2009 and in India in 2012.

Simulation methods are frequently used in testing such systems; however, it might not be adequate to show the absence of errors given the complexity of the system under test. Failure in detecting errors in safety critical systems can lead to catastrophic situations. In this paper we propose an approach for simulation-based analysis of cyber physical systems in which we demonstrate the approach on an industrial case study of a four tank process that demonstrates several challenging features in the design and implementation of CPS. Our experimental results show that the proposed approach is efficiently used in order to test and verify the four tanks process system, where simulation results have shown the validity of approximation and abstraction of the system.

Figure 1 below illustrates the four tank process and how it is connected to a data acquisition computer. The process is called the quadruple-tank process and consists of four interconnected water tanks and two pumps. There are two sensors that provide water level for the two main tanks: sensor 1 and sensor 2. As illustrated in Figure 1, Pump01 extracts water from the bottom reservoir and feeds into Tank 1 and Tank 4 via a three-way valve (Valve 1), while Pump 2 feeds Tank 2 and Tank 3 via another three-way valve (Valve 2). The voltages to the two valves are manipulated such that they determine the proportion of the flow that goes into the tanks. The proportion of the output flow into the tanks is determined and controlled by the valves position, as any change in the valve position will alter the quantity (or proportion) of flow into the tanks. The regulation of this process is designed using different types of controllers, however, it has been concluded based on several researches that the splitting of water flow from the pump into all the four tanks causes process interactions and control loop interactions.

This paper presents a practical method for modeling and verification of CPS systems process using simulation. This novel proposal is based on a systematic process that uses high level reasoning in order to model and verify that the design specifications include certain design requirements.

The Problem of Technology Obsolescence

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ABSTRACT

In recent years, new words have entered into our dictionary such as Technology obsolescence. Technology obsolesce is mainly when the technical product, hardware or software is no longer used or even wanted though it could still be in working order. These products will eventually ceases to be useful, productive or compatible and new product will eventually be created to replace the older versions.

The software or file format can become obsolete for a number of reasons. For example, software upgrades may not support legacy files; the format take up is low and the industry does not produce compatible software; software, which supports the format. Furthermore, it might occur when a company stops producing, marketing or supporting a product therefore it is a relevant problem to many organization. The problem of technology obsolescence can have a huge and negative impact on the Organizations if no serious action have been made to avoid it. In addition, organization might not be able to purchase the latest devices every time something new comes out in the market and therefore their digital objects must go through recycling.

First effective solution to avoid technology obsolescence is to customize our own technology so it fits our businesses needs and wants and to always look for what is trendy and new. Outsourcing which is as well a preferable option can help in this, especially since outsourcing helps the organization to focus on its core mission which might be to offer the lowest price , access world class capability for different skills and technologies ,sharing risks in which other companies are willing to take off all the responsibility with you and try to overcome the problem, and most importantly the pay per use method which allows organizations to control and to reduce the cost by only paying for what is needed which will increase the workflow efficiency and improve the device management .

The second solution is that all organization should install a software that provides key alerts on stock levels and demand. This well help the company to focus only on what is important and help them to reach out to their customer in a faster way. cloud computing can help as well in which it has many characteristic including on demand self service which gives the organizations access to desktops and laptops as utilities, where they can enjoy lower total cost of ownership than of purchasing the PCs separately. Moreover, it provides a broad network access, and resource pooling where multiple customers share adjacent resources in the cloud to benefit from one another. In addition, a reactive, proactive and strategic process is as well suggested to all organization No matter how small or big it size is. This process should focus on both the current and future situation this would help to minimize the financial and operational impact. Management needs to be aware of the impact of technology obsolescence on all aspects of their business, and factor it into their decision processes such as selling the old devices or part to gain some profit. These organizations can experience a high ROI (Return on Investment) and benefit from cost savings in production and manufacturing.

This research discusses the serious problem of technology obsolesce and proposes some solutions to avoid obsolescence or to minimize its cost which can be accomplished through action in planning and programming; cloud computing, preplanning, outsourcing, recycling etc.

Business Intelligence Keeps Enterprises Efficient

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ABSTRACT

Enterprises are using the latest ERP technologies to compete between each other to do their work effectively and efficiently. One of these technologies is known as Business Intelligence (BI). BI allows enterprises to gather, store, access and analyze corporate data to aid in decision-making. BI is a term that usually refers to different types of software applications that help companies to analyze their raw data. It keeps firms work efficiently because of several related activities, containing data mining, and online analytical processing (Mulcahy, 2007). Today, several enterprises trend to apply BI tools, skills, and techniques to operate their job efficiently and successfully. This study addresses the question of "How BI helps companies be effective and productive?" More specifically, the study answers the following questions:

- Why companies have to trend to the business intelligence tools?
- How business intelligence helps companies be effective and productive?

The main finding of this study is that enterprises have invested in BI software to help them centralize, better access and get a better understanding of key business metrics such as sales and to predict future performance. BI provides various software for company to turn data into information, information into knowledge, knowledge into decisions and decisions into profits. Without these tools, enterprises would turn the risk of making critical decisions based on insufficient or inaccurate information. Furthermore, BI leads companies to be efficient by:

- Improving sales and negotiations.
- Eliminating waste and reducing labor costs.
- Allowing end-users extract reports when they need them rather than depending on IT people or finance department.
- Helping making faster and better decisions.

The study ends with showing one example of a company that successfully implemented BI. Toyota signed a contract with CRM provider (Salesforce.com) to create a customer-only online and mobile community, like Facebook and other social networks. It chose the customer relationship management (CRM) from BI tools, and use it for the Toyota Friend project. This project is a private social network for Toyota customers and their cars that will be powered by salesforce Chatter, a private social network used by businesses (Sawers, 2011).

To conclude, BI software is defined as a management philosophy, but in a narrower sense. It is a powerful tool that helps companies to increase their profit with the lowest cost. Furthermore, it manages their business information by getting faster answers to business questions and insight into customer behavior. Additionally, it provides information for more effective decision-making and management, and ranges from faster and easier access to information for decision-making, improved public relations and a better reputation of the company (Hocevar, 2010). Finally, it determines where your business has been, where it is now and where it is going to be in the future.

Keywords: business intelligence, benefits, enterprises, efficient, Toyota companies.

CRM Solutions to Enterprises

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ABSTRACT

This paper demonstrates the Customer Relationship Management (CRM) Solutions to Enterprises. CRM is a process by which a company maximizes customer information in an effort to increase loyalty and retain customers' business over their lifetimes. The primary goals of CRM are to build long term and profitable relationships with choosing customers, get closer to those customers at every point of contact and maximize company's share of the customer's wallet (Goldenberg, 2008). Marketing is delivering the right message to the right person at the right time through a range of communication channels that requires the ability to quickly collect data, gain insight, and parlay that insight into action. Modern marketing enables businesses to create personalized, meaningful experiences for customers, turning casual prospects into passionate advocates and achieving more revenue faster. CRM software tools exist to provide customer satisfaction to enterprises. The implementation of CRM is likely to have an effect on customer satisfaction for at least three reasons. First reason, firms are able to customize their assistances for each customer. By accumulating information across customer interactions and processing this information to discover hidden patterns, CRM applications help firms customize their offerings to suit the individual tastes of their customers. This customization enhances the perceived quality of products and services from a customer's viewpoint, and because perceived quality is a determinant of customer satisfaction, it follows that CRM applications indirectly affect customer satisfaction. Recently, research has been conducted to show how large corporations tailor their image and products to get the best response from target consumers. Second reason, CRM applications enable firms to provide timely, accurate processing of customer orders and requests and the ongoing management of customer accounts. Third reason, CRM applications help firms manage customer relationships more effectively across the stages of relationship initiation, maintenance, and termination.

The findings of the study shows that there are more than 377 CRM software systems found in the enterprise world, including Oracle, SAP, Salesforce, Infucsionsoft, TeamSupport, Microsoft Dynamics CRM, Mhelpdesk, Act! Premium, and more (Software Advise, 2015). The solution to ERP systems are provided by two of the dominant CRM software providers (Oracle, and SAP) are as follows: Oracle provides a comprehensive and integrated CRM solutions for today's business. For the client, the customers expect a seamless experience when they interact with enterprises—on social media, mobile, in-store, through the call center, on enterprises' websites, and when making a purchase online. SAP, on the other hand, provides secure and feature-rich deployment option to support enterprises, service, and marketing activities. It helps enterprises build customer loyalty, win more deals, and provide customers with the assistance they need, when they need it. Those two software providers claim that applying CRM results with the following benefits:

- Sell more through digital channels using the industry's top-ranked commerce platform
- Engage customers anytime, anywhere, and on any device from a single end-to-end platform
- Stay a step ahead of demand to analyze data in real time
- Get sales team up to speed – without slowing down
- Deliver exceptional customer service by giving field workers remote, real-time access to data

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How to Protect Data in the Cloud?

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ABSTRACT

As the debate regarding security strategies to provide a protection for data in the cloud, information age seeks a definitive solutions and services for the cloud security issues (Rossi, 2015). During the past few years, cloud has been popular to deploy enterprises data, as well as the demand for the security services and products. It is extremely necessary for businesses and organizations to boost the security of their data in the cloud for a reason that the threats of data safety refuses to die, which puts their stored information at risk. The digital guardians are providing different procedures that will help businesses keep stored data and their processes secured in the cloud (Lord, 2015).

It's ultimately up to each enterprise to put into consideration the security of their data in the cloud to keep them out of danger and avoid data loss. There are various tips to pursue protecting data that enterprises can enforce in their community and it is very important to follow these tips for securing cloud data (Ivey, 2013). These tips are (a) encrypt files with a password, (b) use an encrypted cloud service, (c) access control mechanisms, (d) authentication and identity, and finally (e) secure deletion. The purpose of this study is to showcase these tips to protect data in enterprises. Our study reveals the following observations: Firstly, encrypting files with a password is the best method for protecting data. Before storing the file in the cloud use certain software to create a password for that file and no one will be able to see the content of the file. Secondly, use an encrypted cloud service to encrypt or decrypt files. There are some clouds services to provide this option, and the service works by encrypting files on the computer and store them safely on the cloud. Thirdly, create access control mechanisms, which maintain a complex IT environment for enterprise that reliably supports separation and integrity of different levels or categories of information belonging to multiple parties (Winkler, 2011). Moreover, create authentication and identity that relies on maintaining confidentiality, integrity, and availability for data security. In addition, make secure deletion that refers to understanding how sensitive and valuable enterprise data is deleted in the cloud and it include two key aspects of data deletion such as clearing and sanitization.

In conclusion, securing data in the cloud is ultimately the enterprise choice, but it is extremely important to raise information safety. Therefore, businesses must use the effective data security techniques that will utilize the cloud such as: encrypt files with a password, use an encrypted cloud service, access control mechanisms, authentication and identity, and secure deletion. In order to increase the security of data over the cloud, enterprises must be aware about the latest security tools and news to be fully prepared for the potential risks.

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Tips for a Successful ERP Vendor Selection

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ABSTRACT

This abstract summarizes a term paper that was submitted as partial fulfillment of a senior course in Enterprise Computing at Zayed University. The study was about "Tips for a Successful ERP Vendor Selection". Below, is a summary of the main points raised in this research paper.

In choosing the right ERP System, enterprises should first identify their needs and if they have the resources. Secondly, does the vendor have experience in their business area(s)? Finally, will the ERP solution align with the organization's business processes? The research paper then demonstrates the tips for a successful ERP vendor selection. The five tips are (4)

Set your goal: The first step before choosing an ERP vendor, is to define what enterprises really need from the ERP System and lay out the goals that should be accomplished for the new platform, and will the technology align with strategic business goals.

Outline the Enterprise Requirements: The second step would be to focus on what enterprises need from the technology rather than how the technology will accomplish this, meaning the business should focus on their core function rather than technology.

Evaluate Options: After clearing out the list of priorities and requirements, now the business mission will be quicker and they will be able to eliminate solutions that they don't need and aren't the right fit for the enterprise goals and is not aligning with the organization's business processes.

Ask for references: Ask for at least three references of similar successful business stories. This is because, no vendor will speak directly about the potential downsides of their product, or does it really the best fit for business requirements.

Decide: After collecting all necessary information and references that are needed, it's time to decide what ERP system enterprise will choose. They should pick the solution that is the best fit for business, which aligns with strategic goals to help the business grow and evolve.

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What Skills are Necessary for ERP Project Leader?

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ABSTRACT

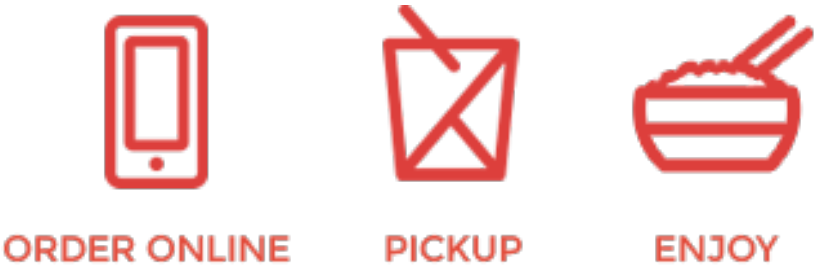
The study examines some critical skills that a project leader ought to possess to successfully lead team members. We investigated several resources and came up with a list of the necessary skills that project leaders should have in running a successful ERP systems. These skills include decision making, technical ERP, communication, team commitment skills, and organizational skills. Decision skills are essential in this case as it would guide the leader to make tough choices where team members encounter problems with other members. Furthermore, the leader will show ability to solve disputes that may derail the implementation process. Regarding technical ERP skills, the project leader ought to possess adequate knowledge on how the ERP software work. This is critical in providing technical assistance to the team members and even describing to other units how to use the software. Communication skill is crucial in the sense that the leader would be able to convince members to support the project by realizing the benefits of the ERP in the enterprise. Team commitment provides motivation to members by gaining willingness to perform assigned tasks. Lastly, organizational skills are vital for the project leader to demonstrate ability in coordinating resources, planning, working within the schedule, managing time and attaining the set objectiv. We believe that those skills are necessary for project leaders to run a successful ERP systems; to stick to the time schedule, use the provide resources until the completion of the ERP project and to stick to the budget to avoid unnecessary delays.

ToGo: Food & Drinks Mobile Application

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Supervised by
Dr.Isra AlTuraiki

ABSTRACT



Time is one of the most important aspects in a person's life especially if that person is a student or an employee. Saving time is always a concern, since splitting time sensibly, between our daily duties guarantees doing them properly and increases the productivity of our work, study...etc. In our case as Information technology students, we take our major very seriously and we perfectly understand the importance of time because we realize that time is involved majorly in our specialty. Time on campus is valuable and we have found that waiting in the line of the cafes and restaurants consumes a lot of time, especially when having a quiz or a workshop in the break time. As a part of the university community, we want to solve this problem of spending a long time in lines and travelling a long distance to another college or the main hall to get a meal or a snack.

In this project, we propose an IOS mobile application that will save time and make workers' days easier. We are proposing to offer a pickup and delivery service from various cafes and restaurants within the campus using a mobile (smartphone) application system: there are multiple applications that support online ordering but, aim to offer this service to indoor facilities and enable the pickup or delivery services. Our application will offer the students, faculty members and employees a list of the available cafes and restaurants and enable them to select the order from the menu, it also shows the time required, the total price, and finally requests either a pick up or a delivery service.

People who have valuable time are the targeted users in this project, as this application will make their lives easier and save their time. Also, the application will help coffee shops and restaurants to control their orders, reduce the traffic and save time. The main goal of our application is to save students' and staff members' time as customers, and increase the income of the university cafes and restaurants by allowing customers to place orders while they are on their way so the merchants can prepare it in time to be picked up - using GPS tracking to control arrival time. Fortunately, technology can solve our problem easily.

KHEDMTI: Mobile Social Commerce Application for Selling Services in Saudi Arabia

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Supervised by
Dr. Salha Abdullah

ABSTRACT

The entire world is shifting from traditional style workmanship to a technological work environment. Thus, the need for an electronic system is clear solves any of the problems that any system usually faces. In addition the range of mobile social commerce has been expanded to include social media tools and content used in the context of e-commerce. The objective of the project is to develop a social online store mobile application for selling services that target talented micro-entrepreneurs service providers and customers who are interested to view and take advantage of the Services provided easily. The name of application is Khedmti and the application categorized as Customer-2-Customer (C2C).

The project scope is to develop application for standard technical services that aggregate between service provider who begin his/her small business and need the help in conducting, advertising and selling his/her services, and between customer who wants to easily order these services. Khedmti application aims to solve the problem of communication barriers between customer and the service provider, whereby the customers could find the best service provider according to their specifications. The application will initially launch in Arabic language, since the target customers are resident or citizen in Saudi Arabia. Khedmti target service providers who sell technical services specifically in five categories: web development, application development, software maintenance, graphical design, and photography. The customers who are interest to order and buy these services, both resident or citizen in Saudi Arabia, and familiar in using social M-commerce application. For now the project team focused on some Technical services with the possibility to add more types on the future.

Problems the Project Aims to solve are communication barriers between customer and the service provider, also the difficulty of agreeing and arranging appointments. The micro-entrepreneurs who are the service provider have no experience in conducting their business so the application helps them organize and manage their work. Marketing also is an issue when starting a business. From the customer side, customers waste their time looking for a desirable service and offers that suits their budget and requirement, also the difficulties of ordering different kind of services. Users find it difficult to follow up with the order status. Some service providers have no authorized online stores to conduct their business and guarantee their rights for both user and service provider. Since services are intangible, something one cannot show or present to the customers before purchase therefore it depends mostly in the rates, reviews and recommendations of the service provider from other customers.

As a result, Khedmti application will help providing a social store that assist service providers in offering their services and facilitate their work, through an organized way and do their business through Khedmti application. By collecting these services in one application customers can find the process of ordering and receiving the services more easily and saves the time and effort.

The project team has used UML as modeling language and Android framework as developing platform by using Agile-Mobile-D methodology.

KAU Virtual Cane: A Smart Vision Application for the Visually Impaired Students

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Supervised by:
Dr. Salma Kammoun

ABSTRACT

Visually impaired students in King Abdul-Aziz University can't navigate around the campus without relying on another sighted person as a guide. The problem is, finding such a person who must be available for them all the time. Hence, making use of device-based solution as an assistive guide will eliminate such problems. Some of these solutions require advanced technology that may not be available for everyone and may also require wearing or carrying extra hardware that makes its user look odd in public. In fact, everyone now is using smartphones, including the visually impaired students via accessibility mode. So developing a mobile-based solution that works as a safe navigational assistance can be a more suitable approach. Our solution proposes an assistive technology for the visually impaired students in order to navigate safely to the buildings where their classes are taken. Figure 1 and Figure 2 demonstrate the flowchart of the proposed system. The system starts by taking GPS signals, camera video frames and user's voice as inputs. Then, applying speech recognition to find the desired destination. The third step is using GPS technology to localize the user and find the correct path to the destination. Following that is processing the video stream of frames to detect static and dynamic obstacles in the sequence of frames. Finally, the system merges the outcomes of these steps to provide an intelligent decision via a voice directive. The system should keep routing all along the way, to keep up updating the path and provide a real-time navigating. The most critical and challenging task is obstacle detection step, the main challenge is enduring the effect of different light conditions on the prediction process's result. Another one is meeting the required speed of image acquisition process, lastly the effect of noise caused by the user's movement. Moreover, our system can detect obstacles without prior knowledge of the environment. Prediction models generated by supervised learning are used to detect static and dynamic obstacles in their proximity along the way. In this offline work, we have taken into consideration all the requirements of the data mining process with a learning set of 56,000 images, pertinence of features (RGB histogram, Gray histogram, HoG Histogram of Oriented Gradients, MSER Maximally Stable Extremal Regions, SIFT Scale-invariant feature transform, LBP Local Binary Patterns and HSV histogram) and several testing and evaluation of different learning algorithms. Our system records good results in term of alert-rate with the results of 90% true positive, 82% true negative, 10% false positive and 18% false negative. An example of qualitative results is shown in Figure 3.



Figure 1: KAU-VC Proposed System

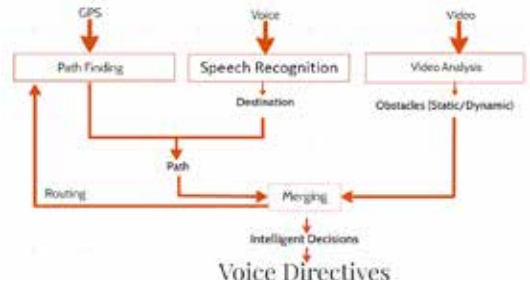


Figure 2: KAU-VC Functional Architecture Diagram

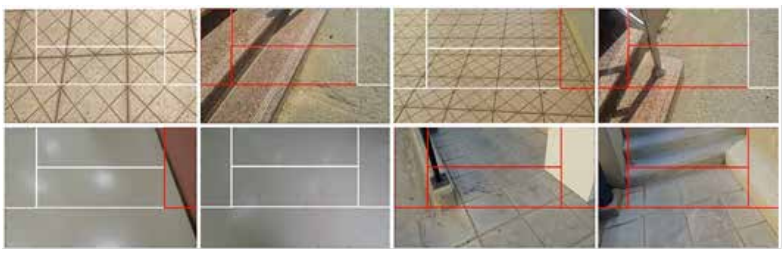


Figure 1: KAU-VC's Prototype Detecting Obstacles

TTM: The Transport Master

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ABSTRACT

Since every day the world is developing, the business nowadays has been transformed from traditional business to the e-business, in which most of the business activities are done online with the help of Information Technology. In line with the development of e-business the logistics concept has to be developed to serve the needs of business and individuals around the world. Our project 'The Transport Master' abbreviated as TTM is a system that offers a new concept for the world of logistic services. As we are aware that most of the business processes weather its online shopping or releasing tenders use the concept of bidding, in TTM we have introduced the concept of reverse bidding using a smart phone in logistics services. This is first of its kind system in GCC, which provides the best transporting technique with the least price for both transportation of goods and corporate transportation. TTM is available as mobile application that allows the sender to post his requirements (like sending goods or to find a transport from his location to the destination) as an advertisement on the application to be viewed for the Carriers. Each registered carrier will put a specific price for the advertisement and they will start the reverse bidding to take the deal. The sender will select the carrier depending upon his rating and the price he offered. After selecting the carrier, the carrier will take the goods or the user to the destination, the user will pay the carrier and provide rating for him, which will be used by the future customers to make decisions. TTM includes all the good services of previous systems such as giving the user the ability to track his package, collecting the package from his premises plus TTM will add new technique like reverse bidding that will make the logistic services more modern, easy, professional and customized according to user needs. The system is designed to benefit for a variety of social sectors like small and medium entrepreneurs, female students and employees who need transportation and small and medium carriers.

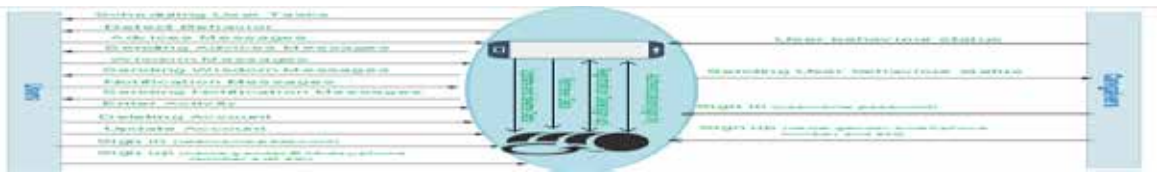
Human Behavior Analysis based on Daily Life Activities

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Supervised by
Dr. Iram Fatimah

ABSTRACT

If you have health, you probably will be happy, and if you have health and happiness, you have all the wealth you need. Each person has different behavior and personality in his/her life. It is difficult for humans to know the behaviors from their daily routine activities. The caregivers should concentrate on their users to find the best behaviors and personalities for their users. There are many applications used to make the caregiver monitored children like behavior tracker app used to allow caregiver to track the behaviors of children in their care. This application is used for saving records for practitioners to support a holistic behavior package. Those applications are not efficient, because it is working only for children, it is not automated detect child behavior and it is wasting time. So our proposed system will be used to figure out the daily life routine simply by using mobile devices as shown in figure [1]. The duration, frequency, age and gender by this information we can analyze the daily life activities for human, and usefulness of knowledge the common human behaviors of daily life activities on each day, it is an important way to analyze the behaviors and give personalized service. When we analyze the daily life activity in the sequential manner we can expect the effect of the previous activity on the future activity if it is positive or negative for the person. Then human will know their best behaviors that are better for them without the need for caregivers. When users enter their daily life activities they did them in a day our proposed system will analyze the daily life activities by search about which personality match the person activities and then our proposed system will find the best behavior that is better for user personality by send this information to users, also our system will send a notification message like remembering, wisdom and habit message. To implement our proposed system we will use sequential pattern mining algorithms to find the bad behaviors that users always did in their day and then analyze them to figure out what users should do to fix those bad behaviors depend on user personality. We will transfer the analysis of the history information by getting help from user activities; we must give support in understanding the users of acquisition, knowledge about their habits and behavior Android system is used to program our proposed system. All levels of People will take benefit from it in identifying their behaviors based on utilizing daily life individually. Every person will use our app; they will get normal life, life without problem and by using our app people will find the entire bad thing on their personality and detect them. To make our system we need to collect information about human personality in the world analytical personality, The person leading and others know which personality match person activities, we need an apriori algorithm to analyze behaviors. We implement around 65% of our application. We finished from implementing the interfaces, notifications, databases and validations. Only Appling the algorithm is remaining for us.



Tourpedia System: Travel Assistant connected to Google Glass

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Supervised by
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ABSTRACT

Tourism is traveling to seek relaxation, enjoyment, new experiences and new cultures. It gives people pleasure to explore new experiences and to break their daily routine. However, tourists sometimes get lost or waste their time looking for information, such as, historical description of a famous landmark, the nearest restroom in a specific location, description of a well-known sculpture, the nearest restaurants and taxi stands … etc. From another perspective, tourists who lost their sight or born with none also face difficulties during their travel. They need someone to guide them and describe popular landmarks for them. In addition, due to the difference in cultural habits, a blind person may face new objects that she/he cannot identify. As a result, blind tourists especially would lose their independency due to the need for other person to describe unusual things for them.

To address all the described issues above, we decided to develop Tourpedia System which will offer guidance for tourists all around the world. Tourpedia system consists of two parts: Google Glass and an Android device which will be connicted via Bluetooth, see (Figure1). We used Google Glass as an input-output device only to enable people who do not own a Google Glass to use all the system's functionalities. Respectively, the system's application consists of two parts: the main application that performs all the functions is uploaded in the Android device. The second application is a small application that will be installed in Google Glass to allow pictures that are taken by the glass to be sent to the Android device. The mobile application will then analyze and identify the pictures, then send it back to Google Glass where the description of the picture will appear. For tourists who do not own a Google Glass, they can use their mobile camera instead, and the application will be a single application uploaded in the Android device. As a result, the tourist will have the ability to capture an image of any object or landmark she/he sees and view its description and related information that will be displayed on Google Glass or the mobile device.

Moreover, blind tourists will be capable of using this system where it will offer them a high level of independency in their travel. The Google Glass will be active all the time, and it will inform the blind tourist of the description and the information related to the captured image in sound format.

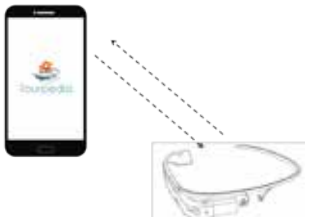


Figure 1: Tourpedia System

Furthermore, the system will offer a tremendous amount of help and guidance to the tourist. It can provide her/him with the nearest taxi-stands locations, public transportations, restaurants, restrooms and different attractions in every specific country. Additionally, the tourist can custom the search process for such locations based on its criteria. For instance, if a tourist would like to search for a specific type of restaurants, she/he will state a specific type of cuisine and price range. Then, the search results will be within the tourist's specifications.

In addition, the system will help the tourist in planning her/his day by either suggesting a plan or allowing the tourist to build one. Also, the system offers an alert functionality to the tourist by alerting her/him if she/he has to be in another place within specific amount of time to help her/him to follow the plan. Similarly, the tourist can enable or disable AroundMe function which alerts the tourist if she/he was passing by a special attraction.

Air Pollution Detection Cycling

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Supervised by
Dr. Ann Nosseir

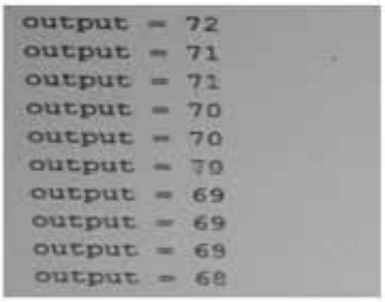
ABSTRACT

Recently in Egypt, young Egyptians form groups on Facebook to go biking around the city. They even used it to go to their schools, universities, work or outings with their bicycles. Egypt is facing the problem of the air pollution which leads to many diseases. The cyclists, therefore, cannot ride their bikes in any path they want to go through. The air pollution is caused by the gases of the cars and the number of the vehicles increases the intensity of the air pollution. In addition, the pollution is caused by the way that the countries contain many factories surrounding the capital. This affects and leads to chronic diseases such as heart and lung diseases and consequently cancer. Having a system that detects the pollution can help the cyclists to avoid polluted paths or roads and as a result reduces the inhaled dose of the air pollution. To avoid the consequences of air pollution, cyclists should go through the roads that are, most likely, less polluted. A few systems have been developed to monitor the high intensity of pollution in different paths and roads. These systems use different kinds of sensors to detect the pollution.

The idea of the system is that it will detect the pollution level in different paths. Consequently, it will allow the users to know how much the pollution is in the streets they went by the day. The system consists of some components to help the cyclists to avoid paths which have the most pollution. Shortly, the system could help to reduce the probability of having heart and lung diseases, which are caused by the air pollution.



1. The System attached at the front of the bicycle.



2. The output of the system displayed on the laptop or computer.

The recommended system consists of some sensors to detect the air pollution, caused by the toxic gasses such as the Carbon Monoxide gas, in the roads. Each sensor, component, in the system is responsible for detecting a specific type of toxic gas. The sensors are connected to the Arduino device and the results of the system will be stored in an SD Card which is also connected to the Arduino device. This SD Card will be inserted to the users` laptop or computer, to store the results of each gas. Not only can the result be displayed on the LCD screen, but also they can be displayed through the Bluetooth connection to the Android phones. The implementation of the system includes the implementation of the Arduino code from which the sensors are connected to. Also, there will be led lights to indicate to the bikers the amount of pollution they are exposed to. As when a specific type of gas exceeds its limit, so there will be a red light led to indicate that the pollution exceeds in that area.

Medical Robotic Car for Hospitals

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Supervised by
Dr. Ann Nosseir

ABSTRACT

Hospitals have quarantine areas that holds patients with epidemic diseases such as Ebola and Cholera. This is to protect the hospital staff and patients from catching the disease. Usually, staff takes a lot of precautions while interacting with these patients. They have a set of rules to prevent the nurses, cleaners and doctors from catching the disease. These rules are to raise the hygiene standards such as wearing gloves and masks and using disposable tools.

Our proposed idea is to minimize the staff interaction with patients by using automated vehicle to handle routine tasks like providing food and medication, taking vital psychological measures of blood pressure and body temperature. The car will pass through barriers and obstacles till it check the patient health to give the suitable drugs and other tools to and from the patients.

The robotic car will move faster than the doctor and the nurse to help the patient. The robotic car will moved automatically without any control from human. The system will use two algorithms which are ant colony optimization technique and genetic algorithm technique to increase the accuracy of crossing the barriers and choosing the shortest path, so Ant colony optimization technique it is technique to calculate a shortest path between the shortest path between the source and destination.

Genetic algorithm Technique it is belong to the larger class of evolutionary algorithms which generate solutions to optimization problems using techniques inspired by natural evolution such as inheritance, mutation, selection and crossover. The robotic car can increase the health safety and protect the staff from catching the disease.

At the end, robotic car will help nurses and doctors to do their job without any effort that the sample jobs which was done by nurse and doctor this robotic car will do it in short time and efficiency so it done its daily processes to check patient health and if doctor or nurse need to do any simple process they will give order to it to this process.

An Intelligent System That Supports Impaired People

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British University in Egypt

ABSTRACT

Blindness is defined as sightless, which means that having less vision rates than the normal vision rates. According to the world health organization it was stated that impaired people are divided into three different categories, the first one is the blindness where the person doesn't have the ability to see, this type is estimated to be approximately 39 million person all over the world, *and the second type is the moderate visual impairment, and finally the severe visual impairment, those who have weak vision,* 246 million person all over the world.

Those people usually have problems about transferring from a place to another without needing a companion especially in the street.

To solve this problem a device that is supported by high technology would be used, however it doesn't need the user to be aware of technology or learn anything to use it where it will be easily used, all the user needs to do is to put it on; Also it will not be expensive so any normal person afford it.

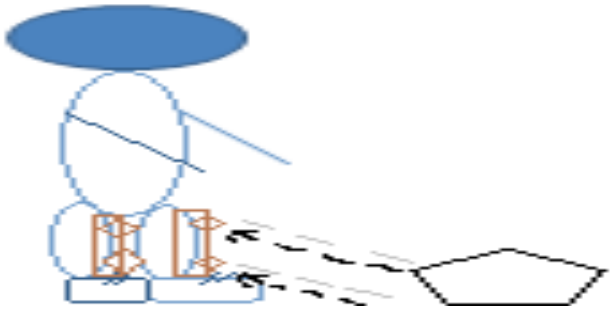


Figure 1: Architectural diagram of the proposed solution

The idea of project is based on a device that drives the impaired person away from any obstacle in/outdoor using Ultrasonic sensors to detect the obstacles (indoors or outdoors) then gives a feedback to the user using a buzzer that sends sounds and some small vibrators.
The device will draw the path for the person using the Arduino UNO Board to detect any obstacles in the way.
This device must effectively calculate the distance between the person & the detected object from and draw a path to be followed by the person, this would happen using a suitable number of ultrasonic sensors; After that the role of the buzzers and the vibrating machines appears, as they work whenever the distance detected by the ultrasonic sensors changes to be less than 0.5 meters.
Using this device will make the impaired person *absolutely safe.*

The developed device should detect the obstacles and drives the user away from it by sending some vibes to him guiding him to the safe direction.

The device consists of Ultrasonic Sensors connected together with an UNO Board that will be carrying the code to process the data collected by them, and a receiver that will receive the vibes directing the user towards the obstacle free direction he/she should take. This device will be connected to the human body directly, on his/her legs, arms … on so on, also it could be attached to a wheelchair if the user has disability and needs a wheelchair.

USRS: University Space Reservation System

Alaa Alshowiman, Elaf Aljahdaly, Jenan Aqeel, Najd Aldughmani and Noor Alnahdi
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ABSTRACT

Manual reservation systems at Faculty of Computing and Information Technology of the King Abdulaziz University. Put a pressure on people to be correct in all details of their work at all times, the problem being that people are not perfect. It can be all easy to accidentally switch details ending up with inconsistency in data entry or in handwritten orders. Manual reservation systems have a lot of problems such as lack of security, paper wastage, slow retrieval of data, and time consuming.

Addressing the issue; we present the design and development of a University Space Reservation System (USRS). It is a web-based application system used to store and retrieve information and make transactions related to reservations spaces. It shows user-friendly features that will familiarize lecturers on the system and highlight the benefits that can be provided to the lecturers. This system has two sections: lecturer and the administrator. Lecturer section access the information provided by the system and the administrator section modifies and updates the information available in the system by communicating with a database. It allows the lecturers to search and reserve spaces such as classrooms, computer labs, and meeting rooms. To make the reservation easier for the user, the system offers features such as a class list , time availability, search engine, interactive map, notification email. The class list has information and properties for each room such as how many chairs are available, what programs this lab had, and others. Interactive map is a web-based map that has clickable rooms. Notification Email makes you know that your request has been confirmed with all the necessary details of your booking. Technologies used to implement the proposed solution include HTML, CSS, MySQL, and PHP. It developed to run on a Mac and Windows PC's. The main purpose is to reduce the manual errors involved in the spaces reservation process, make it suitable for the lecturers to reserve the rooms when they need it, and save time. They can use the system to make reservations, modify reservations or cancel it. Also, it can be implemented at any university in the world.

Inform Me: Location Based Content Using IBeacon Technology

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Supervised by
Ms. Lamya Al-Braheem

ABSTRACT

There is an increasing interest in developing technologies that attempt to deliver content to the users based on their locations. Although many applications can be used for this task, there are still obvious limitations that require more improvement. As a first step to designing a solution that overcomes these limitations, a comparison and discussion of the location-based technologies that can be used for content delivery was done.

The result of this evaluation shows that the technology that satisfies the requirements of the presented project is the iBeacon technology, which is a technology that developed by Apple, based on Bluetooth Low Energy technology and can be used for the indoor positioning system.

According to the result of this comparison, we developed a location-aware mobile application using iBeacon technology. This application can help the event's organizers to enhance attendee's experience by providing location based content such as PDFs, image and videos. This application can provide an efficient way for content delivery by reducing the costs and replacing the printed papers. The figure below shows the architecture of the solution.

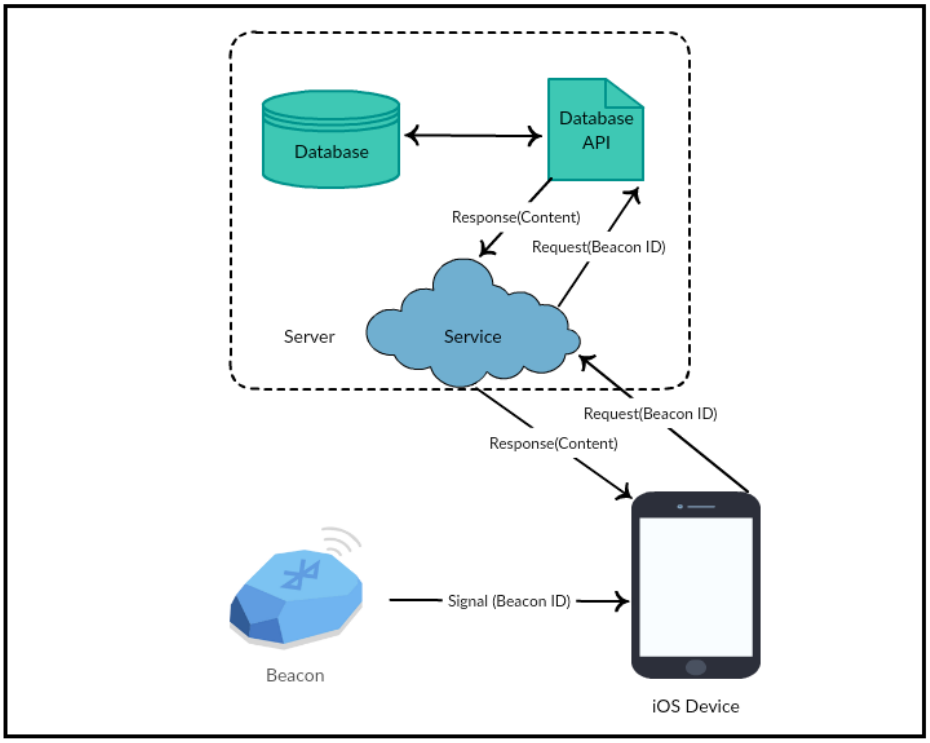


Figure Error! No text of specified style in document.**-1: Initial architecture of the solution**

Smart Pharmacies Network

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King Abdulaziz University, Jeddah, Saudi Arabia

Supervised by
Dr.Nadine Akkari

ABSTRACT

In line with many smart devices in hands that led to provide services to facilitate the user's access to their technical needs, and as the technology has become one of the necessities of life this project is to develop a Smart Pharmacies Network that will contribute to smart city. Smart City, for health application, takes an integrated approach to the use of digital technologies to increase the connectedness of people to the information and city functions that improve health, support a higher quality of life for all its citizens. The project consists of developing a mobile application to provide users with a direct communication with pharmacies that will help them request medicines and make these medicines available in an efficient way. The project is to develop a mobile application with android operating system. The aim of the project is to provide an online medical service by building an application that will allow pharmacies and customers to communicate for the purpose of contributing to smart cities. The Smart Pharmacies Network application offers the customers the capability of searching and reserving a medicine in the recommended pharmacies displayed from the registered pharmacies in the system. This will be provided by activating the location service of both customers and pharmacies thus facilitating the user access to medications in less time and effort. It will also provide the customers with medicine related information (price, volume, etc.) in each neighborhood pharmacies. In addition, it will provide an efficient way for pharmacies to communicate and exchange medical related data. As a result, this project will contribute to smart city by analyzing the exchanged data between different customers and pharmacies. Smart Pharmacies Network application provides information of the highly needed medicines to help smart city analysts to do analysis and statistical reports on some relevant information such as the_spread of specific diseases based on the data exchanged and requests as per the customer's profile and location. It will facilitate analyzing the highly requested medicine over specific time and locating the diseases distribution per region/area. In addition, it will allow pharmacies to communicate with other pharmacies to provide the required medications. Thus the Smart Pharmacies Network application will save a lot of time and effort for users and pharmacies by facilitating the communication process between them and also contributing in an effective manner to provide medicines.

Smart Homes: Emotiv Cognitive vs. Facial Expression

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ABSTRACT

As declared in the World Health Organization, around 15% of the world's population, which equivalent to more than one billion people are suffering from some kind of disability [1]. Moreover, between 250,000 and 500,000 people every year endure spinal cord injury that cause them suffer from critical disabilities such as paralysis in both upper and lower limbs or part of them [1] [2]. Since the percentage of disabled people is increasing over the years; several technologies have been developed to help them live their life as normal as possible. In fact, smart home technology can be used as an assistant for disabled people. Smart home is an intelligent environment that provides central computerized control on any electrical device within the home to facilitate inhabitants' daily activities [3].

Indeed, motion sensors is one of the controlling mechanisms that can be used to provide control on the smart home for disabled people. However, this also is not feasible especially for opening and closing doors; Since for instance, if the disabled person is setting on his BCI-based wheelchair and he is moving from one room to another passing beside a door, this door will be opened automatically and it may hurt that person if the opening direction is toward him. Hence, to cope this problem, some of the controlling mechanisms turned out to be based on *Brain Computer Interfacing* (BCI). BCI is a system that allows human's brain to communicate directly with the computer or any other external device [4]. This communication and control paradigm has been introduced to improve or complement doing daily tasks via surrogate interface [5]. Thus, BCI-based smart home systems give the disabled people control on their living environments by detecting specific brain signals and map these signals to the appropriate control command.

This project is presenting a BCI-based smart home system. Furthermore, it will allow disabled people who cannot move both of their limps from utilizing the features provided by smart home technology through combining this technology with a BCI system. Indeed, Expressive suite and Cognitive suite of Emotiv EPOC headset will be used independently from each other for delivering the objectives of smart home technology to disabled people. Finally, this project will analyze the results of using each headset's suite by taking into account the training time, ease of generating signals, detection accuracy and user preference; in order to determine which one is much suitable for daily use. For demonstration, **Error! Reference source not found.** is a high-level architecture that illustrates how the system will work. Whereas Figure 2 is a snapshot of the main user interface of BSH system.



Figure 1 BSH high-level architecture



Figure 2 BSH snapshot

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Mum's Dream

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ABSTRACT

Mum's Dream is an advertisement project that is based on the idea of placing a portable nursery school in public places authorized by the Ministry of Education and Social Affairs.
What distinguishes the nursery is that it is portable and not like the rest of the traditional incubators that cost huge sums and available all day. It also helps decrease the pressure on traditional fixed nurseries and on the parents that wait a long time to place registration for their children. It can serve the families that do not have adults or nannies at home too. The nursery is divided into connected rooms designed for learning, playing, eating and sleeping that have appropriate toys and equipment. The rooms are bright and offer a warm and stimulating environment for kids from 3 months to 9 years old to develop their skills.



To solve this issue, we propose *Mum's Dream as* a mobile application that will connect the mother with her child at the nursery, while she is away. Also to have a barcode for more security on the kids for the parents. Such an application would help the mothers save time as they don't have to go to the nursery to check their child's status. In addition, it would help them save money with monthly offers, many different located branches, and provide a convenient nursery experience anytime and anywhere.

There are many nursery schools provided by the government entity. However, they do not provide a convenient full nursery experience through the mobile applications. In addition they do not provide a service for parent's to register their children online and have a look at the offers and prices. On the other hand the parents cannot check their child's status. A multiple choice questionnaire was designed to examine the people that prefer an application to keep up with their children at the portable nursery. The findings in this project showed that 95.2% would prefer an application to keep track of the child.

We presented the design of Mums Dream a novel mobile application for portable nursery schools in Riyadh, Saudi Arabia. The application facilitates a convenient full nursery experience by connecting the mother's time with her child. Also solve all of these gab mentioned above and more of additional and beautiful features .To the best of our knowledge, this is the first application that serves this purpose. Currently, the system is under implementation and will be tested to meet our objectives.

Table 1

Compression points/ Nursery	Mums Dream	Sparks Academy
Ages	From birth and up to 9 years.	From birth and up to 6 years.
Registration	Register via mobile application.	Register via Website.
Security	- Barcode twin bracelet for child and mother. - IP camera.	- ID card. - Phone call from the mother.
Working Hours	7 am – 10 pm.	8 am – 5 pm.
Payment	Online payment via visa credit card.	Online payment by transferring.
Checking Childs Status	Updated via the application every 30 minutes.	Check up by phone.
Offers	1- Daily/ weekly/ monthly offers. 2- Siblings offers. 3- Occasion offers.	Provide the opportunity for employers to help working mothers by covering 50% of the nursery fees for their children.
Activities	Learning, playing, cinema, bedrooms and dining corners.	Provide educational and extracurricular programs that suit the development stages of the children
Location	Portable nursery located around public places and commercial areas and can be changed.	Located next to business and commercial areas in order to be close to the mother's work and provide her peace of mind.



Figure 1 GUI Contact Page



Figure 2 GUI

Smart Watering System

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Supervised by:
Mr. Conrado Vizcarra

ABSTRACT

The purpose of this project is to design and develop a cost efficient watering system for King Faisal University landscape. Combining technology and gardening we can develop a system that will save a valuable amount of water during the watering process. Preserving water resources from drought is one of the issues in the community that needs to be solved. Hence, researchers and system developers need to delve into this issue to come up with a solution to preserve these useful resources from scarcity. Traditional watering systems irrigate landscapes without considering the amount of water needed by the plants that will lead to waste of water. Our team is developing a new automatic watering system namely Smart Watering System, that aims to preserve water from being wasted during the watering process and supply enough water for plants to grow healthy. The working principle of this system is that the watering process will be carried on based on the level of the soil moisture. When the soil moisture level drops below the desired level, the watering process will be started automatically. After the soil moisture reaches the desired level, the system stops the watering process. In addition to that, the system will keep saving data of the amount of water that has consumed. These data will be saved in order to calculate the water consumption and display the results on a desktop application. The power of Smart Watering System is supplied by taking the advantage of the solar energy. Figure 1 shows the smart watering system architecture. And figure 2 shows the primary result of operating the system, this interface is not finalized yet, and it is in the process of improvement.

System Implementation

The system architecture shows that Smart Watering System has been implemented by combining many components, these components are: Arduino microcontroller in which the code of the program will be uploaded, relay module that acts as a switch to control the water pump, RTC module which provides the microcontroller with the time and date details, WiFi shield that is used to enable the system to send data wirelessly, water level sensor to check the level of water in the water container, water flow sensor to sense the amount of water passing through the water hose during a specific watering period, moisture sensors to sense the soil moisture level, water pump and the rechargeable battery connected to a solar panel.

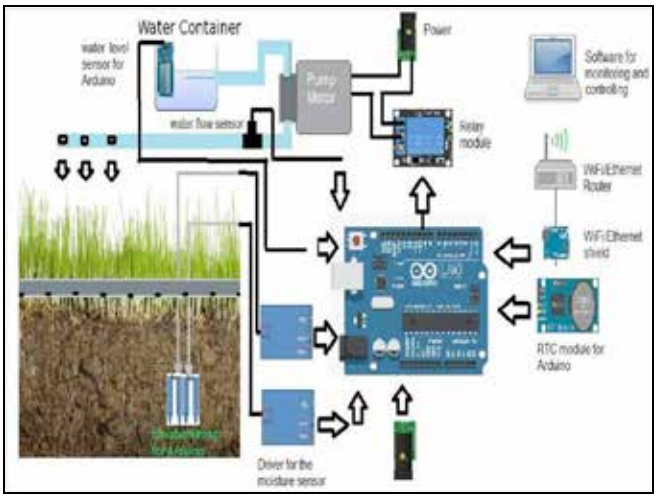


Figure 1: Smart Watering System Architecture

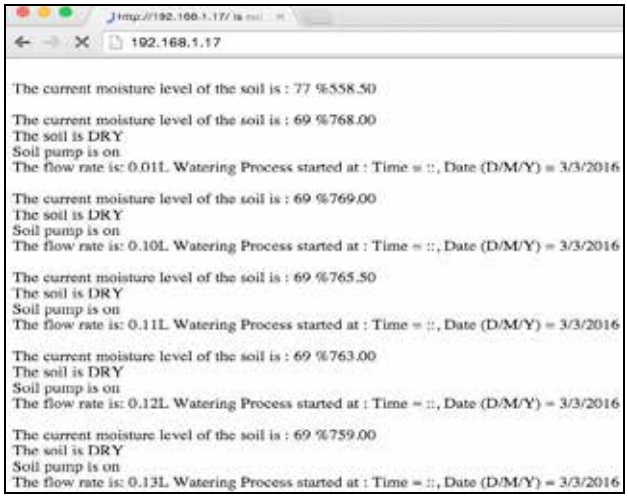


Figure 2: The Primary results shown in a web page

Sun Chaser Robot

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Dr. Seyed E Esmaeili

ABSTRACT

The World is threated by Global Worming. It is mainly caused by using sources of energy that are not environ- mentally friendly as they release harmful gases. So, the world is heading nowadays to use solar energy as an alternative and clean source of energy. Solar energy is the process of harnessing the sun's power through the use of solar panels to generate electricity. However, there is a probability that large amount of energy is being lost due to the sun's movement during the day. To solve this problem, we decided to build a system that tracks the movement of the sun, then positions the solar panels at the direction of maximum light intensity. The proposed sun chaser robot can help in reducing the wasted solar energy by increasing the efficiency thus encouraging people to use solar energy as a main source of power.



The proposed sun chaser robot is a tracker system that follows the direction the sun's maximum light intensity. The system consists of the following components: four light depending resistors (LDRs), two servo motors, solar panels, voltage sensor, current sensor, light sensor, advanced servo controllers, interface kit, charger, a dual relay, and rechargeable batteries. In addition, a graphical user interface (GUI) was designed for the system which presents a graph of extracted current and voltage of the solar panels over time and can be used to control the system manually.

The system works as following: first it detects which angle has the maximum sunlight through the LDR sensors by a specific algorithm. Then, the system gives order to the servo motors to move the solar panels and directs them to that angle. After directing the solar panels to the desired position, the solar panels extract sun's power to charge the batteries that can be used for different applications. The system is able to charge more than one battery automatically by using a relay to switch the charging from one battery to the other. In addition, a load is connected to the system in such a way that helps save on electricity. A light sensor is used to connect the charged battery to the load through the relay during the night.

The goal of Sun Chaser Robot is to take full advantage of the solar energy by moving the solar panels according to the movement of the sun instead of being fixed in one direction. As engineers, we want to reduce pollution and provide clean air and at the same time have a source of long lasting energy. What distinguishes the proposed sun chaser robot is that it is flexible and can operate in any environment. The sun chaser robot can provide many countries with a clean and affordable source of energy.

Computer Maintenance Managements Work Housing System (CMMWHS)

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ABSTRACT

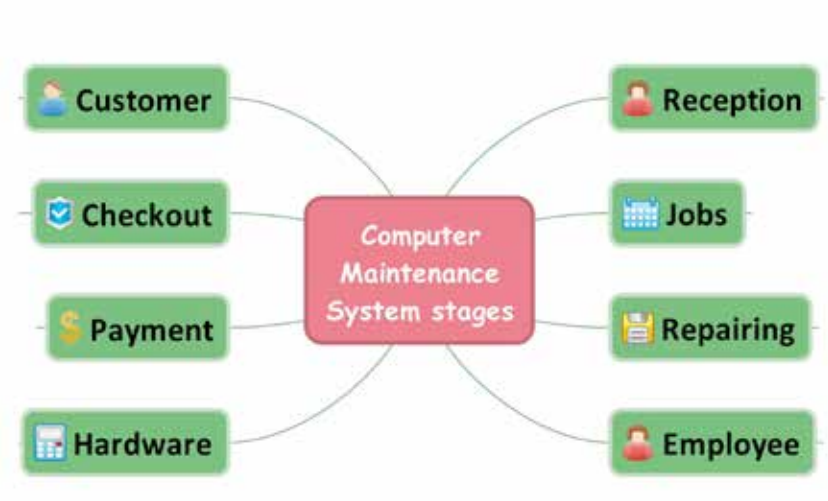
This Project presents the Computerized Maintenance Management System Work Housing (CMMWH), project that will provide the means for optimizing maintenance of computers and electronic devices inside stages use of web applications tools. Software will integrate those technologies into a cohesive maintenance computers, Tracking Jobs and equipment monitoring, system focused on maintaining these jobs orders are taking efficient and reliable manner. System provide improved reliability, reduced maintenance lost data, increased works efficient and add value to company , etc.

The targets of system intend to convert the manual paper entry system to computing automate system, make the entry and checkout of devices easier, suitable, modern, reliable , achieved and organized.

Also distribute the tasks and responsibilities of employees through the device lifecycle within the system, archive all jobs, customer data, task and payment to tracking tasks.

The web app software helps maintenance teams or Costumer Service Centers (CSC), that provide a maintain service for computer device and it's derivative like printer ,tablet and monitors, etc. to keep a record information of all devices data they are responsible for tracking maintenance tasks, and keep a historical record of what are done on that's devices.

This project build to make sure that technology will work for customer and employers, that prepared to decrease time and effort in the of daily activates and increase of other three parts - Technology control, Business rules, and Organization values.



Baby Care: A Mobile-Based App for New Parents

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ABSTRACT

Now a days the living standards has changed drastically to nuclear family. Both husband and wife are working to fulfil the families requirements so for these nuclear families tacking care of their children is quite difficult. Moreover not all families have elders around to help them and to provide proper guidance

Baby Care is an Android based app, whose aim is to facilitate monitoring babies development. Due to daily life activities and the lack of parents awareness, especially new ones, an application like Baby Care will help them keep track of their babies growth. Moreover, via our baby care app, parents will be able to save pictures of the special moments of their baby's life , such as first smile, first tooth, first steps, and first words. In addition, through this app, parents will be able towrite blogs, upload photos, and make daily diary entries to save the most precious, amazing, and funny moments of their baby's life. Moreover, our Baby Care app will be very useful for monitoring baby's development such as feeding and sleeping times and patterns . These information are not only useful to the parents but to the baby's paediatrician whenever required .

In this project we aim to design and develop our Baby Care app equipped with a set of features to reach the following objectives:

- ✓ Saving babies' data periodically, such as weight, height, head circumference in order to keep track of a baby's growth.
- ✓ Following up the feeding process for babies since their birth along with reminding notifications of the feeding times.
- ✓ Following up sleeping times for babies along with reminding notifications.
- ✓ From the feeding and sleeping data, statistics about children health will be drawn to track babies sleeping and feeding patterns.
- ✓ Guides and tips about how to take care of babies will be provided
- ✓ Statistics about children health.
- ✓ Guides and tips about how to dealing with children.
- ✓ Reminders about baby visit due to Paediatrician.

Our application (Baby Care) will support synchronization between many devices and improves the performance shows the user beautifully and attractive colors and gives reminders and graphs as he supports more than one baby's.

We believe that our Baby Care app will be helpful for new parents by providing tools and features facilitating parenthood, especially in first few years of a baby life.





Smartwatch Assistant for Elderly People

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ABSTRACT

Reduced mental and cognitive ability is a sign of old age. Whenever a person getting older, his ability of storing and retrieving the information becomes harder. It takes them more time than normal people to store and process new information or retrieve old information. Elderly people have trouble remembering the names of people, phone numbers. Sometimes they have difficulties with daily activities, such as performing hobbies or finances, taking medication, handling emergencies. However, memory loss is different in normal aging from Alzheimer's disease, although there is a probability of progression from memory loss to Alzheimer's.

Advanced technologies have tangible impacts in improving the quality of our daily lives. Nowadays, we have various emerging technologies which have the potential to help elderly people maintain their independence and health. Therefore, we want to develop a smartwatch application to help elderly people in doing their daily living tasks. The application will alert them in each prayer time and the number of raka'a. In addition, it will provide alerts for taking their medication. As well as, the application will directly contact a relative in case of emergency.

Smartwatch assistant for elderly people (SAE) is a mobile-based application, SAE will achieve this goals using smartwatch.

The main goal of the project is to help older adults to remember doing their day-to-day important tasks (prays & taking medications). The first goal is help elderly people remember taking their medications on time by sending them an audio alert. This will help in reducing the risk of over- or under- dosing and let elderly people remain independent in their homes.

The second goal is to help older adults to remember performing the five prayers on time and let them know the name of each prayer in order to remove any uncertainty about the current prayer name. Another important goal is to help elderly people remember the number of the current raka'a in the prayer they are performing. This will be very helpful as older adults tend to forget and lose concentration during the prayers.

The last goal of the project is to help older people when falling down alone by detecting their falls and sending instant message to their relatives. This will allow the relatives to provide immediate assistance and rescue the parents in case of emergency or general danger.

The applications that available in the market with the same function of SAE useless because it's applied in smart phone, SAE will make the idea easier by using smartwatch. Smartwatch assistant is a new and useful application that helps elderly people to perform their everyday tasks easily.

We have done some functions till now, and we are still working to accomplish the rest. However, the submission date for the project is on 8-may and we will try our best to deliver it before URC competition.

Building a Distributional Semantic Model for Extracting Paradigmatic Relations in Classical Arabic Texts

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Supervised by
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ABSTRACT

Classical Arabic is one of the languages that have maintained its linguistic structure for more than 14 centuries. It is associated with the holy Quran, Arabic literature and Islamic heritage. In addition, Classical Arabic is known for its rich vocabulary and synonyms. In this project, will use distributional semantics to build a model for Classical Arabic through the collection of words distribution statistics from King Saud University Corpus of Classical Arabic (KSUCCA), which is a very large corpus of classical Arabic. This model involves extracting two types of relations, which are syntagmatic and paradigmatic relations.

Syntagmatic relations involves extracting collocations and words' significant co-occurrences using the Refined Dice association measure, which is calculated as in the following equation:

$$Refined\ Dice = 30 + \log_2 (Dice_{x,y} \times \frac{\log(f_{xy})}{f_x * f_y})$$

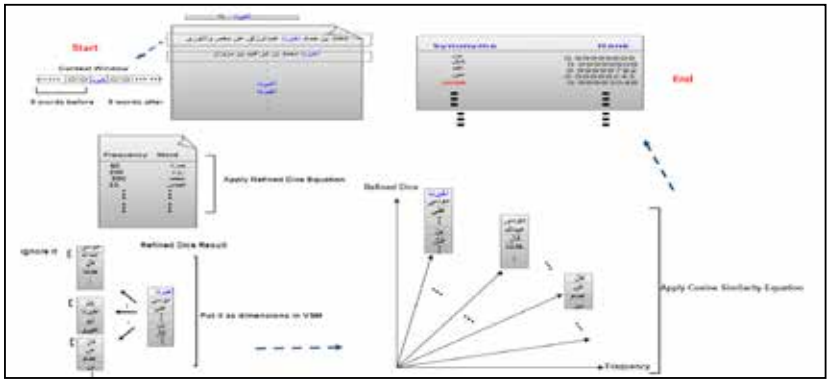
Refined Dice association measure

While paradigmatic relations involves extracting words' synonyms by representing words as vectors in the vector space model using the words' co-occurrences extracted by the first step as features for these vectors and then paradigmatic relations are extracted by applying the Cosine similarity measure using the following equation:

$$Cosine(X, Y) = \frac{X.Y}{\|XY\|}$$

Cosine similarity measure

Our web-based application applies these models by using the Refined Dice association measure to extract words significant co-occurrences, and the Cosine similarity measure to extract synonyms from Classical Arabic. The results obtained were promising and this application is intended to serve a wide range of users.





3DEX City: Three Dimensional Exhibition City

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ABSTRACT

3DEX City is a reliable, secure and creative web-based system for virtual three-dimensional (3D) exhibition that simulates reality (See Figure1). This system allows any person to visit personal creations of users or any public exhibitions at any time and any place. It also allows the users to have their own virtual 3D exhibition and to add/delete/arrange their belongings easily, so they can share their works with others. All this is done in realistic environment, where every user chooses his/her own character and use it as his/her Avatar (See Figure2). One of the most important functionality that 3DEX City provides is auctions. 3DEX City provide an interactive environment similar to reality for an easy online bidding where the user actions are reflected in real time , so it allows the user to reserve an auction and display his/her items or bid in the auction using 3D pictorial environment.



Figure 1:Avatar



Figure 2: Part of 3Dex City System

The main goal of 3Dex City system is to have a 3D virtual city that simulates to real live exhibitions, provides suitable dynamic environment that gathers different exhibitions around the world in one place and be a good opportunity for users to display their talents and artistic creations to others. This system is built using Unity 3D Game Engine to import the basic objects and build the initial virtual city. For implementation, C# language is used at the client side in addition to JAVA in order to make the database connection and server side scripting. Moreover, SmartFox is used for the database because it support multiNetwork.

Artists and visitors all benefit from using the 3Dex City system. For artists, money is needed to rent an exhibit space in real world exhibitions and more cost is caused for private exhibition, but 3Dex City system helps to share their artistic work for large number of people without any cost. In addition, they can earn money from auctions that is established by system. For Visitors, the systems helps them to reduce the costs of attending or traveling to visit exhibitions. Also, they can visit multiple exhibitions for different artist in one place.

Transforming the idea of traditional exhibitions to virtual reality exhibitions with adding some technology would create the best convenient experience of participating in exhibition. 3DEX City was developed with this concept in mind. Overall, the results indicate that 3D virtual reality exhibitions with real time auctions is reducing the time, effort and costs of renting and visiting the exhibitions. Also, it is considered as suitable environment for developing art because it is gather many artists and people who are interested in art from different cultures in one place.

ICar : An Intelligent Car that Talks about the Future

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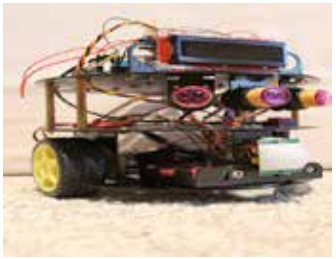
Supervised by
Dr.Wael Qassas

ABSTRACT

ICar is a hardware board based 2WD car model. ICar is a very intelligent car. ICar will improve the manufacturing of cars in the future. Nowadays, Internet of Things (IOT) is the most important technology when we use the Sensors and Re-Programmable Boards such as Arduino UNO which I used in my project and Intel Galileo Board Gen2 that is the latest board from Intel company or other boards like Arduino Mega, RaspberryPI … etc.

ICar's goal is to make a new doable car with a unique ideas full of multiple sensors. And the idea is to make the life simpler and easier in the future according to cars manufacturing field. The most important things in this invention prototype is the Avoidance technique, Safety, Motion sensors, LCD screen to show distances around, Temperature and Buzzer sensor for important warnings, and the protection using Radio Frequency Identification sensor.

Using Arduino Programming Language and Ultrasonic sensor I have written a good smart code to make the car avoid any obstacle around it and the second thing is the RFID (Radio Frequency Identification) sensor to protect the car and make an authentication for the user or users who are using it. The new thing which is added to ICar is the Parking assistant (or the Auto-Parking) which means that you leave ICar when you arrive to your location and ICar will park in the nearest safe place or park or anywhere and you can also check that using your android mobile phone via internet connection to the board to manage the process in an excellent way.



As a result, Vehicles factories, Car Developers, Car Users, and the environment all will benefit from using ICar. For vehicle factories the car system will help to increase sales and will make more customers want this product. Also ICar will make the future of cars safer and more protected, according to car developers it will help them to create new ideas through the use of ICar. Users who want to feel good and safe when they are driving ICar is the solution. Because there is will be no accidents when you drive ICar, no more casualties and it does not cost to repair the outer structure of the car because there will be no chance to break the structure due to the use of sensors in a smart way. The last thing is that when factories manufacture this car it will cost you less than any other car because of the best use of all the possibilities for all parts and sensors using smart coding.

When we use the cars in our daily life the best thing is that adding the flavor of technology in each and every detail which makes the routine movements more simple and easy to do in all time. The easiness in the routine movement gives us more flexibility to do different life activities. Overall, the result of using smart sensors and safety modes in one of most important personal purposes like the car is a great and powerful idea to make your day beautiful.

Sohar VR: Virtual Environment on Sohar City Architecture

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Supervised by
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ABSTRACT

Virtual reality is an electronic simulation environment of the real one which enables the user to interact with a three dimensional objects as well as navigating each object through that environment. Navigation implies the ability to move around things or through other, this interaction provides the ability to select and manipulate objects in the scene. This project will implements this concept in order to create an application that simulates the real architecture of Sohar city with the main buildings, landmarks and the infrastructure services lines in three dimensions. It allows you to search for them as well as providing an advanced searching to search for commercial, industrial or residential lands. The details of each landmark will be shown to the user using pop-up windows either by hovering or clicking on the location itself. Actually, Sohar Municipality and other authorities currently using the manual maps and the electronic maps based on Google Earth and Google Maps. They are using them for many purposes such as future vision for the coming architecture, specifying the proper place for putting the infrastructure services lines as well as lands. The project will be beneficial to present the future vision of Sohar city architecture in an interactive way.

Designing 3D architecture of Sohar city supposed to reduce the usage of the traditional techniques in parsing the actual map of the city to work on the future vision of Sohar as well as implementing huge projects (bridges), distinguishing between the types of lands, also determining, maintaining and setting down the infrastructure services lines. Moreover, the system provides an interactive way for developers from some authorities that are concerned with this field, especially the municipality of Sohar City. Furthermore, since virtual reality is something viable; people tried to implement it in many various sectors such as, Military, Education, Healthcare, Entertainment, Fashion, Business, Engineering, Sport, Media, Telecommunication, Constructions and Films using some programming Languages such as C#.



The above 3D interactive map of Al-Hijrah region in Sohar City is our current sample which we have created using Blender software that uses python programming language. The map is allowing users to go though it from all directions as well as zooming in and out. These functionalities will be added using JavaScript, CSS3 along with HTML5 language in order to meet the basic requirements of our project and the sample data will be loaded from the database using PHP language. Basically, the map will be attached to a dynamic website which will facilitates the searching process for users and guide them through it, especially there are a variety of land types and landmarks; that is why we needed to categorize them based on their type. Moreover, the area of each land will be presented using 3D columns which going to be rendered on the map itself. All of these functionalities will lead us toward a successful 3D map.

Crowdsourced Data Gathering for Disaster Management

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Supervised by
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ABSTRACT

Disasters are an unavoidable reality categorized into natural and human-induced. As it is impossible to escape them, the best way is to find possible solutions for quick mitigation and reducing the risk of losses. Information Technology (IT) can be effectively used to manage the after-effects of disasters. One contribution of IT in this regard is to extract disaster-specific information for swift circulation among potential stakeholders for quick mitigation.

An effective disaster management information system requires real time information collection. Conventional disaster management systems are limited in accomplishing this task. For instance Sahana, a disaster management system, needs manual data entry which can take considerable time and effort causing delay in information outspread. Another disaster management system called Crisis Tracker does collect data automatically but does not provide any data storage facility.

We propose 'Crowdsourced Data Gathering for Disaster Management', a semantic web based system to automatically collect disaster-specific information and store it in a database for retrieval purposes. This will be helpful for related stakeholders in timely access to the information for them to carry out decision making and mitigation procedures. The proposed system will focus on Twitter feeds as an information resource because they are condensed due to 140 character entry limitation. This feature increases the possibility of required information relevance.

This system consists of 2 components: 1. Tweet collection, 2. Information Extraction (IE). In tweet collection, the system accesses the global streams of public data flowing through Twitter in order to follow tweets specific to a disaster by using Streaming API provided by Twitter. The Streaming API allows the system continuous real time tweet stream handling. The filter API, which is one of the streaming APIs, is used to return public tweets that match one or more filter parameter, e.g. locations and track parameters. The system considers tweets written in English language alone, by setting the language code to English.

The open-source GATE (General Architecture for Text Engineering) is a natural language processing (NLP) framework which can be used to extract information from text. GATE offers different IE pipelines one of which is TwitIE. The system will use TwitIE to extract information from collected tweets. Figure 1 shows a conceptual architecture of Crowdsourced Data Gathering for Disaster Management.

Expected result of this system is effective disaster-specific information extraction. This process is to be done automatically in real time. Partial system implementation has been completed and complete system development is expected by the end of this academic year.

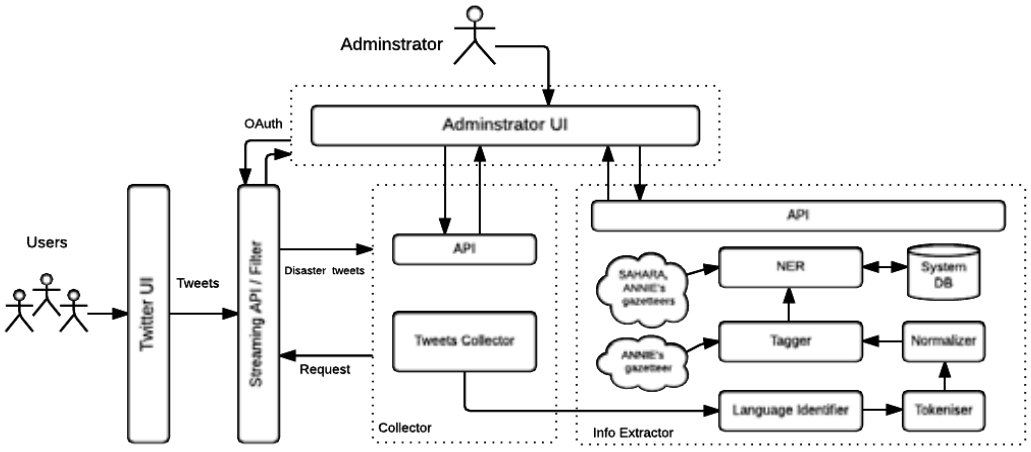


Figure 1: Conceptual Architecture of Crowdsourced Data Gathering for Disaster Management

An Intelligent Road System for Smart Cities

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ABSTRACT

This project focuses on several problems related to city streets and provides a possible solution for some of these problems. First, street lighting consumes a huge amount of unneeded electrical energy.

Since streets have a very low traffic-rate at night, on-demand lighting is provided based on vehicles' presence detection using their weights. This will help in reducing the energy usage and the cost burden.

Second, people with reduced mobility have a problem crossing the street, as a solution for this issue, the project offers a pedestrian crossing that automatically detects human presence and switches the traffic lights accordingly.

Third, a camera is used to monitor the speed of passing vehicles and to help keep the speed of the vehicles within the limits on the roads.

Fourth, counting-down screens are used to inform car drivers when the green light is on. Another screen is added on the pedestrian crossing to display how many seconds are remaining before safely crossing the street.

Finally, a screen is added on the street to display traffic conditions, government and weather announcements.

The project is implemented using the Phidgets data-acquisition board and its available libraries under Visual Basic. The block diagram of the project is illustrated in Figure 1. Moreover, a control/monitoring application is developed, Figure 2, so that ministry personnel can have full control over the street if required.

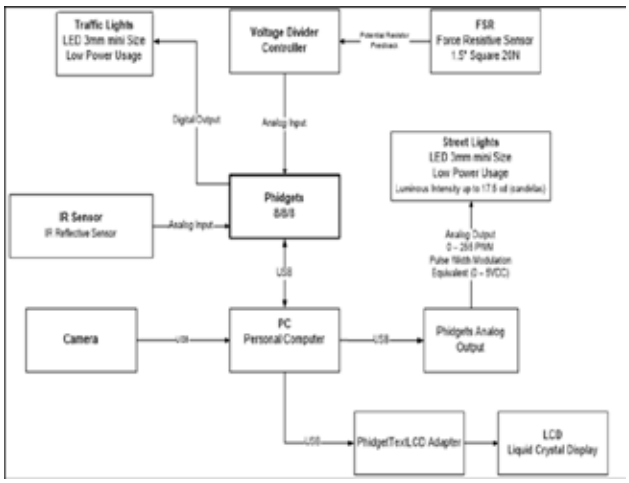


Figure 1 The Block Diagram.



Figure 2: The Control/Monitor Screen.

CUCOPA: Curricula and Course Planner Assistant

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Supervised by
Dr. Manar Salama

ABSTRACT

Academic departments in Universities need to provide detailed plans for the taught courses they offer for their students. These course plans should describe predefined attributes such as: topics covered and Course Learning Outcomes (CLOs), which should be gained by the students at the end of each course taught. In order to confirm the content of a degree program, a Curriculum is defined for the program in terms of its individual course plans. To ensure the quality of an academic program, the content of a curriculum must be aligned with a well-known and recognized standard. The ACM Education Board and the IEEE-CS Educational Activities Board, in a joint work, have provided the computing disciplines with curriculum guidelines and recommendations. The usual scenario in academic departments is that a curriculum committee is assigned the job of revising and updating the department's curriculum to conform to the changes and the updates in the standard. Such auditing work is usually done manually which is an exhausting and error prone process. In this work, we provide a tool, CUrriculum and COurse Planner Assistant (CUCOPA), for automating the process of building and auditing course plans and curriculums for computing disciplines. The proposed system is a web application. The methodology that the proposed system follows is the phased release methodology. The project has been divided into three main phases. In Phase 1, where the focus is on the back-end server, the system stores the ACM/IEEE 2013 standard, which is the most recent guideline document for the computer science undergraduate degree, in a database by using Microsoft SQL Server. The system will assist individual instructors and curriculum committee members through a step-by-step tool to perform course and curriculum dependent functionalities. In Phase 2, through a user friendly and interactive interface designed and implemented in Microsoft Visual Studio, the user can build course plans by selecting knowledge areas, knowledge units, topics, subtopics, and CLOs from the standard's stored ontology. The user can create, import, and modify course plans. In Phase 3, the same actions that can be performed on courses can be done to curriculums. Furthermore, users of the system can view statistics about individual courses and/or curriculum to make further decisions about their course offerings. The system is designed to be extendable and to accommodate the standards of other disciplines, namely, the Information Technology (IT) and the Information Systems (IS). The first two phases have been fully implemented and are functional. The final phase, which is Phase 3, is still in the development process.

Voice-Biometric Based Locking and Unlocking System

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Supervised by
Dr. Qurban Ali

ABSTRACT

This project is about building an efficient security system that works based on the human voice taking an advantage of the fact that every human have a different voice features that make his voice a unique one even if somebody tried to mimic it. This might look wrong for the reader till he knows that mimicking may seem okay for human ears but not for the computing programs that can differentiate between voices in a very precise way. The objective is to design a speaker recognition device that acts as a security lock triggered only by the sound biometrics. There are many security systems that exist in the technical market, which vary in the degree of security they offer, in addition to the difference in the working principle, the easiness, and the ability of being customized.

In the developed prototype, it is easy to see the difference between the two persons although they spoke the same word. One can find a lot of similar systems that use voice in a similar way, but most of them do not provide the complete solution for locking and unlocking problem. This means that anyone can record the voice of the authorized person and then lock or unlock the system by the recorded tag. In the developed prototype, we found the way to prevent recorded tags from being the key of the system by using dynamic time wrapping on the software side. This technique is used to differentiate between the two words spoken by the same speaker and/or different speakers. This technique is useful because it can compare between matrices from different ranks. This obviously works side by side with centroid calculations that represent the person's spoken tag features by just one value, so the comparison is done between this value and the stored value of the tag stored previously. The product has two modes of operation: training and testing. Training mode allows the user (i.e., owner) to provide voice samples to set the lock, while the testing mode is the standard setting in which several users attempt to unlock the locked system. The accuracy of the device will be investigated as a threshold for a real security system.

There are companies, where the security systems are used to lock and unlock doors or lockers of any protected assets. Typically, banks use the pin number to identify the user of the ATM card who wants to make use of the ATM machine. In addition, call centers typically ask for user information each time you call. Also, attendance tracking system sometimes is done by ID card scanning or by finger print scanning or any other security system. These companies can become the users of this product if they want to replace their old security system or even integrate it with this product to be as a backup system.

Smart Internet-Of-Things (IOT) Switch

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ABSTRACT

The term "Internet of Things" describes a number of technologies and research disciplines that enable the Internet to reach out into the real world of physical objects. These new technologies allow the connectivity between humans and things and also things with other things at any time and at any place. The IOT technologies will help us to dynamic control of industry and daily life, to improve the resource utilization ratio, to have better relationship between human and nature, to form an intellectual entity by integrating human society and physical systems, to have resource efficiency–energy conservation and finally to decrease pollution and disaster chances.

In This project, an efficient smart IOT switch is designed and implemented. This smart switch can be connected to any outlet and it is controlled from any IOS or Android smart cell phones. The designed switch outperforms other existing switches since it can control up to four devices at the same time. The cost analysis shows that the designed IOT switch is cheaper than existing industrial switches. One important application of the designed switch is also presented where schedules for home appliances can be set and controlled remotely using a mobile internet connection. In addition available display is designed to show the real status of the controlled device.

Advantages

1- Remote-control 2-Save power 3-Reduced cost 4- Multifunctional 5-Time-Scheduling 6- Device-Status Display



Fig. 1: Block diagram of the smart IOT switch.

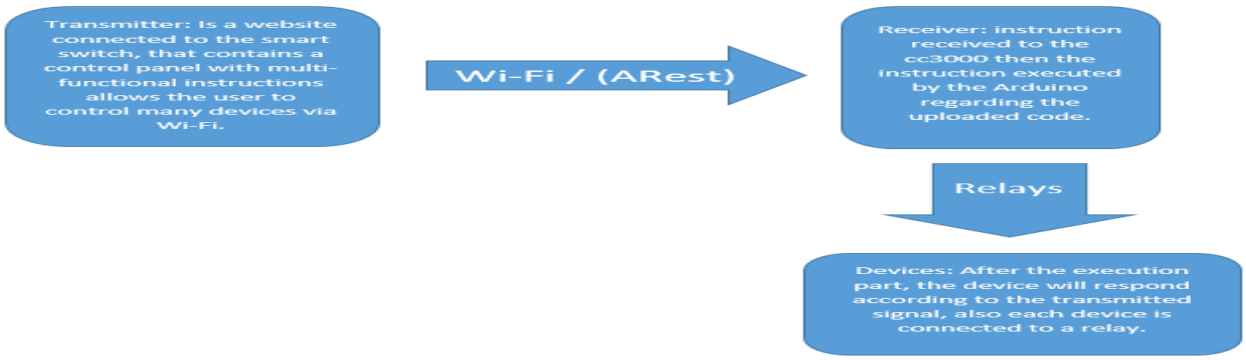


Fig. 2: Description chart of the smart IOT switch

SISA: Special Intelligent Support Application for Blind People

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ABSTRACT

Covering impairments, activities limitations, and participation restrictions are the most challenges that face people with special needs. Therefore, a special need is a complex phenomenon, and that reflects the interaction between a person's and the community in which he/she lives.

As the development team we have developed a Special Intelligent Support Application for people with special needs (blind people) reflect the actual natural life. This allows people with special needs to engage with life better than before and to help blind people rely on him/herself by a list of features that combination of software and hardware.

SISA is a program accessible through mobile channels that have limited input from the client, without difficulty in use. SISA allows blind people to make voice calls; make a call to one of contact list through voice request, video calls; make a call to get assistance such as get to a certain place in the house or a place of some staff, and transfer calls; allow the user to transfer the call to one of the contact list. Moreover, Smart bracelets (contain a vibration, RGB Led, Bluetooth for linking device, Wireless, battery, and a button ON & OF.) and Smart Stick (Contains the radar a button ON & OF, and Bluetooth that connected to the smart bracelet if there is an object near the smart bracelets will alert the person where that their object with differ the frequency of vibration) are used to provide a list of features that blind people could rely on it in order to in minimize the restrictions and activities limitations they face.

Smart Parking System

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ABSTRACT

Finding a parking area to park your car is getting harder and harder as the population is increasing an consequently more empty areas are needed to provide parking spaces for the massive number of vehicles that i increasing every day. Nowadays in congested places, time is wasted in finding an empty area for parking resultin in wasting of car fuel.

The main objective of this project is to design and build an attractive, feature rich, low cost and lov power parking system that uses an application to reserve a parking space to reduce the hassle of finding a parking avoid crowding, save fuel energy by reducing the time of looking for a space in crowded parking areas. Man similar systems exist, for example the automated parking system, that address the mentioned problems by makin the parking areas vertical with multiple floors to save space and letting the machine take the car and park i However, this costs extra space and of course extra money to build such type of a system.

This project aims to save time and money, while finding parking space on already existing buildings b reservation before going to the place of visit. An application is created that operates on smart devices wher people can use it to reserve their parking on a specified location and at specified time. This is done by entering th information required from the user. If space is available, the system confirms the reservation by showing confirmation message includes a four digits password. The information will be saved in the database. When th user reaches the parking area he/she should enter the password provided by the application using the keypad at th gate of the parking area. In order to enable communication between the information saved in the database and th information entered in the parking, an Ethernet wired network is used. The system installed in the parking are includes microcontroller that sends the information entered by the user to the database for verification. If th information is correct, the microcontroller operates the traffic arm to lift allowing the car to enter the parking area When the reservation period ends the user is expected to leave the parking area and the system database i updated. This project is designed and demonstrated on a small scale prototype.

Smart Recycling Bin

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Supervised by
S. E. Esmaeili

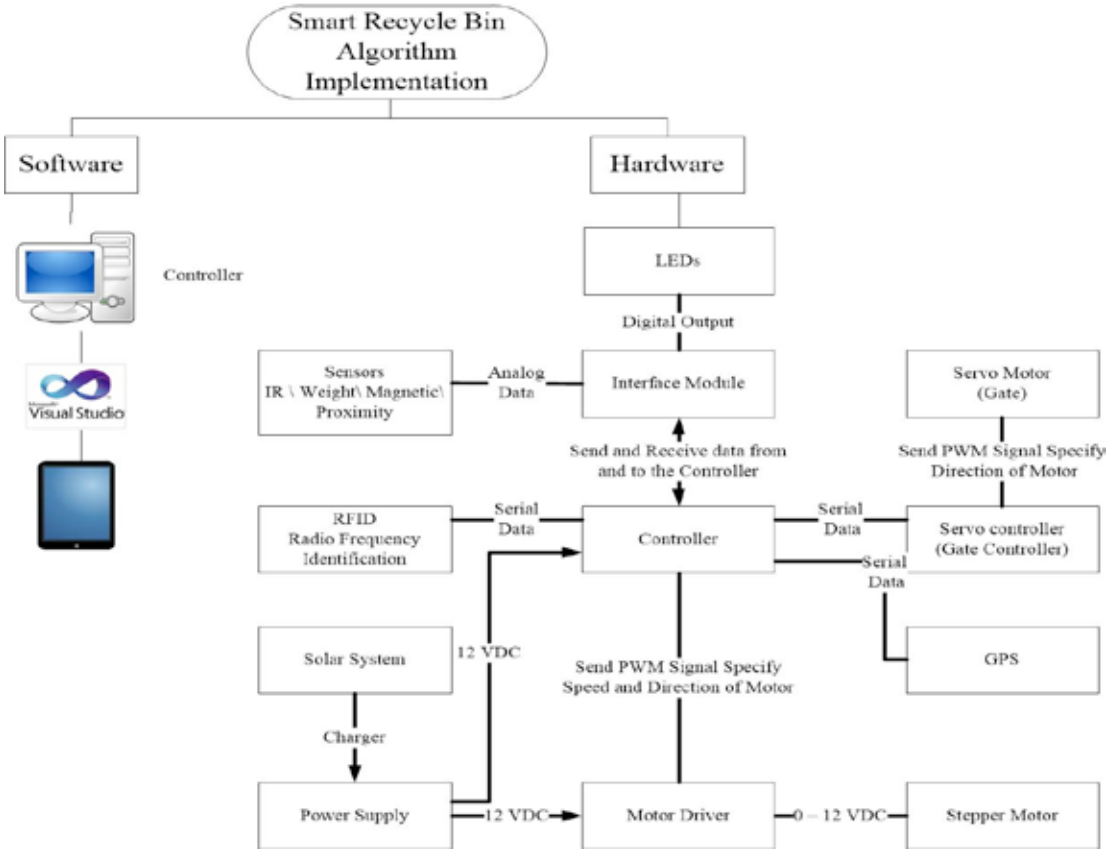
ABSTRACT

Recycling is a subject that has been talked about for many years now, but one that is not being applied as much as the world needs it to be. It is a fundamental element of maintainable development for all living creatures. Recycling in general is the process of recovering and reusing waste products from household use, business, agriculture, and manufacturing, thereby reducing their affliction on the environment.

Products that are recycled in large quantities include paper, metals, glass and plastics. These products are then remanufactured into new goods to be sold. Because of the absence of recycling and efficient waste manage- ment, this has, and still is, causing signifi cant environmental problems, e.g., pollution, in addition to the waste of natural resources, energy as well as time therefore causing a large economical burden.

The main objectives of the proposed smart recycling bin (SRB) are to recognize the correct material type of the items being thrown into it using different sensors that include but are not limited to IR, weight, magnetic, and proximity sensors. After determining the correct type of the material, each item will then be allocated to its designated container. Another objective of the proposed SRB is to keep count of the number of items in each container and determine when a container is full or empty. The proposed SRB will establish a wireless communication with the authorities to: notify them when a container is full, communicate exact location of said bin using global position system (GPS), and to exchange information about the contents of the bin. Furthermore, the proposed SRB will run mostly on solar power to operate the bin by having a power saving mode, and a solar charged backup battery.

The first step of the recycling process begins from when the garbage gets collected and then sent to the appropriate facility to be handled. Hence, the notion was to create a smart recycling bin that can do the sorting for us when an item is dropped into it. The implementation of such a project would be beneficial due to the fact that even without recycling bins, there is a garbage problem in general that happens to start at the source of garbage disposal. And so, even if a user was not intending on recycling the item that they wish to throw away, it would be done so unknowingly and without any effort required from their part.



UNIEN: UNIversity E-Notebook

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Supervised by
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ABSTRACT

Moving around with actual notebooks can get messy, tiring, and inconvenient sometimes. In addition sharing academic materials, such as lecture notes, exams, and assignments between students from different schools can be difficult without having dedicated software.

There are applications that allow users to share lectures notes; however, they do not authenticate registered users. Therefore, posted information cannot be always trusted. Some applications, such as OneClass, do not have the feature of organizing lecture notes in the form of chapters, and they are limited to certain countries.

UNIEN is a micro-blogging mobile application that simplifies sharing lecture notes, assignments and exams with students and instructors from different universities around the globe. Users can create their own personal profiles, write notes, share exams and assignments, and attach pictures and videos. Unlike existing applications, UNIEN allows users to organize their posts into chapters, which is similar to writing in actual notebook. In addition, UNIEN adapts social media application's features to build an entertaining environment to encourage students to use it. Account holders can follow friends and have followers, favorite others' posts, send direct messages to friends, search for friends and for a particular course, block users, and most importantly our application allows users to upload texts, photos, and videos. Figure 1 and Figure 2 are screen-shots of two of the application's interfaces.



Figure 1: User profile



Figure 2: Home page

Our greatest challenges were: (1) trying to build an entering application that attracts students to share academic materials, and (2) developing an application that can be used by different schools and colleges. UNIEN application currently focuses on students and instructors of the college of computing and information technology at King Abdul-Aziz University (KAU). Our application can be extended to support additional colleges at KAU, other schools in the Kingdom of Saudi Arabia and from other countries. UNIEN can also be extended to allow users to have a wish list, add mentions and hashtags, repost of other posts, and organize followers into lists. We built a user-friendly application that work for both Android and IOS smartphones.

Route It: Smart Riyadh Metro Routing

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Supervised by
Dr. Ghazi Al-Naymat

ABSTRACT

the proposed application is that the application developed for Riyadh city, which consist of a modern networked metro system, supported and fed by multilevel networks of buses transport system. In addition, it incorporates hybrid functionalities from different applications; to produce an application that provides optimum routes.

Route It is an Android application that applies computing in transit systems. It combines both, metro and buses in its routing process to help metro users to not only reach their destination wherever they were, but also reaching it in an optimal time saving time and effort. The application is based on A* algorithm to calculate the shortest path considering incremental delay, buses and metros schedules. In addition, ***Route It*** allows saving user's locations, as favorite to reach them quickly again. As we go towards smart cities, users will be notified if any closed roads/stations or congestion exists in any point included in the route.

Figure below describes a scenario that explains the idea behind the proposed solution. There is a person who wants to go from his current location to King Abdul-Aziz historical center. The figure shows that there are two route options for the user after implementing different calculation. Route1 is optimal even though it is longer than route2 since the calculation is based on bus congestions and metro schedule.



Figure 1: Scenario on how the application works

The challenge is that the transportation network is still under development, so to validate our goal; a 3D simulation for Riyadh city with the transportation network is produced using Unity engine that will be integrated with ***Route It*** application to get the congestion data, as the figure bellow.



Figure 2: Integration Of Unity engine.

In conclusion, the project incorporates the knowledge in the IT field in a way that serves the community. So by developing this application we are helping to solve the congestion problem, which the society suffers from.

The Design of a PCB Milling Machine

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Supervised by
Dr. Seyed E. Esmaeili

ABSTRACT

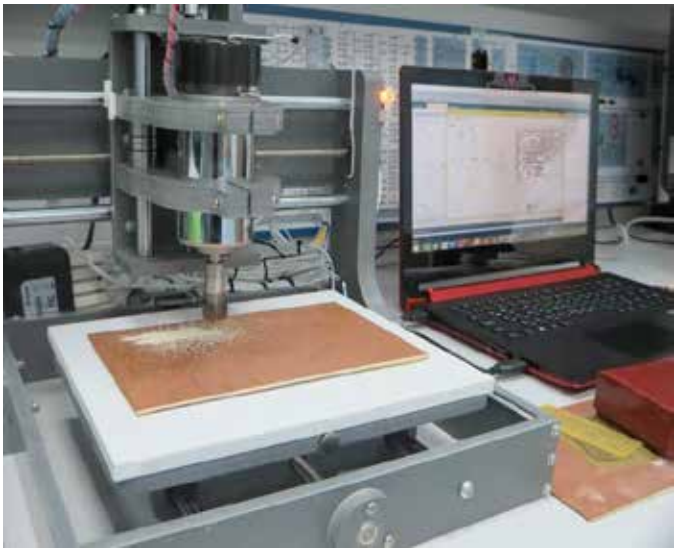
Commercially manufactured printed circuit boards (PCBs) are commonly designed using a photolithographic process whereby the undesired copper is chemically etched away from the copper substrate. Most commercially manufactured PCBs are designed using a photolithographic process or chemical milling. In this process, the regions to be etched are defined optically using a photolithographic mask. The undesired copper is chemically etched away from the copper substrate using an acid in order to create objects with the desired shape. The photolithographic process, though commonly used, poses many challenges:

1. The etching process requires the use of acids.
2. The board needs to be put in the acid for a relatively long time interval (around 3 to 4 hours).
3. Taking the board out early means that some parts have not been removed completely which might cause short circuits. On the other hand, taking the board out late, means that some parts have been etched away which might cause an open circuit.

Alternatively, simple PCBs can also be made through the removal of unwanted copper using a purely mechanical process known as milling. In a milled PCB, a milling machine is used to remove the unwanted copper from a bare copper substrate to form the desired traces. Note that resulting boards are still referred to as PCBs despite the fact that they are not "printed". In the following, the design of a PCB milling machine is introduced with a thorough description of components and the prototype's mechanical, hardware, and software requirements.

The proposed milling machine consists of the following components: three stepper motors, one drill motor, four control units (one to control each motor), and a personal computer (PC). The software used in the machine consists of Visual Studio 2010 as .NET framework, Visual Basic .NET as the programming language, and the Phidget Library to check the connection of the hardware.

In the initialization stage, the milling machine needs to be calibrated manually. The drill motor needs to be lowered down to the limit of the Z-Axis. The drill motor tip should be touching the plate. A test run is initiated using a white image. Next, the PCB image is selected and loaded. The image should be black and white, where black is the wanted copper area and the white is the milling area, i.e., unwanted area. The software translates the PCB image into a G-code instruction that feeds the computer. After pressing the start icon, the machine will start milling. The proposed PCB milling machine is aimed for engineers in general and engineering students in particular who could encounter some problems and possibly harmful situations when trying to design and produce PCBs in the traditional approach. Our PCB milling machine provides increased productivity with reduced exposure to risks. The major benefits of the proposed milling machine are lower per-board cost and shorter turnaround time.



In the future, we plan to add a vacuum head next to the drilling motor in order to remove the unwanted small particles generated during the milling process.

MySmartMed

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Supervised by
Dr. Shaheen Khatoon Syed

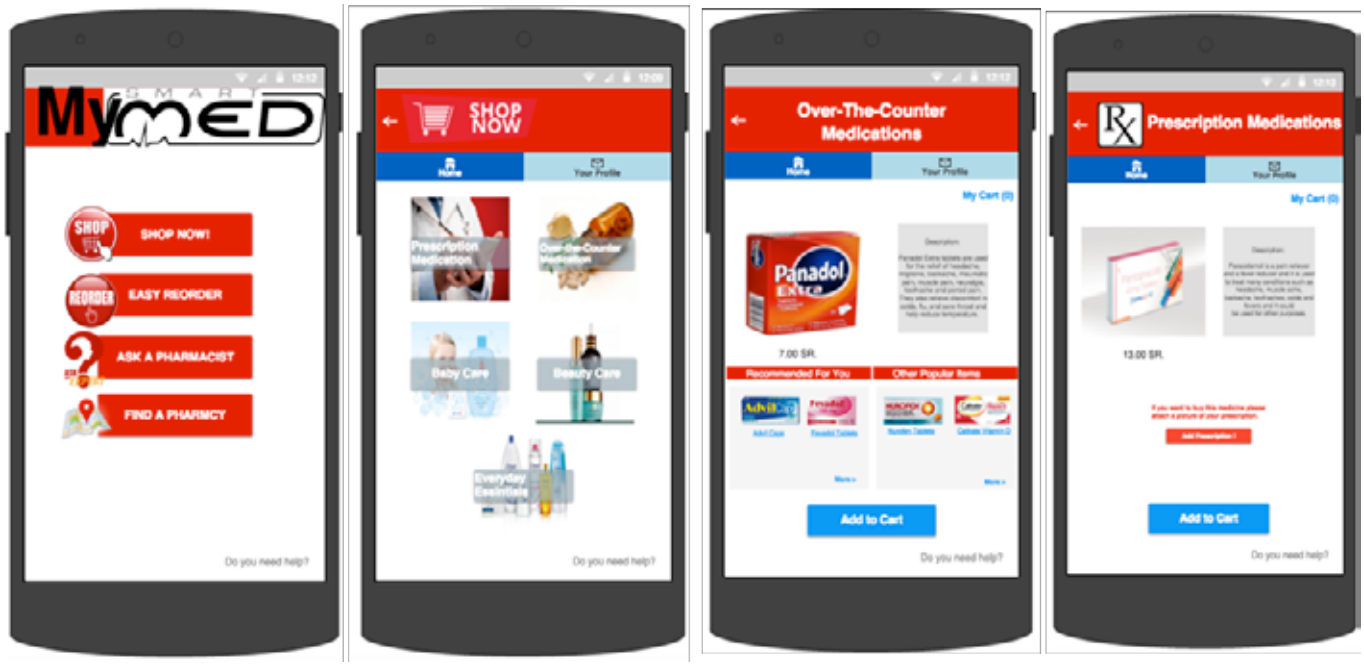
ABSTRACT

A pharmacy plays an important role in the delivery of health services to the ordinary public. There are several pharmacies locally, but medicines as well as health and beauty products are commonly purchased in a traditional manner - pretty much like any other consumer products. Because our lives are dominated by technologies and smartphones, we developed our MySmartMed Android App to facilitate ordering and delivery of pharmaceutical products to customers directly to their location. Moreover, the App facilitates product recommendations as well as community interactions among customers and pharmacists.

MySmartMed aims to offer several value-added services such as home delivery from the nearest pharmacy. The customers receive not only the medicine they order, but also comprehensive advice about their medicines such as medical advice along with caution about any side effect. For health and beauty product lines, customers receive recommendations of related products that might suit customer's needs and preferences. MySmartMed also observes pharmacy sales on a daily basis to detect widespread diseases and outbreaks. In addition to that, the application provides an interactive social network between pharmacists and customers where they can ask questions and get answers by the community of pharmacists.

The Application aims to provide the user with the ability to access a database to check the medication details they want to order. The embedded Google Maps displays the nearest pharmacy to the client based on availability of stock. Medicines that require a prescription need to be sent as a picture in order to be verified by the pharmacist. As for the recommendation system, it generates suggestions about newer or better products as well as potentially relevant products based on past purchase history. The application also uses data mining techniques to view patterns of customer purchases around Saudi Arabia to predict disease outbreaks and provide health officials a heads-up on outbreak diseases in order to take early precautions.

MySmartMed is being implemented using Android Studio, Java and SQLite. The simple interface makes the application easy to use. As for future development, we plan to develop the App on other platforms such as iOS and Windows.



Service Bidding Platform

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ABSTRACT

In a modern fast-paced world where time is gold and seeking opportunities is like treasure hunts, it is burden full to waste time looking for a capable worker to perform specific tasks. For example, when a water pipe leaks, the average home owner looks for the nearest yellow pages and searches for a plumber to call. The time-wasting risk is that this service provider is not guaranteed at all. The least concern can be about the workers who may not be as skilled as expected, perhaps the two parties never have matching free time slots, if they did they might not agree on a price, not to mention their locations plays a role in the success of the deal. As a result, the Service Bidding Platform is introduced.

The Service Bidding Platform is a mobile application where users (let's call them service consumers) post a specific job to be done. Now, the job posted is categorized and tags are added. The other stakeholder in the application are the service providers. Those are special users of the application that search for tags in their field of expertise, time availability and location (included in but not limited to other search criteria). They can then bid and write a short proposal for the consumer. Afterwards, the consumer sees the list of bidders on his job post from which he compares service providers (from their costumers' ratings and profiles) and awards one of them the job. In this phase, communication between the two stakeholders takes place and after the job is done, and finally each stakeholder will rate the other.

In the end, the Service Bidding Platform provides a solution for communication between two types of stakeholders, service consumers and service providers. The service consumers have the benefit of getting the job required done with best convenience and high quality job as well as competitive prices. In addition, the service providers have a way to reach a wider range of costumers and increase their revenue. Nevertheless, the application developers can enforce transaction fees and/or subscription fees to revenue from the system.

SENTIMENT ANALYSIS OF UAE SOCIAL MEDIA

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Supervised by
Drs. Khaled Salah and Hassan Almuhairi

ABSTRACT

Our project is to develop an automated, seamless way to get sentiment. We want to show the sentiment of a populace in a specific geographical area either generally or on a certain topic to users through an app. A prototype of that app is the expected final product this project. The source of the data to be processed comes from the social media, mainly twitter for now. When using the app, the user can select a topic of interest. Visualizations in the form of line graphs or maps appear depending on the user's choice. These visualizations show the results of sentiment analysis on the user's selected topic. The user can also choose the timeframe they are interested in.

We get raw data from Twitter through its APIs. We filter this data to get the information we need. Such information includes the tweets themselves and their geolocations. Non-English Tweets are translated into English through Bing Translation Service API. We use Text-Processing's Sentiment Analysis API. It allows us to determine first the subjectivity then the polarity of tweets. If the tweets are subjective, we drop them from our sentiment analysis. If they are objective, their polarity is determined. There is a variable for positive sentiment and a variable for negative sentiment. The one with the higher value determines the polarity of the tweet. We have a central cloud server connected to a database. Data collected and resulted acquired are stored in that database. We have opted to use the cloud due to physical constraints. We have neither the space nor the processing power to carry out the required tasks in-house.

Currently, other apps that attempt to work with sentiment, such as the Happiness Meter, get their input from the people themselves. The users are expected to feed in the data. There are three faces they could select, happy, sad, and neutral. This is an inaccurate, limited way to measure happiness. We believe so because not everyone would rate the entity. Their rating may not reflect their feeling to an acceptable degree.

The aim of the project is to do sentiment analysis on social media to measure the sentiment of people in Dubai and Abu Dhabi about some of the most popular topics. Some of these key topics could include "Global Village", "Gitex", and "Expo". Sentiment Analysis is the seamless acquisition of data and its processing to get an accurate measurement of people's feelings. Companies could use sentiment analysis to determine marketing strategy, how people feel about their products and services, and how to market to potential customers and clients. This would also allow companies to improve their customer service and to quantify customer loyalty. It could also benefit the Federal National Council (FNC) candidates in their campaigning to gauge their support among the populace. The government could use sentiment analysis to determine unemployment rates and to quantify happiness. They could also use it in policy-making.

Plen 4 Autism

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Supervised by
Dr. Seyed Esmaeili

ABSTRACT

Plen 4 Autism is a humanoid robot that deals with autistic children. It is one of the few robots that could be printed using a 3D printer. Plen 4 Autism is around 20cm tall.

For many years scientists have been trying to find a solution for autism. Autism is a mental condition usually affecting the person at a very young age. It causes the person to have difficulty to socialize with people. In other words, people with autism prefer to be isolated. Scientists first tried medications to test on autistic humans, but not much result came out of it. Several therapies took action; still it didn't work as effective as they thought. As technology interfered more in this world, scientists realized the level of autism in children was increasing. The percentage of autism started growing. Scientists didn't give up on trying finding the best solution for autism. Few years ago, they found out robots were very effective towards children with autism. Children were actually responding to it. That's when different kind of robots was produced for autism.

Different robots have been made over the past years. Different companies produced different kinds of robots for autism. They all differ in shape, sizes, costs, appearance and even the features. The robots that are considered cheap; aren't highly tech at all. As for the highly tech robots, they are considered to be rather very expensive. The objective of the project is trying to produce a robot that meets all the requirements to treat autistic kids, produce a humanoid robot that is highly tech, produce a robot that is user friendly (not hard to deal with), and creating the base for a marketable practical product that would be used easily by parents to treat their autistic children. Since this robot can be printed using a 3d printer, the aim is also to try to produce the cheapest robot for autism in the market.

PLEN 4 Autism works by sensing the child's movement and reacting to it. To do that motion sensors from the Xbox 360 Kinect camera detect the child's movement (using Skeletal Tracking). That picture is translated into java code and transferred to the computer and then to Arduino, which then transfers that into signals that will make the robot move (through the RC motors) its left/right arms and legs up and down to interact with the child's motion. This interaction leads to the autistic child's happiness, helps increase their attention span and with time improves their communication skills. Furthermore, the Kinect will also be used for voice recognition. The robot will be able to take certain actions from a child (verbally), and respond to it; by performing whatever command it took from the child.

The issue being discussed here is one that lacks true treatment; while many others have taken initiative about the matter no one really does a good job at it. Most of the robots on the market are very costly and not specific to Child Autism. The PLEN 4 Autism should be a cost effective prototype that addresses the subject of child autism specifically and more effectively. By reacting to the child's movements, and speech; the PLEN 4 Autism will help improve their social interaction and communication skills.

PSB: Pilgrim Smart Bracelet

Hadeel Khalid Alhudaib
King Faisal University, Alhassa, Saudi Arabia

Supervised by
Dr.Shaheen Khatoon

ABSTRACT

Hajj is one of the five pillars of Islam and annually 2.5-3 million Muslims from all over the world visit Mecca during Hajj period. Hajj is a very crowded place and as we see in the news, pilgrims in Hajj face many problems due to overcrowding, physical exertion and mismanagement. Nevertheless, Saudi Arabia government is doing its best in making it as smooth as possible for pilgrims and Hajj service providers. Two of the most common problems that each pilgrim may face are, difficulty of finding their family or group if they get separated from each other due to any reason. Telephone communication with their group may not help in this situation due to number of reasons such as weak signal coverage; network over traffic etc. Also, pilgrims may collapse for any health reason, and may not be able to communicate with aiders if they do not speak the same language, or if they are unconscious. This cause loss of thousands of life's in past. This problem requires a solution to make Hajj experience safe and pleasant for both pilgrims in specific and Hajj service providers in general.

As a computer science student my proposed solution is PSB (Pilgrim Smart Bracelet), a bracelet with a small screen that will track pilgrims by using GPS and RFID technology. There are many features in PSB that helps pilgrims to experience a better Hajj, and service providers to better manage crowed. The main feature is finding the groups locations and guiding the pilgrim to it if one gets lost. Also, every bracelet will contain a medical history, and basic information about the pilgrim, which can help pilgrim's identification and medical aid in case of any medical emergency. The PBSs will be connected to each other via RFID technology. RFID will be associate with GPS to help identifying the groups location if any pilgrim gets lost. Bluetooth connecting with the PSB will help aiders in aiding pilgrims if any health problem occurs.

8TH ANNUAL
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ON APPLIED
COMPUTING

Clustering and Predicting Heart Disease using Data Mining Techniques

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Supervised by
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ABSTRACT

Heart disease is the leading cause of death in the world over the past 10 years. Researchers have been using lots of data mining techniques to help the health care professionals in the diagnosis of heart disease. Hospitals have a problem that they have huge datasets for the patients of heart disease with missing, hidden or unknown patterns. Data mining can be used for the problem of the hidden patterns in the huge datasets. Data mining techniques make it useful for the large datasets to extract from them the hidden and the unknown knowledge, relationships and patterns that are difficult to be discovered by using classical or traditional methods. The project is on Clustering and Predicting heart diseases using different data mining techniques on different heart disease datasets. There are real data will be collected and will be based on the research; data will decide the attribute to cluster and predict the heart disease. The techniques that will be used in the project are K-nearest neighbor and Genetic Algorithm for clustering, and Naïve Bayes, Decision Tree, and Neural Network for prediction.

The main motivation for this project is that the mortality of heart disease patients is increasing each year around the world and the huge amount of patients' data that are available that could be used to generate useful knowledge. Data mining techniques have been used by researchers to help health care professionals in the diagnosis of the heart disease. Data mining techniques make it useful for the large datasets to extract from them the hidden and the unknown knowledge, relationships and patterns that are difficult to be discovered by using classical or traditional methods.

The aim of this project is to work on real data by using some data mining techniques such as K-nearest neighbour, Genetic Algorithm (GA), Naive Bayes, Decision Tree, and Neural Network and this will be based on the researches and the data will decide the attribute to cluster and predict heart disease.

There are three datasets are going to be used in the project using the several data mining techniques. There are two datasets from UCI Machine Learning Repository which are Heart Disease dataset especially on Cleveland Clinic Foundation dataset and Statlog (Heart) dataset and the third dataset is on Congenital Heart Disease (CHD). The tool that is going to be used to compare the different techniques is Matlab.

Arabic Text-to-Speech Application using Intelligent Prediction System for Disabled People

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ABSTRACT

People are communicating with each other using their natural language. However, some people are not able to use their voice in communication because of speech disability that may result from many reasons such as stroke, progressive illness, or voice disorder. Assistive technology has a great effective factor in helping people with speech difficulty using applications support Text-to-Speech (TTS) technique that converts text to spoken language automatically. The value of these applications lies in its usability and efficiency in the writing process and the clarity of the speech produced automatically. Since the writing process usually slower than speaking, we propose a new TTS application for Arabic that uses intelligent word prediction using a statistical approach in language modelling to predict the next word or sentence in Modern Standard Arabic.

Word prediction is an important technique that enhances data entry; it enables users to write part of the word or sentence then the system suggests suitable completions depending on the previously written part. This technique will reduce the spelling mistakes and the time required to write complete sentences. Similar applications exist for other languages but the usage of text prediction in TTS applications for Arabic is in the early stages. Current Arabic TTS applications use lists of common phrases and the user previously entered words. Our proposed system add a new statistical technique to suggest words not entered before, using a large Arabic corpus.

Although there are many existing Arabic corpora, most of them are classical Arabic such as religious text, which is not suitable for our target application that uses current modern Arabic. On other hand, corpora of Modern Standard Arabic such as news and sport text also are not enough to our purpose since speech involves daily communication more than political or sport speech. Thus, we have to collect a representative corpus of all possible chatting speech in Arabic. In addition to Modern Standard Arabic corpora, we collected frequently asked questions from different fields from the internet, social media, chatting conversations, books to learn Arabic speaking and scripts of voice conversations.

Our big corpus needs a sort of normalization process as pre-step to our language modelling such as automatic spell checking, eliminating not used words in speech such as punctuations, some function words and symbols. We use n-gram models to predict the next words and other features such as user age and the level of formality. Moreover, the interface is designed to increase the usability, in addition to show the recently used phrases by the user, it contains clear and meaningful icons of the main functions, list of suggested words and lists of the most common used phrases in different categories (such as greeting, school, hospital, and restaurant). These features offer fast and easy access to the desired words or phrases.

The proposed application is supposed to be the first Arabic application that provides intelligent text prediction system integrated with TTS tools. The application uses statistical language models with a large Arabic corpus for the daily conversations. We think we may easily apply the same system to other languages that do not have intelligent prediction systems yet in their TTS applications.

Study and Analysis of Morphological Shape Representation Algorithms

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ABSTRACT

Images speak more than words right from ages to this millennium to inform, illustrate, explore details in science, engineering, technology, medicine, biometrics, astronomy, surveillance, remote-sensing, multimedia and internet applications. Upon the invention of digital computers and the requirements of a NASA space research for want of distortion-free images of lunar surfaces, did the field of digital image processing (DIP) come into existence and it became panacea to the diverse issues of all those scientific and technical domains. The major areas of Digital image processing include Acquisition, Enhancement, Restoration, Segmentation, Compression, Representation and Recognition.



Fig. 1. Approximation examples By MSD and MST of Lamp image when they use only 80 skeleton points

Among these areas, Image representation plays an important role to provide the foundation for image coding, shape matching and object recognition, content-based video processing, image data retrieval, character recognition, automatic visual inspection and medical diagnostics based applications. Since human recognition system largely depends on shape features, shape representation is an important step to any computer vision based recognition system [1]. These shape representation techniques can be internal / external. External shape representation techniques make use of boundary features of objects to represent an object while internal shape representation techniques use internal features of the object for representation. Among all shape representation techniques, internal mathematical morphology based representation techniques showed much improved performance due to its simplicity, compactness and translation / rotation / scaling invariant properties. Mathematical Morphology is a set of mathematical operation / tools for extracting image components for the representation and the basic morphological operations are dilation, erosion opening and closing.

The project concentrates on studying, implementing and analyzing morphological shape representation algorithms using Matlab. The algorithms in the study include Morphological Shape Decomposition (MSD) and Morphological Skeleton Transform (MST). The morphological skeleton transform (MST) [1] decomposes a binary shape X by overlapping shape components of discs with different radii and is represented as union of all the maximal disks contained in the given shape. MST is formulated by the equation $X = \bigcup_{i=0}^{N} S_i \oplus iB$ and the skeleton subset $S_i = (X \ominus iB) \setminus ((X \ominus iB) \circ B)$. In these equations, $\oplus$, $\ominus$ and $\setminus$ respectively represent dilation, opening and set difference operations. Further, $iB = \underbrace{B \oplus B \oplus \cdots \oplus B}_{i \text{ times}}$ and N is the largest integer such that $(X \ominus iB) \neq \phi$. The morphological Shape Decomposition (MSD) [1] decomposes a binary shape X by non-overlapping shape components of discs with the difference that the skeleton subset $S_i = \left(X \setminus \left(\bigcup_{j=i+1}^{N} S_j \oplus jB \right) \right) \ominus iB$. We have implemented MST and MSD in Matlab platform and found that MST uses lesser number of skeleton points but more computationally complex when compared to MSD. From the results from our experiments shown in the Fig. 1 it can be identified that MST provides more realistic output useful for object recognition. Further, we will continue our study to develop a new algorithm with better comparative results from MST and MSD as a future work.

References

[1] J. Xu, "Efficient Morphological Shape Representation with Overlapping Disk Components", *IEEE Trans.Image Processing*, vol. 10, no. 9, pp 1346- 1356, September 2005.

Airport Luggage Protection System

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ABSTRACT

Millions of luggage are reported missing each year at airports due to several reasons. This problem is causing tension to the passengers when handling their luggage. The design and implementation of Airport Luggage Protection System (ALPS) is presented in this project. The main objective of the system is to minimize the amount of lost luggage, decrease insurance fees for airports, detect if someone mishandled, lost, or forgot the luggage.

The implementation of the system consists of both hardware and software. The hardware is composed of RFID writers, RFID readers, RFID stamper, 360° barcode readers and camera. The software part is a novel algorithm coded using C++/C# for the multi-stage process. The process starts when the passenger checks his/her passport at the immigration desk, the immigration officer will use image detection to capture the information attached to the passenger ticket, scan the barcodes of the luggage attached to the ticket and then generate a serial number that will be written on the RFID tag. The tag will be pasted on the ticket and the passenger will continue his/her way to the conveyor belt as shown in *Figure 1*.

When the luggage arrive, they are dropped on the conveyor belt that transports them to where the passengers receive them, during the process a 360° barcode reader will read the attached barcodes of the luggage and store them in a database, to compare them with the ones checked in the immigration because the barcodes on the ticket are identical to the luggage ticket barcodes which will help in the identification process. Then, the stamping machine will stamp an RFID tag on each luggage, and the RFID writer will write a serial number on the tags that are identical to the numbers on the tickets of owner as shown in *Figure 2*. Additionally an optional mobile application is available for the passenger to track his/her luggage and estimate when they will arrive to the luggage pick up belt using Estimated Time Arrival (ETA) feature, that will check the last time the luggage checked in the database through the RFID technology, this can be accessed by connecting the mobile to the airport Wi-Fi, and for security measures the user have to scan the ticket barcode to access the user profile. The application will also have luggage delivery feature where it will deliver the luggage to any desired destination while the passenger can leave the airport without worrying about them. These mobile application features will help reduce the stress of waiting for the passenger and save the time and the effort of searching and waiting as shown in *Figure 3*. The luggage then is received by the passenger. As a check-out process, the passengers will pass through a gate as shown in *Figure 4,* which is provided with RFID readers, they will read the tags of the ticket and luggage simultaneously, and compare between the serial numbers to make sure they belong to the same passenger. An alarm for the security will be triggered if there is mismatching, or a missing tag. The serial numbers, date, time and the status of the access are stored in a database which can be used in statistics and investigations later. In case the passenger forgot to take his/her luggage and passed through the exit gate, an SMS will be sent to the passenger as a reminder to get back for his/her luggage as seen in *Figure 5*.



Figure 1: Passenger process.



Figure 2: Luggage process.



Figure 3: Mobile application.



Figure 4: Exit gate.



Figure 5: SMS service.

The proposed system is a smart, low cost and secure approach to minimize luggage lost rate. It is using a reliable, secure and light RFID technology. No agreements or international protocols are needed between the airports, it can be adopted by any airport around the world, reduce the number of luggage mishandling and the passenger time spent finding his/her luggage.

A full system prototype has been developed using UHF RFID reader/writer and by developing appropriate software. The developed system can successfully detect multi-exit cases to avoid any luggage mishandling, also generate an encrypted serial number to write them on the detected tags and update the database in each stage, additionally the mobile application is able to access the database for each passenger and show the ETA for each luggage the passenger owns.

Electronic Shop

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ABSTRACT

Through my knowledge Rait that people with special needs neglected by society and few are interested in ordered them so I decided to use everything that I learned during my studies for the established store to this category and provide all that is needed the person whom kits , tools and clothes and wheelchairs in one place with the use of simpler ways to search and purchase through product search through a bar code for the product image and search by voice , too, will be interested in that exhibitors clothing of people with special needs

Buying and selling goods over the internet is known as E-commerce process. Where the user can access all the facilities of the internet to buy or sell products unlike the tradition way which require a physical efforts such as going and getting the products from the shop itself. online shopping websites made it easier for any person to reduce physical effort and to save time. this project explores the idea of building an online shopping website which enable the registered customers to view and to buy the available products in an organized manner using PayPal paid method or any other formal methods, that make the buying operation more easier and flexible for the customer. Because in today's fast changing it is very important to have mechanism to communicate with the customers in the most effective and timely manner. shopping cart is provided to the user in order to facilitate online purchase. the system is implemented using HTML, HP, JAVA SCRIPTS and SQL.

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Smart Nutrition Shopping Cart

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Supervised by
Dr. Mohammad Nasor

ABSTRACT

The design and implementation of a smart nutrition shopping cart is presented in this project. The main objective of project is to read the product price and nutrition information as you put the product in the smart cart, stores your pers data in addition to your monthly shopping list so you can compare your nutritional value history, Gives you the stati through your phone and Suggests what is missed in your diet.

Survey about healthy shopping was done and the statistic shows that 52.2% didn't read the nutritional information o products that they want to purchased and 42.4% gave a reason of this that they feel bored while spending time readin label. The survey ends up with 50% agreed with involving technology in shopping procedure. According to these resul found that the use of the smart nutrition cart will has a very big impact in the society making shopping easier and help pe to manage and take care of their health.

The implementation of the system will begin with the hardware part which consists of the cart that will have a RFID re attached to it which will be controlled by C# program to be able to read the product.

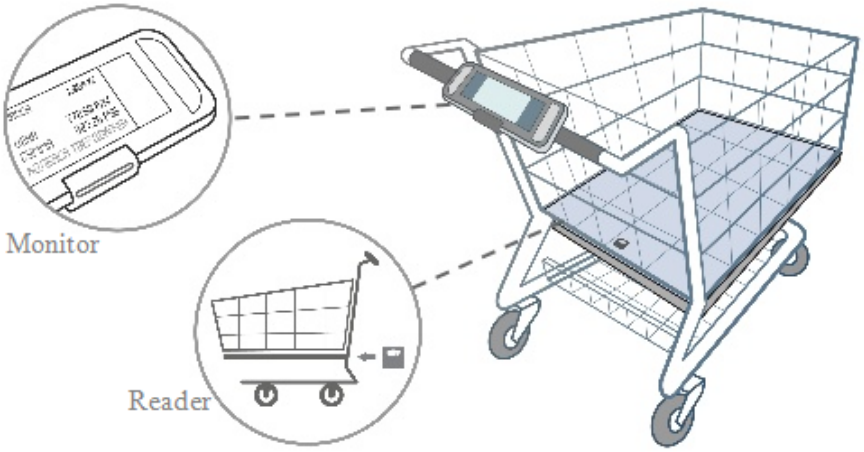


Figure 1: System Diagram

A user will put the products he/she want to buy in the cart, the reader will read the product and show the prices and nutrition information (like: calories, fats, carbohydrate percentages, fiber percentages, protein percentages, vitamins and and it will be shown in a monitor. This information will be saved and compared with the monthly purchased nutr information and will tell the user if something missing in his/her purchase which is important in his/her diet and will him/her suggestion of what he/she have to buy. These information will be saved as statistic which the user doctor can u reassure about the user health as it give a record of what is included in the user diet.

Further addition to the system will be making a watch or wristband for personal use which will detect when the consu takes something from the purchase and read it, a calories counter program inside it will count the consumer cal consumed and will tell him/her if he exceed his calories limit and will tell him to do some exercises to burn calories and give other food options which is better to his/her diet or the types of food which is missed in his diet and he need to eat it.

Reference:

Survey link: https://docs.google.com/forms/d/1Yo4bkZaPLwHFdZhI3m5mt9i6FR9cB8imuHxPsbzKiEU/viewform

An Automatically Generated Classical Arabic Collocation Dictionary using the Refined Dice Association Measure

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ABSTRACT

Linguists are always interested in studying the Arabic language not only because it is the language in which the Holy Quran is revealed, but also because it is one of the oldest and richest languages known. Also, Many other languages have influenced by Arabic language such as English, French, German, Persian, Spanish, and Urdu. Despite all that, Arabic language has a lack of collocation dictionaries; it is very hard to find reliable collocation dictionary for Arabic language except some old trails that are done manually and based on a small to medium corpus. Linguists confirm that the reason for this shortage is due to the rare attempts to build a distributional lexical semantic model for Arabic Language. In our project, we will make the first ever attempt to implement an association measure for Arabic language, and we choose a new association measure called Refined Dice, which is used for detecting the syntagmatic relations between words in a very large corpus. Finally, we will use this implementation to create a powerful and reliable search based collocation dictionary for Arabic Language.

Originally, the Dice algorithm is used to measure the association between species, but it was adopted by distributional semantic to measure the association between word by taking double the ratio between the total co-occurrence of two words X and Y simultaneously (fxy) and the sum of the frequencies of the separate words.
The equation is:

$$\text{Dice} = \frac{2fxy}{fx+fy}$$

The Refined Dice coefficient in an attempt to advance the ranking of significant co-occurrences and reduces the ranking of common co-occurrences such as function words where the new improvement is an outcome of multiplying (Dice score) using the logarithm co-occurrence frequency divided by co-occurring words, and this suggestion is called (calculating new aggregation using Refined Dice). The Equation is designed like this:

$$RefinedDice = Dicex, y * \frac{\log(fxy)}{fx+fy}$$

Dice x, y is the Dice score of the co-occurring words x and y. Log (fxy) is the logarithm of the co-occurrence frequency of x and y. fx is the individual frequency of word x and fy is the individual frequency of word y.

$$RefinedDice = 30 + log_2(Dicex, y * \frac{log\,(fxy)}{fx+fy})$$

Scores of the Refined Dice association measure are small and hard to deal with, to solve this problem a new Equation can be considered to raise the values of the measure without affecting its ranking, as in this equation.

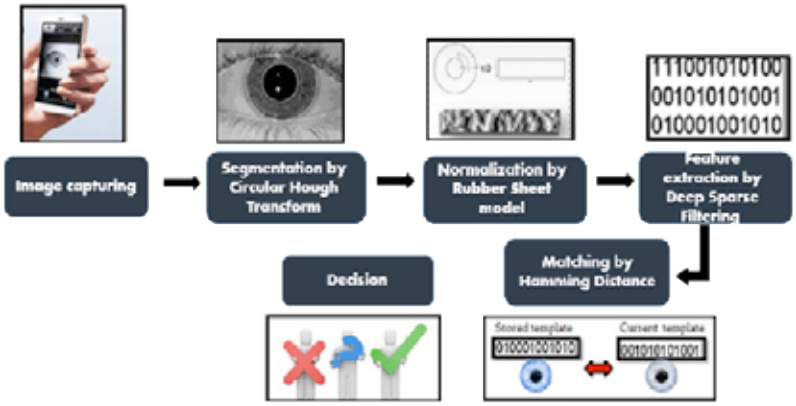
Iris Recognition System using Visible Wavelength for Smartphone Security

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ABSTRACT

Smartphones nowadays have become an important way to store sensitive information. Hence, we should ensure that user's privacy is highly protected by replacing traditional authentication methods with Biometrics technique, which provides automatic identification based on unique individual features or characteristics. Biometrics have been developed based on varies techniques, such as, fingerprints, voice recognition, facial features, signature or iris recognition, which regarded as the most reliable and accurate biometric identification system available today. In our research, we seek to follow our own approach in applying specific algorithms in order to build iris recognition system on smartphones. Most of iris recognition systems use eye images that are taken by infrared camera; this implies many constraints to users besides, the high cost of near-infrared device. Hence, as a suggested solution, we will use eye images that rely on visible wavelength; these images will be acquired by smartphone built-in camera. This will give the advantage of using smartphone as a standalone capture device instead of using extra hardware. However, this will lead to some challenges related to images captured by visible wavelength. They are unlike infrared images, have a lot of noise, such as, reflections, illuminations, and have less iris texture details.

The system consists of four main phases; when the eye image is captured by a phone camera, the system will use this image to localize the iris boundaries, this phase is known as a *segmentation*. After that, the system applies *normalization*, which aims to convert iris image to a fixed size pattern. Then, unique *features are extracted* from that pattern. Finally, the system compares these features with features of iris template that have been stored previously in a database, if the features are *matched*, the system will accept that person. Otherwise, it will reject him/her. When the user captures eye image, the system will need to remove undesired parts of face and eye and discard background. To achieve that, iris region will be detected on acquired image using Haar Cascade-based object detector. Then, we can start with the first phase, segmentation, which is divided in our system into two steps, pupil localization and iris localization. Each step requires passing the iris image through different preprocessing to remove noise and detect image edges as a preface for applying Circular Hough Transform algorithm, which localizes the inner and outer iris boundaries. The second phase; normalization is applied using rubber sheet model. After that, features will be extracted using deep spare filtering algorithm. Finally, matching phase “which we are currently working on” will be applied using Hamming Distance to compare two iris features. The previous steps are shown in the system diagram Figure.



The accuracy we got from segmentation is 70.4% for iris localization and 53% for pupil localization. However, the results of normalization and feature extraction cannot be measured using unit testing, hence, these results will be acquired within system testing. After completing matching phase, some enhancements will be applied on segmentation algorithm to get a satisfied result that could be tested on real users.

Library Management System

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ABSTRACT

library ,it provide facilities to student or member to search for the required books and it allows the administrator or librarian to issue and return books to students(members) and can create and delete membership of students. In our existing system all the transaction of books are done manually, So taking more time for a transaction like borrowing a book or returning a book and also for searching of members and books. Another major disadvantage is that to preparing any reports of books borrowed and the available books will take more time. So after conducting the feasibility study we decided to make the manual Library management system to be computerized. The methodology we will use to develop this system is waterfall model. First we will do system planning, requirement analysis, system design, programming, system testing, and evaluation of the project. For the system planning, the outcomes are the project objectives and project aims as well as to defined the project scope. Requirement analysis is a stage to gather the user requirement such as functional requirement and nonfunctional requirement. Next, the system design is mainly used to design the user interface and database design. We will use model building language UML to applying analysis and design stage. The next stage after system design is programming stage .This is the stage for coding and we will use PHP technique to build the system front interface, and using my SQL to build the back-end database. After complete coding part, we will proceed to system testing the system to minimize errors of the system. The system is an automated web based. Library Management System mainly used by librarian and library administrator, the system gives administrator the complete information about library and monitoring the whole system. By our software user can add members, manage authorized access to the system, add books, search members, search books, update information, edit information, borrow and return books in quick time. Our proposed system has the following advantages. Advantages of web based systems, User friendly interface, Fast access to database, Search facility, Less errors..etc. The library management system needs requirements to achieve their functionality, the requirements are divided into :hardware (An x64-capable processor,2 gigabytes GB of available hard disk space,2 GB or more of RAM, A monitor with a resolution of 1024 × 768), software(Operating System, Browsers ,my SQL and PHP programs), networking, technical support, organization and management, manpower, training.

Wireless Power Transmission and Wireless Charging

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ABSTRACT

Can we imagine the life without electrical wires? The answer to this question is yes. Wireless power transmission is a technique of transferring power to an electrical device through an air gap without the use of wire. The ability to power a device without the use of wires provides a convenient solution for the users of portable devices because it is accessible, and can give the users more versatility with their electronic devices. Imagine sitting down for a drinking a cup of tea, and placing your mobile phone on the table. It is amazing, the mobile phone lights up, and starts to charge automatically without plugging, this is what this research make it true. One of the major reason which makes wireless power transmission so popular is that can be integrated into other application, and make them easier to use such as biomedical implants, electric car, Military, House-hold robots, and wireless charging. Wireless power transmission systems theoretically solve all the Electric battery problem by delivering unlimited range and making it possible to use smaller batteries, which reduce the cost and weight. This project is an attempt to transfer power over a small distance without the use of wires. In future the range of power transfer can be enhanced as the research across the world. In order for the energy to be transferred to the capturing device safely, coupled resonators are used. Coupled resonators are two objects which have same resonant frequency to exchange energy efficiently without plentiful leakage. resonant induction coupling works at a high level. In this method, the transmitter coil is driven by an AC current of the power supply to generate an oscillating magnetic field. When another conductive coil is placed closer to the transmitter coil, some of the magnetic field passes through the center of the second coil which is the receiver. This magnetic field brings an AC current on the receiver which can be used to power the devices.



Figure 1 3D design for Wireless Power Charger.

This paper will explore the technological applications of wireless power transmission, designing and implementing a wireless power transmission system using magnetic resonant induction approach. Numerical data and analysis are presented for power transfer efficiency of both receivers. Graphs are given to illustrate the comparison of power and efficiency with distance of between transmitter and receivers.

The Study and Implementation of a Novel Design for Metal Detector for Minesweeping

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ABSTRACT

Demining is the process of clearing the land mines in an area, while minesweeping is the process of disclosing the mines in an area. Historically, the tools that were used for this purpose included trained animals like dogs and rats. In the modern world, new tools have been developed like the armor vehicles and metal detectors. This paper will examine different possible designs and working concepts for a metal detector to fulfill two requirements, Firstly, the minefields that is being faced by troops at the front lines where the design will make it possible to detect the mines while keeping a safe distance for the human. Secondly, detecting what so called minimum mines, these mines are built with a very small amount of metal which makes them very hard to detect. The current technologies in this field have been fixed and proofed to work correctly to a certain extent. In this work, we suggest to improve the antenna technology, more precisely the directivity of field and pick-up coils, reducing the interference that is caused by unwanted sources, to provide a better and more reliable detection.

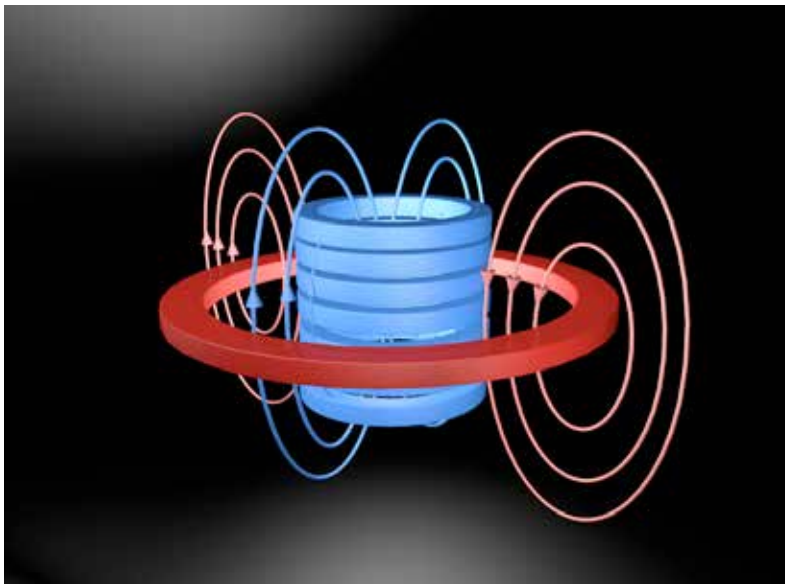
In Kurdistan, we have been going through wars for decades and there are unlimited number of unhandled mines in the region especially in the rear areas which are causing death to the civilians. This requires more work to be done on both mine clearance and demining.

Currently, the manual metal detector is the only tool that can meet the standards that have been set by the United Nations which is 99.6% for humanitarian demining. The negative aspect of the current design of the metal detector are the following:

- Nearness to landmines.
- False positives of 1000 for every one landmine.
- Weak detection for landmines with low metal content.

In this paper, we will try to overcome these issues by enhancing the performance of the metal detector that is used for minesweeping through improving the directivity by suggesting different possible designs for the core of the metal detector.

After a series of suggestions, studies and experiments we decided to use a design that consists of one search coil and stacked pickup coils (see the figure to the right). According to our research, this design will provide better detection for the metal detector.



Intelligent Cart for Transportation and Management of Medication

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Supervised by
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ABSTRACT

Our project focuses on the lack of security of medication management in hospitals as well as the slow work flow of hospitals on a busy day. With a limited number of workers, and an increasing number of patients being admitted to hospitals, hospitals are unable to provide fast quality care for their patients.

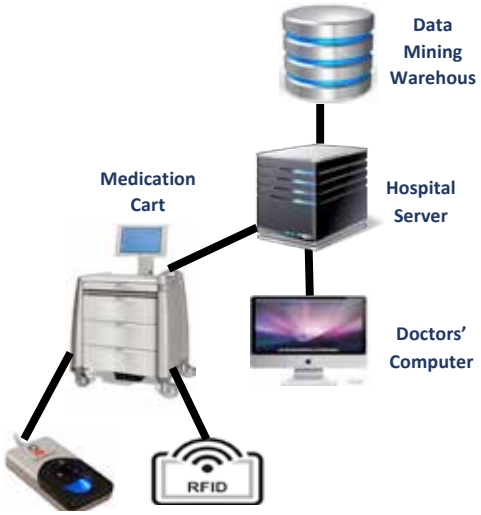
Every day medications are prescribed to around 40,000 patients all around the UAE. Thus, this problem is not only affecting specific individuals but affecting the country at a national level. For optimum healthcare service and workflow, it is important that the hospitals and their associated pharmacies both work alongside each other to eliminate faulty prescriptions, increase medication security, and reduce today's intense physical demand and workload on nurses. With this in mind, we have taken it upon ourselves to further develop a system already used in the hospital every day. This system will reduce nurse demands and speed up the workflow process as well as eliminate human errors.

Our project adds advanced features to the simple medication carts used today. Using a data mining database we are able to not only simplify diagnosis for the doctor, but also recommend previously used medications to patients with similar symptoms or illnesses. Data mining equips hospitals with the ability to look back at previously input data, such as new test results, patient allergies, patient history, and new symptoms; and automatically provide solutions as well as suggested medications to be prescribed. Once the doctor selects the prescribed medication, it will automatically show up on the Intelligent Medications Cart for the nurse to collect from the automated dispensing cabinet. This provides fast communication and patient care.

Once the medication is picked up by the nurse the Intelligent Medications Cart will read the item placed into it adding it to a log specifying what is present inside the cart. The log will show the time the medication was placed in the cart, who the medication is for, where the patient is located, additional information about the medication and finally, when it was administered. This is both for security reasons and for tracking. Once the nurse reaches the patient the cart will detect that the medication has been administered by reading the bracelet on the patient's wrist. This will remove the data of that medication from the log and place it in a new log specifying what medication has been administered. For extra security, the Intelligent Medications Cart cannot be accessed by anyone other than the nurses responsible.

The Intelligent Medications Cart promises to make a positive difference to the healthcare sector nationwide.

For a visual understanding, here is a graphical representation of the main components of the system:



SWSHM: Smart Wearable System for Health Monitoring

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Supervised by
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ABSTRACT

For the recent few years, Smart Wearable Systems (SWS) have been one of the most productive areas that can be considered for clinical utilization. They are an end-to-end connected source and sink (aggregator) nodes implemented to be in communication together either locally or remotely. However, a number of these sensors can be integrated on the Wireless Body Area Networks (WBAN)s, which is a new method for health monitoring. In particular, technology has become a trend that affect the patients needs for requesting an innovation, low cost and flexible system in order to be aware in the change of their physiological and non-physiological body parameters. To provide this demand, Smart Wearable System for Health Monitoring (SWSHM) is proposed as a solution for real-time health monitoring system. This system enables users to constantly monitor their health status (even during walking on the roads) through some bio-sensors distributed on the body surface connected via wireless to mobile application. In addition, if any abnormalities occur in body parameters such as (body temperature, heart electric activity, pulse & oxygen in blood and body position), the system will automatically show alarm message on the mobile application via wireless and send the patients information via GSM to the pre-initialized doctor or to the health professionals.

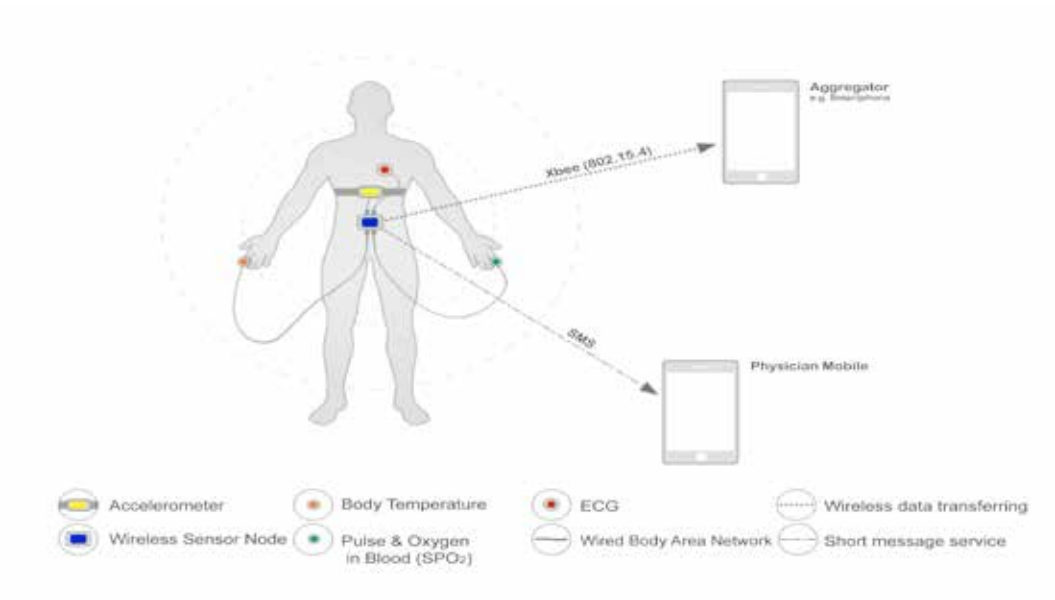


Figure 1: System Model Prototype for the proposed system

This paper mainly focused on design SWSHM based on wired body sensors distributed on the human body surface that are connected to central node to create WBANs to transmit the physiological and non-physiological body parameters via wireless (IEEE 802s.15.4) to the mobile application. Moreover, the system allows users to monitor their body parameters in real-time manner and send user's condition and details information through SMS via GSM shield that is connected to the micro-controller. For sake of developing system prototype, the hardware used is taken from the cook hack e-health kit for Arduino that is beneficial only for implementing the visualization of the project concept. The Xbee chip will be used as an off-the-shelf wireless sensor for WBANs prototype to transmit all sensed data from the body sensors to the custom device (e.g. smart phone). On the other hand, GSM shield for Arduino will be used for acquiring the user's position and sending information to doctor. Overall, the outcome of this project will enable user to monitor their physiological and non-physiological body parameters that leads to reduce health issues via monitoring screen (e.g. mobile application).

Taxi Booking Service using Location Based Services

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Supervised by
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ABSTRACT

Online taxi reservation is a procedure that is considered as a significant daily resources that is required throughout the world. An automated taxi booking facilitates the taxi reservation by using geo-location technology This technology has been conducted to develop the project that provides an online platform for booking taxis Essentially, the system is facilitating the way passengers intend to reserve a taxi by sending a request to the taxi driver. The request will be received by the driver which is the closest taxi according to customer's position Consequently, it is conditional for the taxi to be seemed as available in the system which means the driver is currently has no customers otherwise the server will be able to give the response to the customer that the request is accepted (Algorithm). In addition, the application will be able to decrease the transportation problems that face booking taxi in the district. For example, some time the customer wasting time in waiting for a taxi and vise verse it is a mobile application for both customer and driver but different interface.

Taking taxi manually and old approaches systems that were used hardware tools have been transformed to traditional systems. Nowadays, modern dispatching system can be built using internet, and smartphones instead of all stuffs have been used before for transportation systems. Additionally, some of these technologies are internet and smart phones, which are touchable and available all the time and everywhere. This project focuses on an application, which makes the need of our daily life easier. As it is mentioned, taking taxi manually has become traditional system so with the help of new technologies especially smart phones we can make the taxi booking automatic process.

The main target of the project is to give an application utilize and helpful versatile application to the androic clients, which empowers them to reserve a taxi from one area to any area in Kurdistan. Furthermore, the aim of this project is to make a system to book taxis online utilizing smartphones and network access. If the clients need to book a taxi, they do not have to tend to the road, it should be possible just by a single tick with the assistance of this electronic booking system that gives a taxi to them. Our system will take the order and send it to the closest enlisted taxi to deal with the costumer. After the taxi accept the order it response to client with the location of taxi that accepted the request. Finally, it will calculate the fare according to distance and time. In order to use the application both taxi and costumer ought to be enrolled in the system. In addition, costumer will rate the driver for the quality. The rate depends on the distance of the position, and the customer can give the money to the driver directly or by apple pay using their apple phone. it is an application that can be used in other countries.



ShareTaxi System for Reducing Student Travel Costs and Traffic Congestion

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ABSTRACT

Taxi system in Palestine as in other countries is used to carry passengers from a place to another. The charge of taxi is relatively high mainly for students. Our system aims at reducing taxi cost by allowing a student to share the ride with others going to the same destination. This system also reduces traffic jams particularly during rush hours as it allows four students to share one taxi instead of four taxis. The system is an application for android and IOS based devices. It allows a student to choose the destination from the map, select a taxi close to him/her, and select to share or not share. If the status of the taxi is "to share" other students can see the taxi and order it. The student can set preferences on the system such as male preferences, female preferences, best destination, number of persons, and best charge. On the other side, the system allows taxi drivers to set their preferences too, and allows taxi office manager to monitor taxi location and occupation rates. The system utilizes well known algorithms such as Dijkesta algorithm for identifying the shortest path. The system was tested by the university students and a sample of city drivers who filled a survey to test the usability of the system. The results show that the system was acceptable by students as it reduces the cost. Drivers have concerns about the cost but were satisfied with reducing traffic congestion.

Bumps Detector for Reducing Traffic Accidents and Car Damage

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ABSTRACT

Road bumps are placed in roads to force drivers reduce car speed for avoiding accidents. However, these bumps cause accidents or damages to cars when drivers do not notice them. Our project aims at warning drivers that a bump exists few meters ahead. Our system also reduces car speed if the driver does not do that. The system consists of software part which is Android application programmed specifically for detecting bumps using machine learning techniques and storing the coordinates of the bump in a database. The detection phase depends on the GPS and accelerometer sensors. The system also contains hardware part mainly a microcontroller and DC motor connected to car braking pedal. The system works by continuously identifying the location of the car using GPS and comparing the location with the coordinates of the bumps stored in the database. If the distance between the current location and the bump is less than a threshold value (defined based on car speed) the system will produce a sound message to warn the driver. If the driver does not reduce the speed, the system will send a signal to the microcontroller which makes the DC motor rotate and pull down the brake pedal for making car speed less than 30Km/H. To increase the speed of the system, the database which is related to the car frequent trips was stored in smartphone as a cache. The height and the depth of bumps and their effect on the accelerometer were tested many times to identify when bumps on roads. The input to the database was taken from many cars to train the detection model and reduce the error in bumps locations. The system was tested in Palestine and showed good results as it can identify 90% of bumps. Drivers were satisfied with the speed reducing system as it does not harm cars.

Comprehensive and Real Time Emergency System in Palestine Based on Vehicular Ad Hoc Networks

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Supervised by
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ABSTRACT

Vehicular Ad hoc Networks (VANETs) have recently become in industry and research. VANETs uses radio frequency in the form of Dedicated Short Range Communication (DSRC) to enable the communication between cars. One often cited use case for VANET is applications that relate to emergency vehicles. In addition to the traditional siren, they could use radio communication to warn other vehicles or to preempt traffic lights. Such an application can reduce accident risks during emergency response trips and also save valuable time. In our project, we outline a comprehensive design of such an emergency vehicle warning system that not only makes full use of inter-vehicle communication, but also encompasses road side infrastructure like traffic lights. In our system, other vehicles are warned of an approaching emergency vehicle and they also receive detailed route information. Based on this information, timely and appropriate reaction of other drivers is possible. Our system consists of a transmitter/receiver device and computing unit that can be installed in cars. We employed the Greedy Perimeter Coordinator Routing (GPCR) protocol with little modification to enable the delivery of message efficiently. A prototype of our system has been tested in a traffic environment including emergency vehicles and traffic lights. To identify requirements and evaluate our system, we also conducted a detailed analysis of videos from emergency response trips and an expert survey among members of a local emergency response organization. The result of our testing shows that we can send emergency message with good timing and without delay.

DD: Device for the Deaf and Vocally Impaired

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Supervised by
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ABSTRACT

DD is a device that helps deaf and vocally impaired people to communicate with normal people, so it makes their life easier without any help from others. The problem we solve is that deaf and vocally impaired people have specific needs and limits; they can't communicate with normal people who don't know sign language, or listen for sounds especially the emergency ones. The solution is a device which lets deaf and dump people pay attention for the voice and solve the communication's limits of their sign language. Our method includes designing a belt which has 4 circuits placed on all directions of the belt (front, back, right and left). We also use Arduino microcontroller. The circuits pick up four sings and then the program chooses the max of them, then checks if the max sign is more than the mood sign (which is variant according to the current mood by user choice) then the vibrator of circuit which has the max sign will vibrate to give attention of sound direction for the deaf, so the user will pay attention for surrounding sounds. In addition, by using Leap Motion and Phonetic Algorithm, we programmed a project to translate the sign language to words and then to sound so the normal people can understand the massage. At the same time the program translates the sounds of normal people to words and then to pictures, which are the sign language translation, so they can communicate with each other without the need to learn other language. The result of this project is we can make the deaf and vocally impaired communicate with others and feel of sounds and its directions.

INCOBRARO

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Supervised by
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ABSTRACT

The idea of connecting human brain to machine and controlling it was popular only in science fiction stories. Recently the development of Neuroscience and Electroencephalogram (EEG) with different of EEG device have let this idea to come true. Research has begun building many brain computer interfaces (BCI) using EEG technologies mainly to solve problems of people with physical disabilities. Many systems were built used the output brain signal from facial gestures, in order to control different devices and systems. The recent systems have focused on utilizing brain signal which consequent from the imaginary and thought. However, these systems do not specify which brain signal can be utilized and how. They also do not provide real time solutions. Therefore, our team proposes a novel idea which focuses on obtaining the output brain signals from thought only, and building an intelligent system that makes a real time interface between human and a mechanical device, for example a robot or limbs. The system aims at satisfying the needs of disable people by reading the brain signal, processing it, and transferring it to a robot which performs the required operation. For example, a disable person may think of getting a book from the shelf, the system recognized his thought and transfer the order to the robot which gets the book and gives it to that person. The system consists of the interfacing software, which is written in C Programming Language and executed in OpenViBE to get the data in real-time from EmotivEpoc++ headset. Then the streamed data go to various temporal and spatial filters (preprocessing) then pass through the LDA classification process. Finally, these values are transferred via OV's built-in VRPN server to a 3rd-party VRPN client that prints them to a COM port which is connected to a robot via USB or Serial port to a PC. In the hardware side, our robot looks like a human. The difference is in how it makes tasks. The robot executes tasks based on the user's thinking and it takes two kinds of actions: physical movement action or sound action. The robot mainly contains of pic16f877a microcontroller, Bluetooth, relay, IRF (MOSFET), pc817 opt coupler, pc817 socket, 4M crystal, board, black connector, microphone.

Marketing Mate

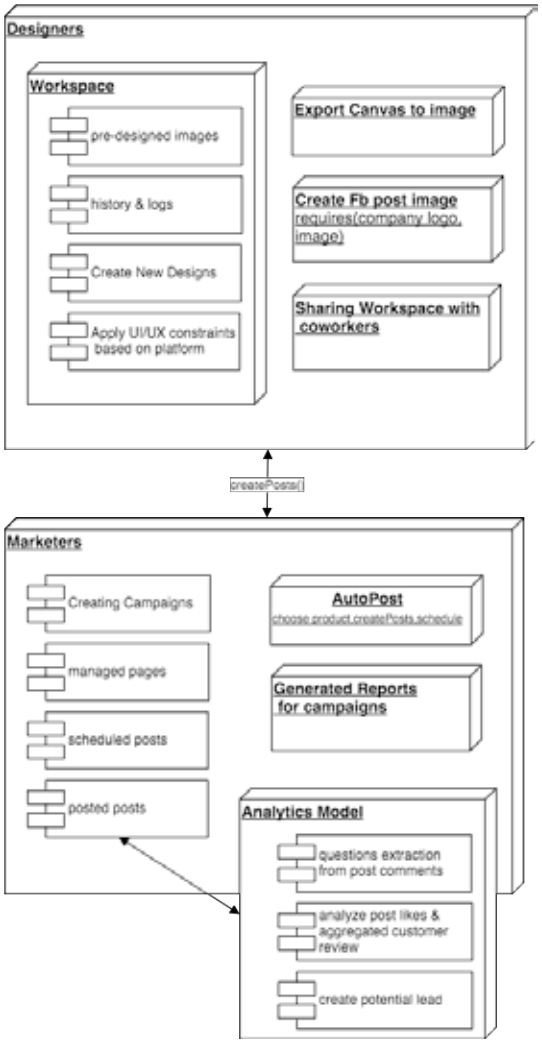
Ahmed Saad, Fady Fawzy and Sherif Ayman

Supervised by
Dr Ahmed Gawish
The British University in Egypt, Cairo, Egypt

ABSTRACT

In a modern fast moving world and challenging market, a business has to keep an eye on the latest technologies and marketing techniques to guarantee a competitive advantage. Inbound Marketing is one of the latest marketing approaches used today by most businesses especially the ones using e-commerce as a main channel. As the majority of customers use the Internet to search for products and services. Recent statistics report that online shopping hit $2.29 billion in sales the 2016 Cyber Monday and 84% of store visitors currently use their mobile devices before or during a shopping trip. It also highlights that 22% of consumers spend more as a result of using digital, where over half of them report spending at least 25% more than they had intended. Moreover, it reveals that 75% of respondents said product information found on social channels influenced their shopping behavior and enhanced loyalty. That's why businesses in every field of industry are converting to e-commerce and taking budgets away from printed advertisements, merchant exhibitions and straight driven e-mails and pushing this money toward further significant and effective inbound marketing approaches. Since Social media is the nowadays trend, not so many people have much experience in it to be able to successfully manage a company's Facebook page and effectively obtain results and generate more leads. E-Marketer is a Digital Marketing Research and Insights agency; it reports that 43% of the marketers' biggest problem is in achieving great results via social media campaigns and the lack of skilled employees. The lack of skilled employees creates a huge gap and this is where our proposed online business solution, Marketing Mate, does its magic.

Marketing Mate is a marketing companion business solution that uses a mix of Natural Language Processing (NLP) techniques, computer aided design and a social network integrated CRM that tracks clients and social media campaigns. It can automate social media campaigns with the ability to track each campaign using the campaign management module, which will allow categorizing, tracking, and generating statistical reports. It also uses NLP techniques to analyze the customer's interactions with the social media campaigns. It provides aggregated analysis with the customer's feedback as well as providing a list of questions that were asked by the customers in each campaign. The data gathered by analyzing customer interaction will be a key success factor to generate better leads by the sales team. In general, creating graphical designs had never been an easy task especially if the marketer wants an appealing and professional post for his products; however, Marketing Mate offers a professional level service without the need for a team of skilled social media experts. Marketing Mate can be used to design post and analyze saving time, effort and helping the managerial level to take the right decisions. Marketing Mate will re-define the way of social media marketing and the interaction with customers. It's a new era of accessible and efficient inbound marketing. The main components of our proposed Marketing Mate are illustrated in the figure.



Human Computer Interface Enabling Blind People to See with Their Tongue

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Supervised by
Yousef-AwwadDaraghmi, MotazDaadoo

ABSTRACT

There are 287 million blind people in the world. The goal of this project is to create a low-cost device that enables blind people to form representation of objects and see how things around them look like. The novel idea in our project is using the tongue as a primary transducer for sight, not eyes, as researchers found that human tongue is connected to the sight center in the brain. The project consists of adjustable hardware devices including camera, microcontroller, and tongue matrix. The camera detects objects and sends the signal to the microcontroller which analyzes the object, converts the image to pixels, and transfers them to the tongue matrix. The tongue matrix is a matrix of 20 * 20 pins that are placed on tongue and convert the electrical signal to pulses which are transferred to the sight center in brain via the tongue. The tongue matrix is calibrated to receive and produce low electrical current (0.3mA approximately) that does not harm human. The project utilizes machine learning techniques such as neural network to help the blind person know exactly the detected object. After testing the project, we found it is an inexpensive way to help blind people see with their tongue, let them feel as normal people, pay attention to objects around them and interpret the information by themselves. The project also improves the safety of blind people and makes them more independent. The main challenge in the project is producing the tongue matrix that is as small as possible and generates pulses with high number of pixels to represent all features in the image. Our prototype contains the matrix as in the figure below and we are currently developing a new matrix with more pins (more pixels).

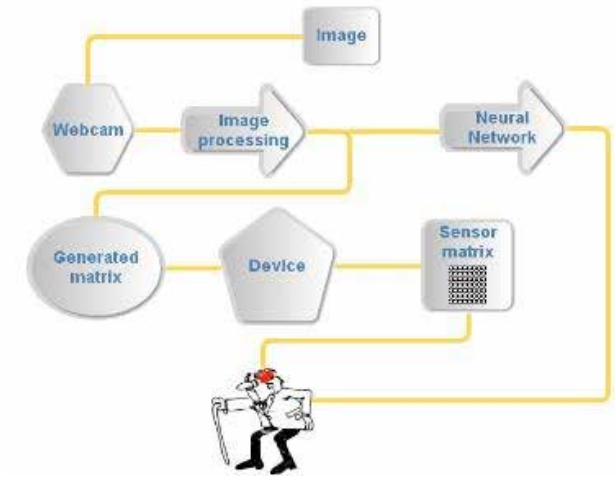


Fig 1. Main architecture

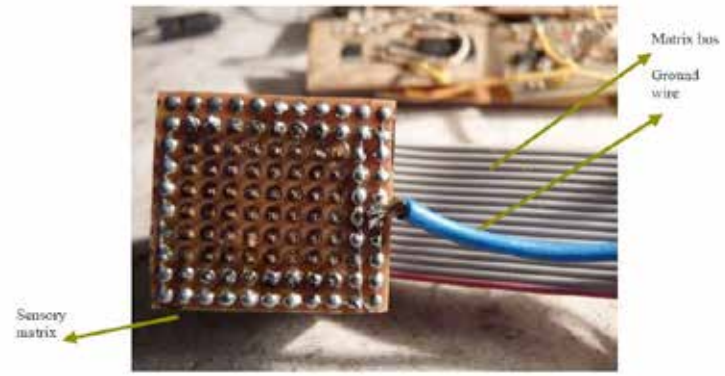


Fig 2. Tongue matrix

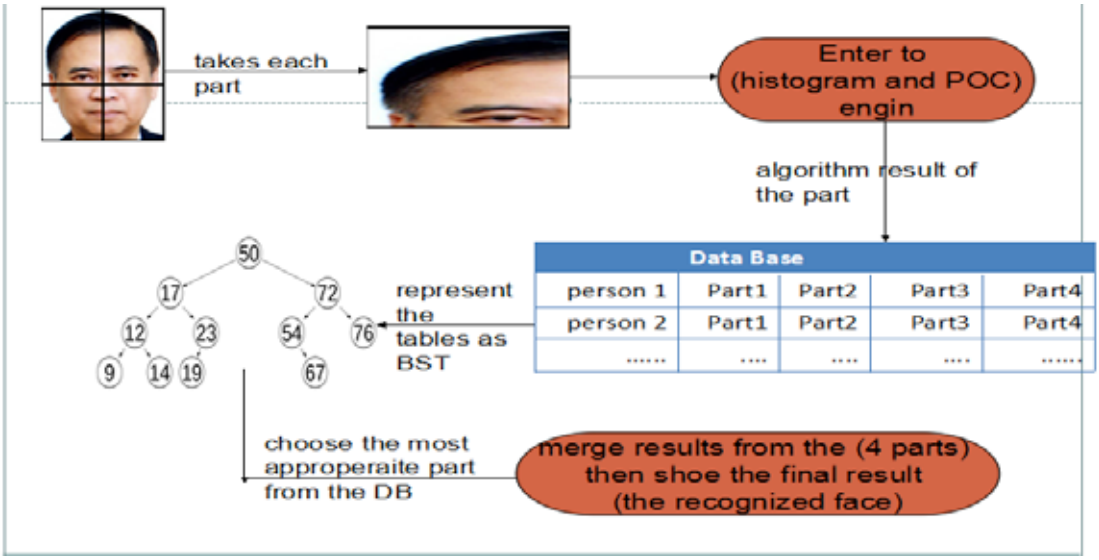
DSHT Algorithm for Face Recognition

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Supervised by
Rasha Saffarini,

ABSTRACT

Face recognition is one of the most challenging tasks for machine recognition. Although humans seem to recognize faces in muddled scenes with relative ease, machine recognition is much more daunting task. We proposed algorithm to solve some problems of the previous algorithms. Our algorithm contains three stages, face detection, face analysis, and testing.
This proposal proposes a very simple, highly reliable automatic face recognition technique.
First, each face is divided into 4 parts then by using of bin-based histogram processing based technique on each part obtain a result ,insert it into the data base , so , in our data base we will have many people , each person has 4 types of data that are for each part of his face (this process is made only once at the beginning of the work not on each time the algorithm used).
Each part of data (let's say right eye for all persons) are represented as Binary Search tree, finally we have four BST.
When a test image is entered each part of the detected face is analyzed and gives a result, this result is compared with the data in the BST, then bring the original image related to the most accurate data compared to the test one. The image with the most number of match parts is returned. So with our algorithm saves much time because the complexity of training process is deleted and the search in the BST takes only O(log (n)) compared to the previous method that takes $O(n^2)$.



IoT Smart Secure House

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ABSTRACT

In recent years, dramatic evolution of network has been introduced in the home environment that enables digital technologies. One of these technologies is Internet-of-Things (IoT), which is the expansion of the services provides by internet. IoT can be used for various fields and smart home is one of the application of IoT. This technology allows more opportunities to increase the connectivity between devices within the home for the purpose of home automation. This project presents the design and construction of a smart and secure home system using the internet of things (IoT) methods with using Arduino Microcontroller, GSM Shield, and different kinds of sensors and actuators. Smart and secure home is a home which is secured via electronic devices and sensors to protect the house from any kind of intrusion and disasters such as fire and gas leakage in the house. Moreover, several cases that currently phase people during the absence in the home such as burglary, energy consumption by house resources in case of not switching off, turn on/off lights, etc. Hence, this project is using the IoT for home automation system to overcome these problems and it is called a smart home as it can be controlled automatically using internet and GSM as well such as switching on/off the household appliances like lights, air conditioning system, and opening the garage door remotely. This project presents the architecture design of Smart home system using IoT that is both secure and smart that can be controlled remotely via mobile communication and internet.

The creativity of this project is that the system does not rely on one communication method (i.e. Internet, GSM, Bluetooth etc.) rather, it uses both internet and GSM for controlling the home appliances and getting notification from the system. So that, the system will be more secure and robust, where the user can control the system even when one of the communication method has a failure.

The main aspects of this project are:

1. Secure the house from different ways including, the doors, the windows and the motion.
2. Alert the user via an SMS if an unnatural situation occurs in the house such as a gas leak or a fire or an intrusion to the house.
3. Monitor the home using a camera and validate the type of the alerts before taking an action after an alert comes from the system.
4. Control the home appliances such as the AC unit and the lights remotely using both Internet and GSM.
5. Open and close the garage door remotely before getting to the house.

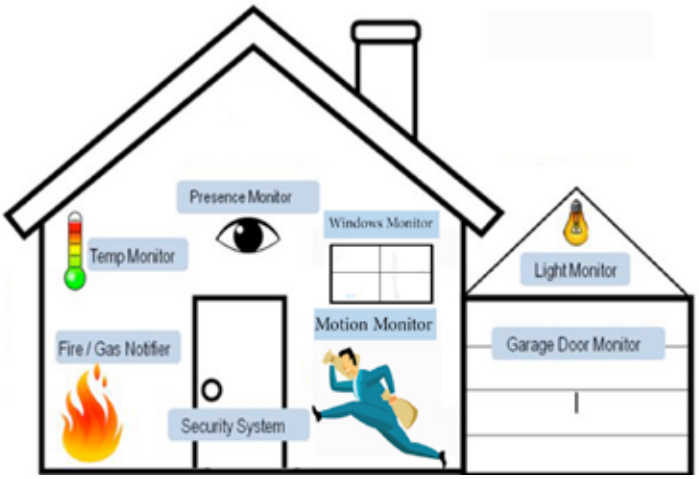


Figure 1 System Overview

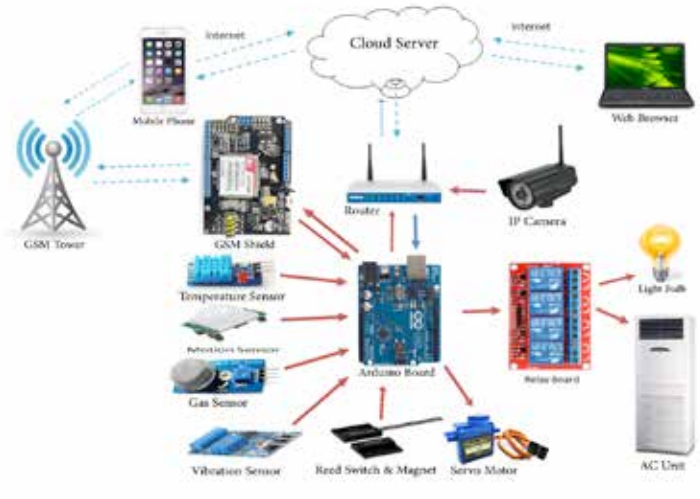


Figure 1 System Architecture

Application Based Augmented Reality for Aspergers

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Supervised by
Dr. Soucene Mahfoudh

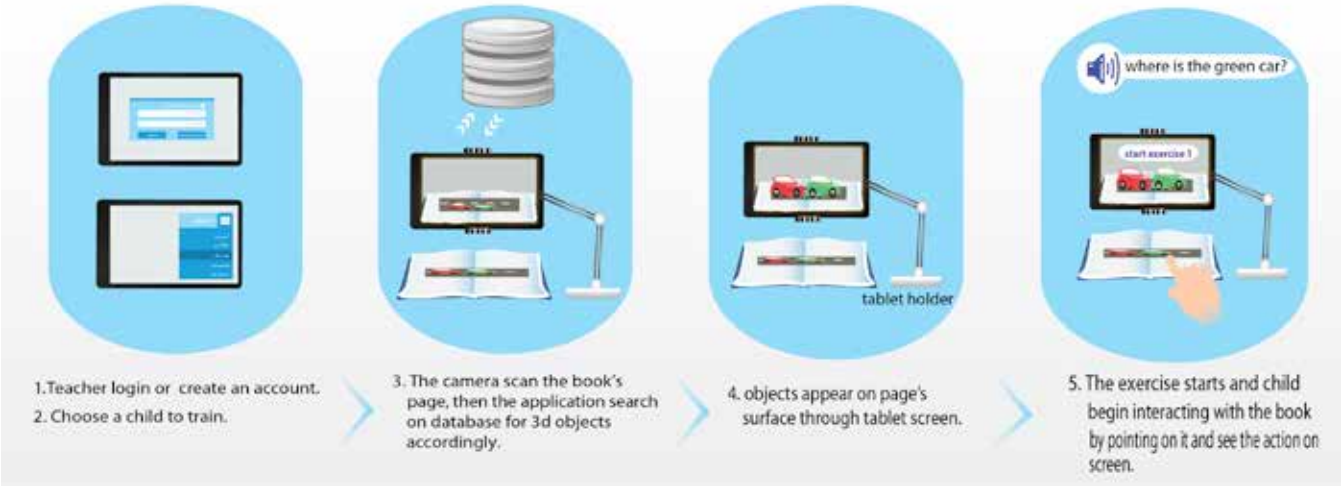
ABSTRACT

Autism children are part of our community; they can be an effective element in our society if we take special care of them. Asperger Syndrome is one of the autism spectrums that are categorized since 2013 as a high functioning form of autism. Asperger children have a normal intelligence and near-normal language development, but they struggle with social skills, anxiety, and repetitive or restrictive behaviors. If we have a look at the personal biography of the most famous scientists and intelligent people, we will find some of them were children with Asperger Syndrome, but they obtained attention and care.

For years, different modes of technology have been used to improve the quality of life for people who have various developmental disabilities. However, the varied use of technology for children with Asperger's continues to receive limited attention, despite the fact that technology tends to be a high-interest area for many of these children.

We want to state here that our system is still in progress, it is intended to create an interactive environment using Augmented Reality Technology (AR). Augmented Reality is a live direct or indirect view of a physical, real-world environment whose elements are augmented by computer-generated sensory input such as sound, video or graphics [1]. This system should enhance the traditional training to be more attractive and interactive. Using unity3D and Vuforia package, we'll develop several exercises, each exercise will be targeting either behavioral, knowledgeable, or other types of skills. To ensure efficiency of our system, we collaborated with specialists in the field to design the exercises.

As an outcome, we will build an application and install it on a tablet, besides a special designed book as an external tool the child will interact with. Each page of the book will be dedicated to represent a simple and familiar environment. Each exercise shows 3D objects as if they appear on the book. There'll be with instructions that the child is required to follow by interacting with the book. Having two things to focus on – the book and the tablet- will develop what specialist call "Joint attention". In the following, a diagram that illustrate our system's main components:



References:

[1] https://en.wikipedia.org/wiki/Augmented_reality

Machine Learning in Bioinformatics: Cancer Diagnosis, Progression, and Prediction

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ABSTRACT

In this paper, we will present an overview survey of the latest studies that make use of Machine Learning (ML) tools for cancer prognosis and prediction. Additionally, we will evaluate the performance of several discussed techniques and describe what kind of data is incorporated. Finally, we will mention some of the challenges faced in these techniques and conclude with a brief discussion on the future prospects of ML in bioinformatics.

ML is a subfield of Artificial Intelligence (AI) that uses specific algorithms to allow computers build up their performance based on their precedent experiences. The main concept of ML is to allow computers to be flexible and grow when given new sets of data, by generalizing from predefined examples. ML research has grown in the last decade because it reduces the need for manual programming and is therefore more feasible. Several authors predict that ML will be a main driver behind the next big paradigm shift in technology.

In this paper we will review the uses of ML methods in the field of bioinformatics, with emphasis on cancer diagnosis, progression, and prediction. Over the years, a lot of effort and time has been spent researching new methods into cancer prediction and treatment. The rise of ML and its application in various fields has allowed scientists and researchers to look into ways it could be utilized into cancer research. Researchers have access to large amounts of cancer data, but lack the time to go through them in detail in order to classify and categorize them into groups. This is where ML techniques come in handy and have become useful tools. These tools can be used to analyze complex data and recognize patterns, which can lead to informative predictions that can very well save thousands of lives.

Basically, the learning process is divided into two main stages. The first is deriving an estimate value from a given set of data that will be used as the system's dependent value. Then comes the utilization of this estimate to predict unknown system states. This learning process can be categorized into two main categories, supervised and unsupervised learning. In supervised learning, a set of data instances are used to train the machine and are labeled to give the correct result. However, in unsupervised learning, there is no pre-determined data sets and no notion of the expected outcome, which means the goal is harder to achieve.

An example of supervised learning is classification systems where data is categorized into different sets. Unsupervised learning includes regression functions that are used as a mapping between the data provided and a real variable and therefore a predictive dependent is estimated. Another type of unsupervised learning is the clustering of data that is used to identify different clusters and therefore describe the given data.

The above techniques have significantly increased the efficiency of cancer prediction systems in the last decade and will be discussed further in detail. This is a work in progress project.

Mobile Application for Image to Braille Converter

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ABSTRACT

Braille is a code that enables a blind person to read and write. It is the only reliable method of literacy for blind people and can actually be substituted for print in most circumstances. Refreshable braille display or braille terminals have been very helpful to assist visually impaired people; however, assistance of another person is usually required to make use of them. Braille displays and terminals are electromechanical devices for displaying braille characters, usually by means of raising dots through holes in a flat surface with the capability of being connected wirelessly to other electronic devices.

Despite of their obvious utility, such devices have not been in much use due to an absence of other associated systems, which could work in coordination with them to provide full support to people with visual disabilities. Visually impaired people can read or write in braille language however, magazine, books and posters etc. have usually been out of reach for such people. It is very important to empower them to read published and printed material. Therefore, there is a dire need to build a system that executes on a smart device that has the capability of taking a picture of written English text in an initiative way using gestures.

The proposed application Image to Braille Converter is based on the above mentioned idea and its design focuses on providing utility to visually impaired people such that there would be no need of any human assistance. The main function of the application is to convert English printed text into Braille efficiently and on the fly. The below figure shows the system architecture:

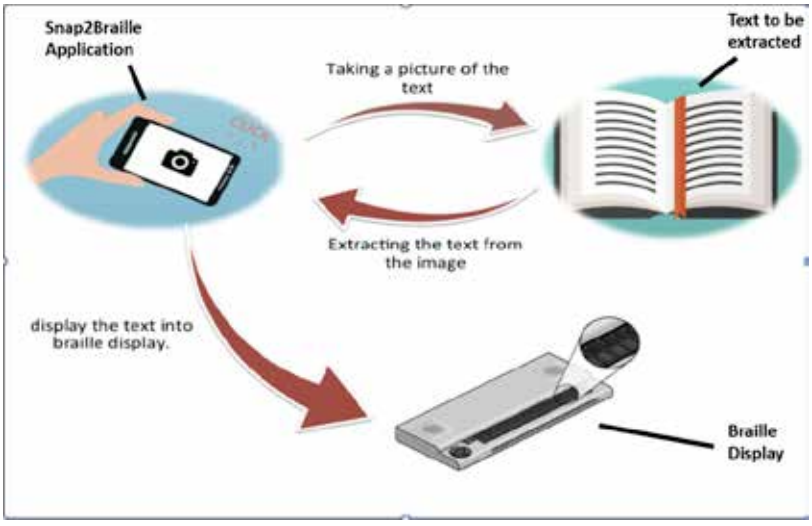


Figure 1: **Error! No text of specified style in document.**

The tools planned to be used in order to implement the system are: Android Development Kit, Optical Character Recognition (OCR), Braille Back, Android profiler, Native Development Kit, and SQLite. The proposed framework is being developed to run on a device with android operating systems that can be connected via Bluetooth to Braille display.

An App for Smartphone Based Health Tracking System

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ABSTRACT

The topic of chronic diseases is one of the most health problems that have been highlighted in Several research discussions. According to recent reference, 71% of deaths in Saudi Arabia were caused by chronic diseases. These diseases are considered to be one of the most common and costly health challenges. They affect people of all different ages, not only elderly people but children as well. Chronic diseases are long-term conditions that can be managed but not healed. Moreover, they cause irregular health for patients and in some cases trigger an emergency situation for example fall down. Therefore, these patients need to be under the observation all the time. As chronic diseases are associated with the way a person lives, our proposed system will collect data on daily life activities over long periods of time such as walking, running, sitting and standing. We aim to use a smartphone built-in sensor to develop a mobile application. It is devoted for recognizing patients' activities, medication compliance, the monitoring of the disease and notifying emergency situation to caregivers.

The main architecture of the proposed system is shown in Figure 1. The tri-accelerometer sensor of the smartphone tracks the daily life activities of patients. This sensor gathers signals in the form of x, y, and z-axis. We process these axes of the sensor and remove the noise and unnecessary values from the data. These data use as input for the K-Nearest Neighbor (KNN) which is a type of machine-learning algorithm. We use 10-fold cross validation to identify patients' activities.

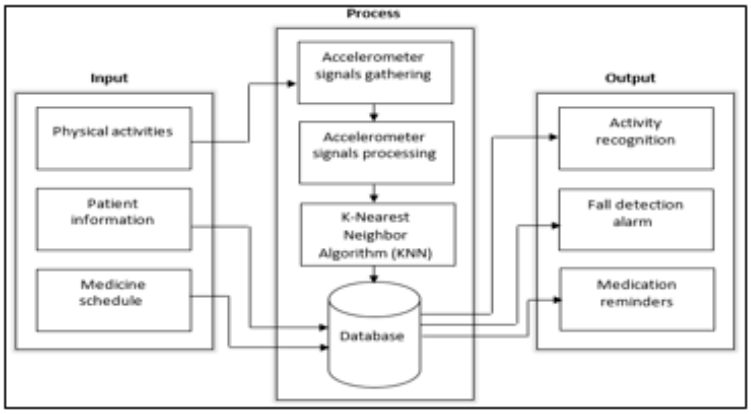


Figure 1: Architecture of the proposed system



Figure 2: Main screen



Figure 3: Fall down notification

In order to use the application, the patients need to create a profile. They have to register their personal information (Name, Age, Caregiver's name and Caregiver's number) followed by their doctor's name and e-mail. With a doctor consultation, patients have to set up their medicine reminder. Then, the patients are able to access and view the classified activities in the main screen, as shown in Figure 2. When the patients' action seems to be abnormal i.e. falling down, the proposed system is able to detect it. With the help of the variation in the tri-accelerometer signals the system recognizes the fall down activity, it then sends an SMS message to their caregiver to get a help, as shown in Figure 3. Moreover, our proposed system is able to send a weekly report to patients' doctor via email. This report includes the type of the activity and the duration time. In addition, this system helps patients to manage their lives. They can set a reminder for their medicine and receive a notification when it is the time to take it.

As a result, our proposed system aims to help chronic diseases' patients to make healthier lifestyle choices. It immediately serves these patients when is required. It targets to increase the relationship between the patients and their doctors.

Modeling and Virtualization of Emirati Heritage

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ABSTRACT

Our research develops a framework for modeling and virtualizing cultural heritage. The UAE is rich and diverse in culture and heritage. Throughout the years, this culture has dealt with various rapid changes. These sudden changes made life of our ancestors filled with challenges and hardship. This entire heritage is now displayed and preserved in museums around the country, which make the museum an integral part of life, especially in the perseveration and transfer of knowledge. Technology through virtualization and animation has found its way into museum displays, however, they do not take full advantage of interactivity and immersion as supported by games. Through game-based technology, cultural heritage can be preserved and presented in an innovative and interactive way, similar to museums, thus allowing the country to thrive without losing its history or culture. Preserving culture and keeping it alive in a meaningful and engaging context require a multimodal representation that immerses the visitor into an authentic and semantically rich environment.

Our research addressed several objectives, among them: (1) survey of people (Figure 1); (2) survey of online museums; (3) collection of documents related to Emirati life in the 1960's; (4) synthesis of a prototypical Emirati village; (5) conceptual modeling and software modeling of such a village; (6) exploration tree and interactive matrix;(7) full implementation of the game followed by testing plan and actual testing to test the game; and (8) analysis survey of the impact of the game on people. Figure 2 shows that the younger generation learnt much by playing our game. Figure 3 shows the process we carried in our research.

To measure the extent of the knowledge Emiratis have about the past, we carried out a survey to quantify information about the culture. Results of the survey indicates that there are people who has some knowledge of Emirati culture and willing to see it come to life. The graph in Figure 1 shows the results to a question about how much knowledge know about Emirati culture back in the 1960's. The answers confirm that knowledge of the recent past by younger people is fading away which rise an issues to be considered. They need an environment that would help them to relive the ancient life. To accomplish this objective, we elaborated a model and a game-like implementation of an Emirati village in the 1960's which is called Al Maqith.

Al Maqith is a game-based virtual model of an environment that depicts the lifestyle in an Emirati village which supports: exploration, interactivity, learning and fun at the same time. Additionally, it is a general framework to support game-based heritage modeling. As a result, Al Maqith creates a new way to support museums in presenting, preserving, visualizing and modeling not only Emirati culture but also any culture.

The original idea was inspired by the Emirati Society general education course offered at the UAE University. However, our major contribution is a fundamental. We developed a framework (Figure 3) and a process that allows developers to efficiently and systematically accomplish virtualization of entities similar to our village. A close example may be virtualizing the zoo. Such a virtual zoo would be a great resource for schools.

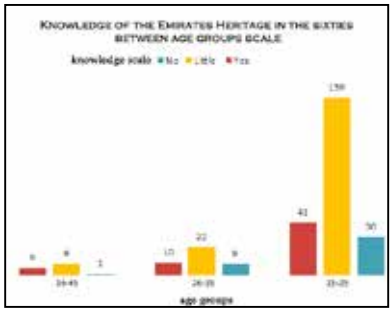


Figure 1: Heritage Awareness Survey

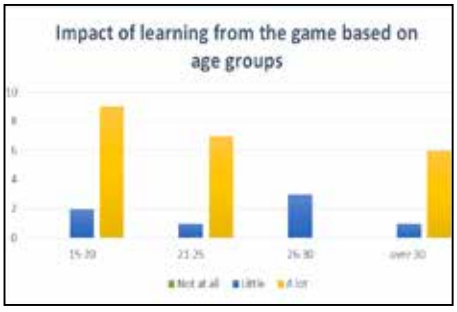


Figure 2: Impact of Learning from the Game

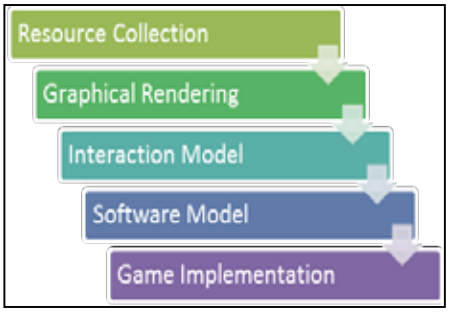


Figure 3: Culture Modeling Framework

Automated Coffee System

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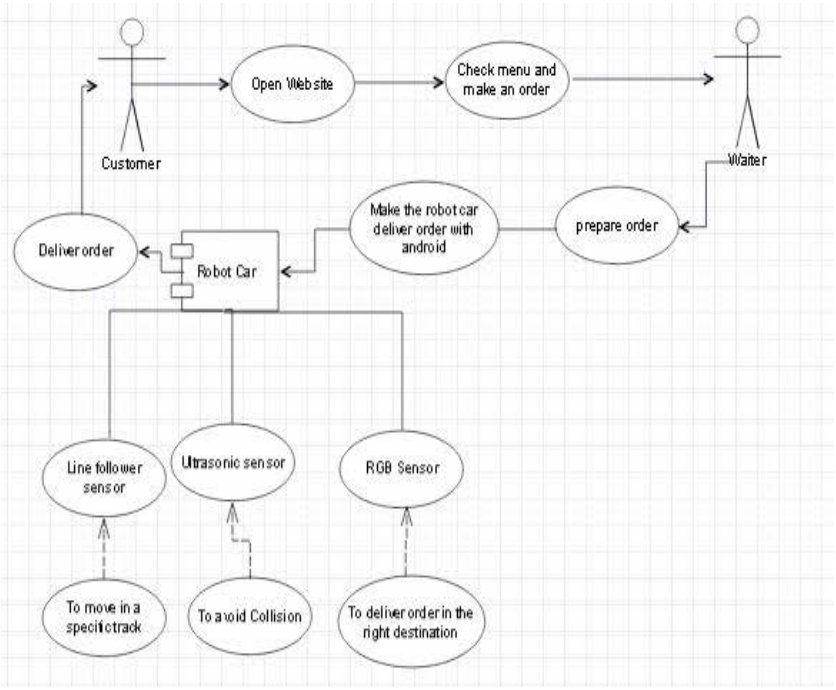
Supervised by
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ABSTRACT

In any coffee shop the customers may wait a long time for the waiter to come to his/her table and provide the menu. Additionally, customers wait for the order to be taken and finally receive the order.

The project idea is about developing an intelligent automated coffee system that predicts the customer orders and deliver the order with a smart car. The system will have two parts. First the system collects data about the customers' orders. This is through a an online application android that will allow customers to request their orders and later on the system can predict the frequent customers' orders. This will happen in the system by calculating how much a customer requested the same order. For example. If a specific customer requested the same order five times the system will send a message to the customer if he wants the same order as he requested before or not. If yes the electronic car will deliver his/her order to his table This will solve the problem of waiting for a long time to request his order. Whether he/she is new to the cafe or frequently customer to the cafe if he wants the same order that he/she is adapted to request.

The other part will be an electronic car that is responsible for delivering every order to its table without needing a human involvement with less effort for waiter. Therefore, no human involvement needed. the car will deliver the order. The automated car will use different sensors to direct the car to the right destination. The efficiency of the system provides the car with a sensor that detects the distance between the car and any object to avoid obstacles. The project have not been done yet but it is in progress.



Shaggy The Blinbot Assistive Robot for Blind and Visually Impaired People

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ABSTRACT

The advent of the new millennium has shown that the world that individual's inhabit is a non-stop and ever-changing world where almost everything is controlled by technology. A sequence of inventions and discoveries is continuously arising. Artificial intelligence and robotics are two of the most outstanding emerging domains. These technologies studied the concept of Human Computer Interaction (HCI). HCI is a field of practical_experimental science and engineering design. It covers the comprehension of the way people can benefit from the use of devices and systems that integrate computation, and the development of new systems and devices which improve human being's performance and facilitate their lives, especially those with physical disabilities.

One particular issue which makes HCI an important and interesting field of research is the progress of mobile applications. Improvements in mobile technology have presented thousands of mobile applications to be developed. This development has evolved in a way that it started allowing users to interact with other devices including: mobiles, computers, robots, etc. , via several means (Wi-Fi, Bluetooth, 3G, 4G, etc.)

To further study the advances of the HCI and mobile app field, a research was conducted in order to help people with physical disabilities, in particular those with visual impairments to overcome their reduced mobility.

The main objective of this project was to develop an android mobile application that controls an Arduino platform-based robot via voice recognition which helps blind and visually impaired people to wander in a plane closed environment. The software technologies used to implement the previously mentioned solution are: Eclipse IDE 2013 for the mobile application development which is based on the Jelly Bean 4.3.1 Android version and API Level minimum: 8, maximum: 18 on one hand, and Arduino IDE for sketches to be executed by the robot, using "C" language on the other. The communication between the two parties (Android phone and Arduino robot) is established using Bluetooth. The obstacle avoidance strategy is provided via an ultrasonic sensor that continuously sends sound pulses during the navigation. Once these echoes are reflected back, an obstacle is detected. This output: "Obstacle Detection", is communicated back to the Arduino, causing the buzzer to beep, thus notifying the user. There exist 5 predefined commands that the agent can choose among: forward, backward, left, right and stop. If the communicated command is not recognized by the system, the robot remains motionless, it will stand still waiting for another input, while the application prompts the client to give the robot another command. If the command was recognized, the mobile application will analyze the given input and share this command with the Arduino robot via Bluetooth, which will trigger the gear motors to execute accordingly.

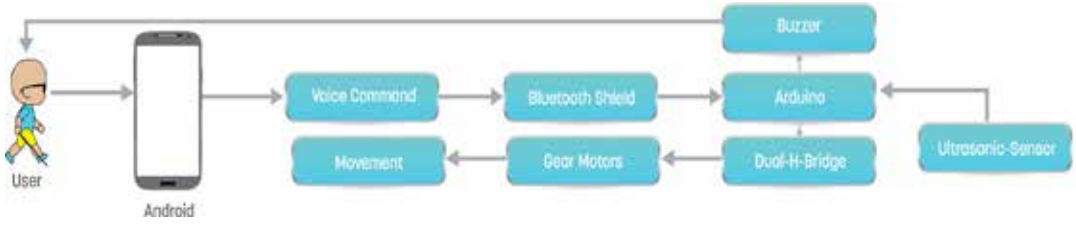


Figure 1: Arduino-Android System Architecture

Virtualization based Ethical Educational Platform for Hands-on Lab Activities on DoS Attacks

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ABSTRACT

In the field of Information Security, students are taught how to perform offensive techniques along with the appropriate defensive ones. When it comes to implementing concepts, student's activities usually pose a threat to the overall stability of a network since the activities they are required to perform usually include changing the configuration of a network and disrupting traffic throughout that network. In terms of Network Security, students are asked to launch certain network-based attacks such as Denial Of Service attacks that lead to the improper communication between hosts in a network and sometimes the termination of communication between them. This is where virtualization comes into the picture. Virtualization simply refers to the abstraction of physical resources such as network switches and routers into virtual ones. Through the adaptation of virtualization, students will be able to safely implement precarious experiments that cannot be performed on actual computers because of the consequences that would result to the instability of a computer network.

For this project, a virtualization based tool for Information Security network attacks has been developed to allow students to safely execute common Denial Of Service attacks such as the TCP SYN Flood attack, the ARP Cache Poisoning attack without infecting any harm in return. This project not only provides students with safe environments to perform network-based attacks, it also deploys a network simulator that allows students to reduce the time it takes to build a desired network. Thus through this project, students will be given the capability to build networks virtually through GNS3 network simulator and configure them as they would do in a real environment in addition to perform common network based attacks in a sandbox-like environment and to enhance their understanding of such attacks.

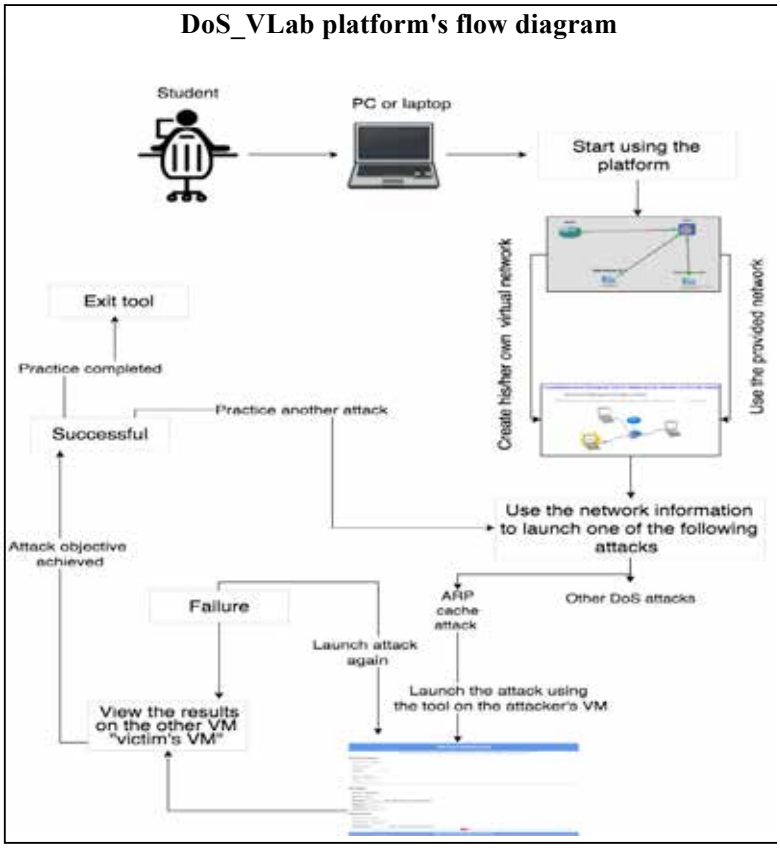


Figure 1: Flow of steps to use the proposed ethical tool "DoS_VLab"

Keywords: virtualization, information security education, DoS attacks, network attacks, educational tools, GNS3

Enabling Faster and Reliable Communications Using Adaptive Array Processing

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ABSTRACT

Since the past few years, the advancement in the wireless technology has become massive which lead to an increase in the user demands and expectations. The rapid growth in the number of mobile users along with the increasing demand of the users, caused the coverage area of the mobile cellular network to expand resulting in poor signal transmission.

Smart antenna systems, in particular adaptive antenna arrays, were employed to overcome such limitations by combating interference and noise signals using beamforming techniques that separate spatially the desired signals from other unwanted and undesired interference signals. This is carried out by combining multiple antennas in a phased array system in which constructive and destructive interfaces in the signals occur at specific angles depending on the array geometry and weights (complex adjustment of amplitude and phase at the array sensor elements). Adaptive antenna arrays are widely used in applications and systems that require tracking of mobile objects and targets such as cellular systems. In these systems, the use of adaptive antenna arrays will help in allocating the antenna beams to a specific direction instead of all the directions making more efficient use of bandwidth and reducing the loss in power to enhance the quality of service.

In this research, the formation of beams for reception will be studied, providing an overview of beamforming from a signal processing perspective. Moreover, multiple adaptive beamforming algorithms such as Least Mean Square (LMS), Normalized Least Mean Square (NLMS), and Recursive Least Square (RLS) that adjust the antenna array weights to adapt to the input signals statics, are analytically analyzed and compared. These algorithms help in minimizing the error between the desired output of the system and the actual output so that the signal - to - noise ratio is increased. By maintaining the same antenna array geometry (linear geometry), each one of these algorithms will have its own complexity, and will provide different stability and speed of convergence to the system. Recently, adaptive beamforming algorithms have a nice tradeoff between the complexity and the convergence speed. The more complexity, the faster the system will converge. Through this research, simulation results are obtained to identify the optimum beamforming algorithm that will perform better, under various sensor array and signal conditions. Optimum performance is defined by the fastest convergence, the highest stability and the smallest error between the desired and the actual output.

Events and Users Tracker based on Intelligent Recommendation Method

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ABSTRACT

Nowadays with the growth of using social media, it becomes a good source for users to search about preferable events or search about other users. With the large amounts of users accounts and published events in these social media it became hard for users to search manually about desirable events or users accounts, which consumes user's effort and time. Recommender methods help in giving some recommended events and users to facilitate finding these for users. It is vastly used in smart applications that help users in decision-making to select an item from large different alternative choices from a group of items depending on a common methodology [1][2]. This methodology is based on finding a relation between user information with item's information as content-based approach, with user's social surrounding (as example the following users) as in Collaborative Filtering or integrating those approaches together as Hybrid approach [1]. However, these approaches may be unavailing in providing suggestions based on users' interests and desires. Using these approaches could make users are not satisfied with the suggestion results, which could sometimes make users need to search more to find the desirable target.

To address this issue and providing events and users accounts recommendation based on users' interests, we proposed an efficient recommendation method which based on machine learning. The idea of this method is using users' Twitter accounts in order to provide recommendations depending on learning model which enhances the recommending process by determining users' interests based on using text classification algorithm for users' tweets. It goes through some steps: Initially, the method requires a fully access to the users' tweets to collect it. Then, it will use bi-language classifier for classifying users' Arabic and English tweets in order to categorize users according to their interests. Building on the result of the tweets classification the method will recommend upcoming events and will also suggest users to be followed.

In classification step the data firstly will be processed by using tokenization, stop-words removing and stemming by using SAFAR (Alkhalil Morphological Analyzer) stemmer for Arabic tweets and Porter stemmer for English tweets. Then it will prepare user's data as Documents to Vectors and reducing its size by Term Frequency for each word in the document. The classification done using Naïve Bayes classifier to assign user to one of five classes which are: Religious, Technical, Medical, Business and General. As a result, the method be able to determine users' interests and intelligently it helps them in finding the desirable events and other users' accounts without consuming their efforts and time. It also helps events publishers in publishing the events for people interested in these events.

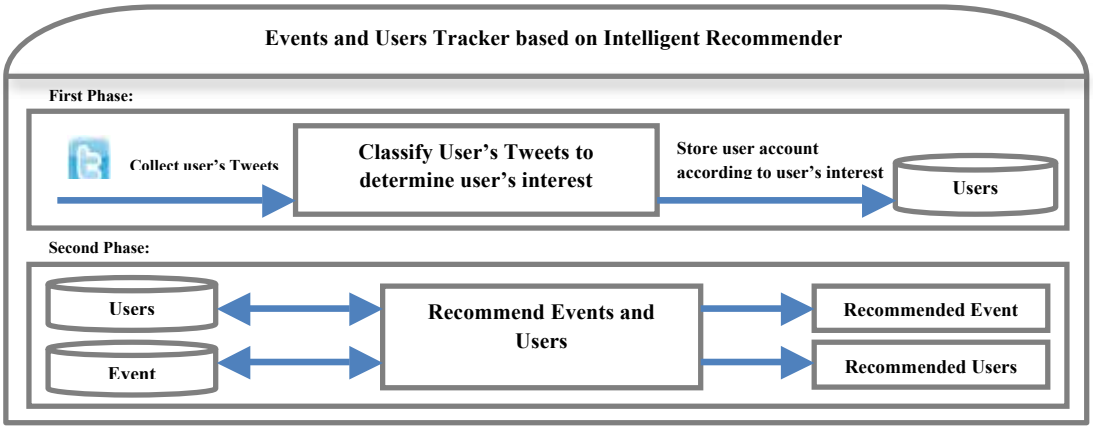


Figure 1 Event and Users Tracker based on Intelligent Recommendation Method

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A Museum Tour Guide Robot

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ABSTRACT

In this work, we propose the implementation of a museums tour guide robot. As museums are one of the many tourist sites being visited by tourists when exploring a new place, it is very important to provide them with an enjoyable and unforgettable experience. This could be achieved by using tour guide robots that can interact with human visitors, guide them through the place, and provide information about exhibited item is requested.

In this project, human-robot interaction is realized by the use of Kinect device. First, the visitor wears a shirt with a specific color; the robot identifies the color through Kinect and is able from this point forward to follow the visitor around while avoiding obstacles. In the time being, only black and white colors are used as a proof of concept. The voice commands "Follow Me", "Speak", and "Stop" are currently implemented. The first command is issued for the robot to follow the visitor around. When the robot identifies an exhibited item, it automatically stops and waits for another command. If the next command is "Speak", the robot provides information about the item. However, if the next command is again "Follow me", the robot continues its movement. The visitor can interrupt the robot when speaking by issuing the "Stop" command. The choice for making the robot follow the visitor is that now visitors can choose which items to visit and they wander around the museum at their own pace.

Items are identified by the robot using RFID tags. RFID tags are placed on the different items while an RFID reader is fixed on the platform of the robot and connected to the PC; so the reader will be able to detect the tags. Each tag is associated with a different audio file that is played to explain the exhibited item to the tourist in the museum.

By gathering RFID information, a tracking system is implemented in order for museum personnel to know the robot whereabouts at all times. Furthermore, this system could be used by the tourists as well to know where the robot is and if they have a chance to catch up with the tour or how long they will have to wait for another robot to become available. The used robot platform, Eddie, is shown in Fig. 1 while the project architecture diagram is shown in Fig. 2.

In the future, we intend to incorporate gesture identification, add more voice commands, identify more shirt colors, and implement a larger system with more than one robot.



Figure 1 Eddie Platform.



Figure 2 Architecture Diagram.

Empowering Future Healthcare and Wireless Systems Using Compressive Sensing

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ABSTRACT

Most of the digital signal processing applications such as audio, video, radio receivers, radar, and medical devices, are based on the well-established Shannon-Nyquist theorem. Recently, the ever growing demand for data have promoted the use of high-bandwidth signals which caused challenges in applying Nyquist theorem for data acquiring and processing. An optimum solution is compressive sensing which is based on sampling wideband signals at rates far lower than the Shannon-Nyquist rate. This is carried out without missing any important encoded information in the underlying signal, even if the information was contaminated with significant levels of noise. Hence it is obvious that compressive sensing results in faster sampling and processing rates, lower energy consumption, and higher data storage capability. Moreover, compressive sensing overcomes many of the current problems such as encoder complexity and low resiliency to channel errors. The most remarkable advantage of compressive sensing is that it allows for a sensor to very efficiently capture the information in a sparse signal without trying to comprehend the signal.

The use of compressive sensing is becoming vital along with the rapid advancements in electrical engineering and computer science, and the fact that we are dealing with much more complex systems, and higher dimensional codes, and data. For example, the error-correction problem in coding and information theory, the rank minimization problem for system identification in control, the approximate embedding problem in data mining, the face recognition problem in computer vision, and the locality sensitive hashing in theoretical computer science.

Compressive sensing enables rapid advancements in key healthcare applications. Actually, wireless tele-monitoring is an evolving direction in personalized medicine and home-based e-Health. One of the reasons is because it enables communication, via the Internet, with a health care provider in a remote terminal by using nearby smart-phones or handheld devices. Thus, it is a convenient way for patients to avoid frequent hospital visits and save lots of time and medical expenses. However, designing such systems requires minimum energy consumption and higher data compression for less device cost. Therefore, CS is more favorable to be used since it has superior performance over the conventional data compression methodologies as it consumes less energy which increases the battery and sensor life time and accordingly reduces operational costs of the system.

This research focuses on applying compressive sensing for medical monitoring of physiological signals via wireless body area network (WBAN). We analyze signals that have high degree of sparsely where CS is directly applicable, as well as signals that are partially sparse which require modified CS techniques to be developed.

Halcyon – Assistive Technology for Alzheimer's Patients

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Supervised by
Dr. Adnan El Nasan

ABSTRACT

Alzheimer's is a neurological disease, which slowly diminishes the cognitive functions of those who suffer from it, leaving them unable to fully care for themselves. Alzheimer's also has a profound economic impact, with the United States projected to spend approximately 1 trillion dollars in the treatment of both the disease and its effects by 2018. Memory lapse, disorientation and lack of concentration are some of the unfortunate effects of Alzheimer's disease. The current assistive technology in the market is expensive and difficult to implement. Our project aims to consolidate and improve on numerous expensive solutions currently on the market, each of which addresses a very specific complication with Alzheimer's, into one device which is both more streamlined and cost effective (Dhs.675 only for first prototype). Currently on the market, a caregiver can purchase a GPS watch which informs them if their loved one has left the house, an automated pill dispenser which reminds the patients to take their medication at specific times, and a motion detector to determine if the patient is moving which all come to a cumulative cost of approximately Dhs.1,728, thereby making these incomplete and expensive solutions.

This project aims to provide an automated, non-intrusive and effective solution for some issues faced by early-stage Alzheimer's patients by offering autonomy to them and ease of mind to their caregiver. The caregiver, through an application on their smartphone has the option to record audio instructions for their loved ones on how to employ certain home appliances such as a coffeemaker, a microwave etc. The caregiver is given the option to associate and link every instruction to a certain home appliance by simply placing Bluetooth tags on the furniture or appliances within the home. The customized instructions are then uploaded and synced with the patient's connected wearable Bluetooth-enabled smart watch, which is able to accurately identify when the patient is about to employ one of the home appliances. Upon approaching one of the Bluetooth-equipped appliances, the watch plays out the prerecorded instructions aloud. The system is extremely flexible and through the mobile application, the caregiver can provide the patient with the option of declining help in each case if he sees fit. A log of the time and the kind of patient's activity is reported back to the caregiver for their reference. The system also utilizes accelerometer data to alert the caregiver that the patient has taken the watch off. Our solution provides the caregiver with the autonomy to create customized audio instructions as they are the best judge on where the patient needs assistance. As a result, the patient should be more willing to accept the assistance.
Figure 1 below illustrates the high level schematic, caregiver app and patient wearable interface of the proposed solution.

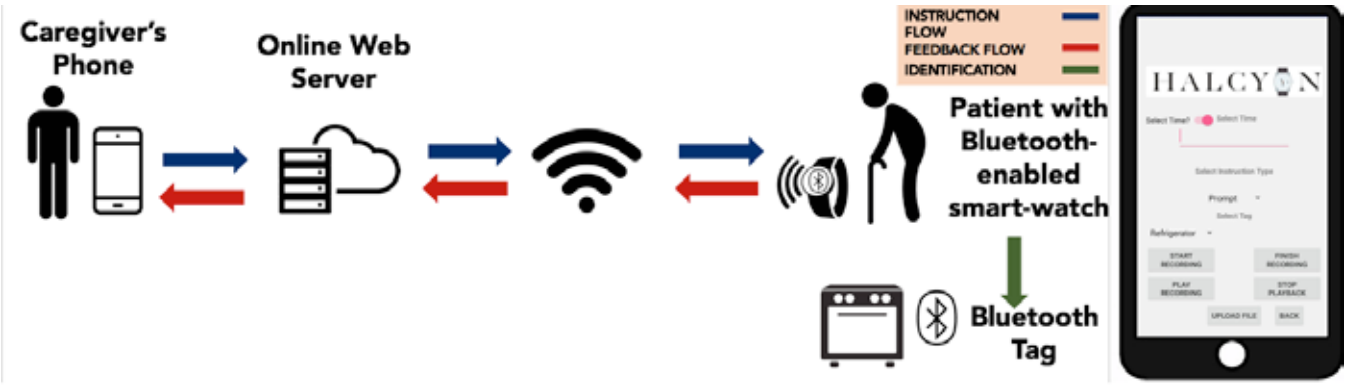


Figure 1: High-level schematic, Caregiver App and Patient Wearable of the proposed solution.



The system is simple to implement and easy to deploy. Every appliance or piece of furniture in the home can be integrated as part of this connected assistive platform by simply recording audio instructions and placing Bluetooth tags on them. This technology will improve the independence of the patient, while empowering the caregiver and providing them with peace of mind. Upon completion, this project will significantly reduce the cost associated with assisted living, as it will replace numerous devices on the market. It will also drastically increase the quality of life for both the caregiver and the approximately 46 million people who suffer from Dementia internationally.

Voice-Controlled TV Remote: Initial Design and User Study

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Supervised by
Dr. Adnan El Nasan

ABSTRACT

This project presents the preliminary user study of the Voice-Controlled Remote for TV. Nowadays, there are many TV channels provided by TV stations available for viewers to choose and view. However, TV viewers especially elderly and little kids experienced difficulties in order to memorize and reach the specific desired channel without getting any assistance from others. Currently, not many products are available in the market that supports the needs of the user. Therefore, this project explores the possibility of designing a Voice-Controlled TV Remote that will help users to navigate and find their desired channel easily. The Voice-Controlled Remote is a simple TV remote control with some additional features that allows users to record their voice and assign the recorded voice/word to specific channel using the record button (Figure 1). Therefore, they will be able to recall their desired TV channel using the voice recognition feature by a single click on the microphone button and calling the channel by the previously assigned voice/word. By using this approach, the elderly and kids will be able to reach the wanted channel easily without the need to memories its number or to go through the menu or the favourites list as we usually do with the current technology. During the early stage of the project, we concentrated on understanding users by collecting requirements from a group of users via interviews and online surveys. Then, we designed and tested the initial design of the Voice-Controlled TV Remote using a low fidelity paper-based prototype of the device, and the TV screen was made to present and show the process of recording and assigning voices to channels. Afterwards we used a high fidelity prototype that was done by making a slideshow using microsoft powerpoint to visualize a TV screen along with the previously mentioned processes with a group of randomly selected elderly and kids users (Figure 2). Overall, the findings gathered from the evaluation session show that our participants enjoyed and appreciated the idea to be implemented in real life while interacting with the prototype. Feedbacks and suggestions from the evaluation sessions were gathered for future work such as improving the voice recognition accuracy in order to recognize the voice changes and add an Arabic language to the remote control itself.



Figure 1: Recording Process.

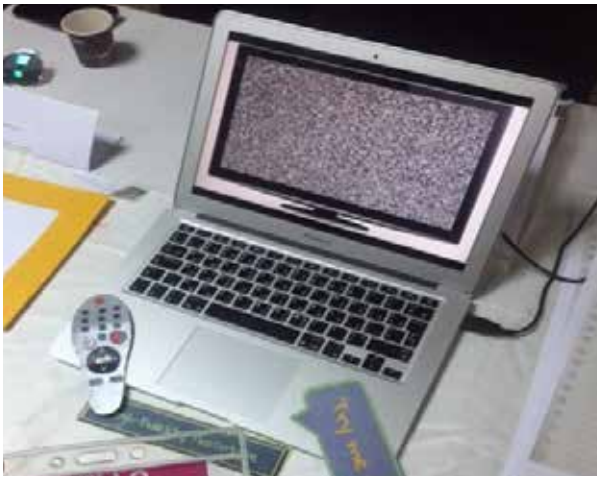


Figure 2: Evaluation Setting.

FashionAir: Fashionable Wearable Pollution Sensor

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Supervised by
Noura Alhakbani

ABSTRACT

Air quality is an important aspect within the environment and vital for human and all living creatures wellbeing. Many urban cities are fighting pollution and moving toward cleaner cities through adopting smart technologies. Our goal is for Riyadh to join this movement and provide better environment for the future generations. In addition to different natural causes, the huge construction projects, and increased traffic flow affects air quality negatively.

To measure air quality and pollution levels we adopt the use of miniature wearable air quality sensors. The wearable piece's portability, affordability and visual appeal raise its' attainability by all community members of all ages and interests, which helps to raise awareness among the Saudi community with regard to air quality importance in the environment. It encourages the scientists and citizens to take action; and make a change in the environment. Moreover it encourages adopting greener footprint and embrace the saying "Better air for a better health". Furthermore "FashionAir" adds to the air quality data and information contributed to and about Riyadh city that can be readily used or manipulated to be used for other purposes by different interested groups.

FashionAir consist of an application and wearable pieces that acts as a sensor and an indicator as presented in the figure below. The sensed data is sent to the application that remotely stores the data on a cloud to be retrieved later for visualization and analysis. The pollution information is presented to the user through multimodal mediums and attractive presentation, such as lights, maps or charts.

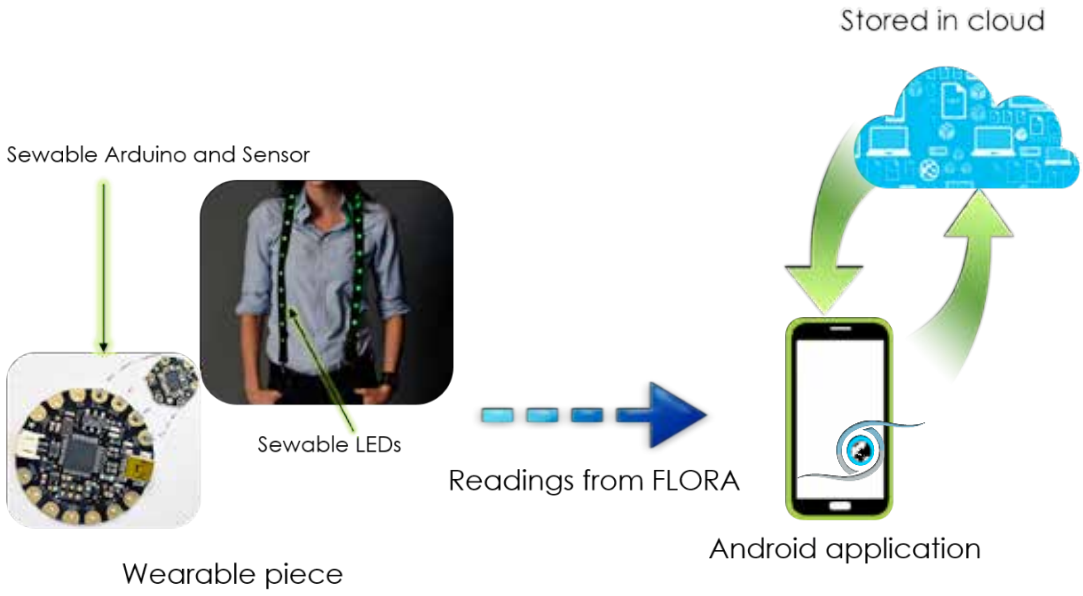


Figure 1: "FashionAir" System

Assistive Technology for Integrating the Visually-Impaired in Mainstream Education and Society

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Engr. Tazeen Sharif and Engr. Wessam Ghassan

ABSTRACT

Where a normal child wakes up to a bright sunny morning, grabs his lunch box and hops into the school bus, a blind child is wondering why everything around him is always dark! Coffee with newspaper, social interaction, independent mobility are some of the few impossible tasks for 5% of the world's population that represent blind community. Modern cities are getting smarter by the day but a question still remains unanswered, are they more inclusive too? Can the blind and visually impaired have opportunities for education, accessibility to public places, and lead an independent and dignified life?

The value of education can never be overstated, and the dangers of its ignorance can never be overestimated. The most important outcome of education is to contribute in building the society and lead to a dignified life. The basis of an inclusive society is an ideology that excludes any discrimination and that ensures equal treatment of all people, creates customized service for people with challenges and respond to their special needs. In an inclusive society, visual impairment should not prevent one from pursuing high goals of his/her life and should be able to provide necessary opportunities – in all aspects of life – for everyone.

The aim of the project is to design and implement a cost-effective and portable assistive technology tool, capable of integrating the Visually Impaired (VI) individuals into mainstream society and education. The Internet of Things (IoT) network, as illustrated in Fig 1, comprises of smart glasses, smart phone, a processing unit (Raspberry Pi3), cloud database, real-time text to speech conversion and user application. The system enables the VI individuals to read text in English and Arabic languages, identify people and provide support for in-door navigation.

The smart glasses with mounted web-cam captures images of text and converts them into audible output. It is tested for having 95% accuracy is reading English text and 85% accuracy in reading Arabic. The VI individual can identify people by capturing faces, comparing with the pre-stored images for face recognition and receiving audible output. The system operates with 100% accuracy, and gives audible output for unknown faces as "Stranger". The indoor navigation feature allows the VI individual to freely navigate with audible details about the closed environment. The indoor navigation feature requires installation of a transceiver with no changes in the existing infrastructure. The user can select to read or identify faces using buttons on the developed smart-phone application. In addition to that, the 'Emergency Alert' feature on the software interface allows the user to update their guardian with the touch of a button.

With such an approach, the VI individual will have independent life, have access to professional education, find employment and add to the sustainability of the society.



Fig 1: System Block Diagram

Electronic Eye: Aiding Colorblind Drivers in Distinguishing Traffic Signal

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Supervised by
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ABSTRACT

Color-blind persons are often unable to distinguish various colors reliably wherein the color of various objects is important or even critical to accurate interpretation of the object e.g. traffic signals. In many countries color blind people are forbidden to drive due to their inability to recognize colors in the traffic light. As a result, they always need driver or assistant to perform their day to day operation, which leaves them handicapped in achieving desired level of mobility.

With the advancement in information technology which brought a revolution to almost every field, there is a pressing need of introduction of advance technology and equipment to help color blind people to drive like normal people. Also, accurate and fast object recognition which require the use of computationally intensive image and video processing algorithms, are becoming increasingly important for systems aiming to help the blind navigate independently and safely.

The study proposes a solution called *Electronic Eye*, which uses a camera to capture the current traffic light and process the signal to identify its color. By installing a camera in car front it will capture traffic light and transfer to car system or smartphone via Bluetooth. By implementing fast image processing algorithm application will identify light color and inform driver to take action accordingly. This solution is easy to use, portable and affordable.

Although there is a similar solution called EnChroma glasses that already exists and can help colorblind people to see the colors, it is still unreliable. Governments would not trust or guarantee that wearing the glasses is a sufficient reason to give colorblind people a driving license. They could forget it or ignore the commitments that insist on wearing it. Therefore, there is a necessity to invent and find another solution as making up a system that enable them to see and distinguish colors, so they can drive properly as other normal people.

Smart Wheelchair for Elderly People

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Supervised by
Prof. Mustahsan Mir

ABSTRACT

The main objective of the project presented in this paper is to enhance the mobility and independence of elderly people on wheelchairs and make them more comfortable in performing their day to day activities. Moreover, they should be under continual supervision of caretakers for vital sign check-ups without requiring physical presence of caretakers round the clock. This will provide the elderly as well as caretakers more freedom and liberty to do other work. In order to achieve all these objectives, we came up with an idea to embed a real-time patient monitoring system onto a wheelchair and redesign it in such a way that will be most compatible for an elderly person on wheelchair. The patient monitoring system embedded on the wheelchair will be constantly monitoring 7 vital signs of the patient. If any abnormality is detected, the system will alert the caretaker and the nearest ambulance service, thereby increasing the possibility of survival. The implementation of this system involves the fusion of data from various sensors acquired from an Android-based Smartphone. Upon the request from Elderly Home in Ajman, a design strategy was developed keeping all the external and internal factors of the project in mind. With goals to merge engineering creativity by redesigning wheelchair as per the requirements and medical applications for effective and convenient results, the working process of the Smart Wheelchair is shown in Fig. 1.

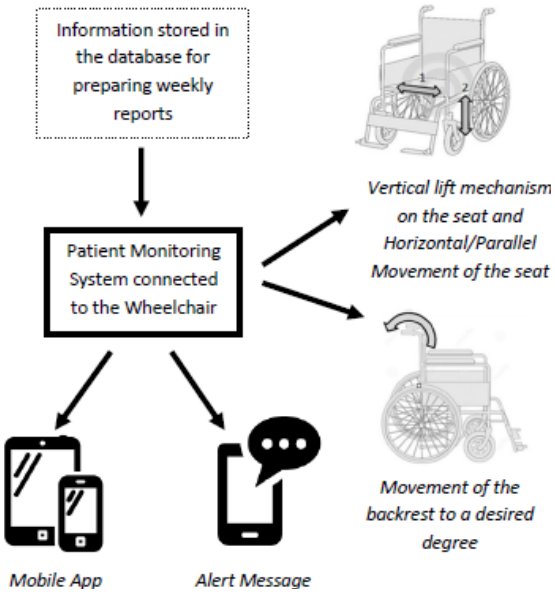


Fig. 1: Block Diagram of the System

Using E-Health Sensor Platform V2.0, the vital signs are continuously measured and stored in the patient's database for analyzing and preparing weekly reports. When the given threshold values are crossed, the situation will be marked as an emergency and an alert message will be sent to the nearest caretaker. To make the elderly people be self reliant and overcome locomotive challenges, the needed modifications on a manual wheelchair were made as shown in Fig.1. These include vertical lift mechanism, movement of back rest to a comfortable degree as required by the elderly person and parallel/horizontal movement of the seat to allow the patient to move to/from the bed and toilet usage.

With an approximate accuracy of 80%, 5 parameter readings were successfully observed using Raspberry Pi 2B+, hence making this project cost effective and reliable (Fig. 2). A successful wireless connection and real-time data transmission is planned to be achieved over a distance using ZigBee technology.

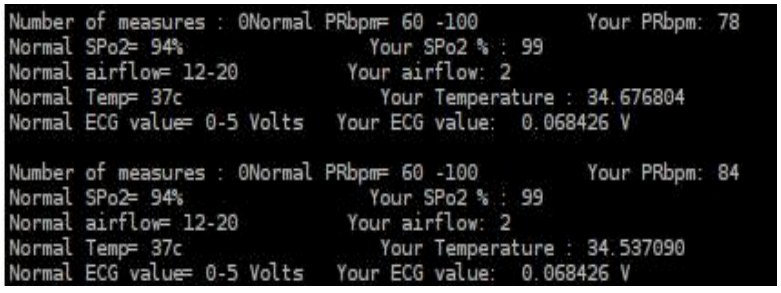


Fig. 2: Successful Parameter Readings

iCART: Intelligent Shopping Cart

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Supervised by
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ABSTRACT

In our daily lives shopping is an essential activity. However, shopping may become a demanding and time consuming task, especially during holidays and season's sales. As reported by the American Time Use Survey (ATUS), on a typical day 32 million American adults shop at grocery stores, while on weekends this number grows to 41 million. The average time spent on grocery shopping is about 41 minutes and a significant part of this time may be spent while waiting at the cashier counter. This time can be minimized by introducing new technology at shopping markets. At present, most shopping markets use barcode technology at the Point of Sale (PoS) which has some drawbacks such as waste of time, failure rate in reading barcodes, low range of reading and typing errors. With new developments in technology and smart systems, shoppers are looking for an efficient shopping experience that can minimize their shopping time especially at the cashier counters.

The main objective of this paper is to utilize RFID technology in developing an intelligent shopping cart that can identify its contents without human intervention. The cart will keep updating the customer about the total bill through a display screen as well as provide the name and price of each product that the customer wants to buy. Once the customer completes the shopping and proceeds to cashier, the total bill will be sent wirelessly to the PoS and the payment will be done there without any further time delay.

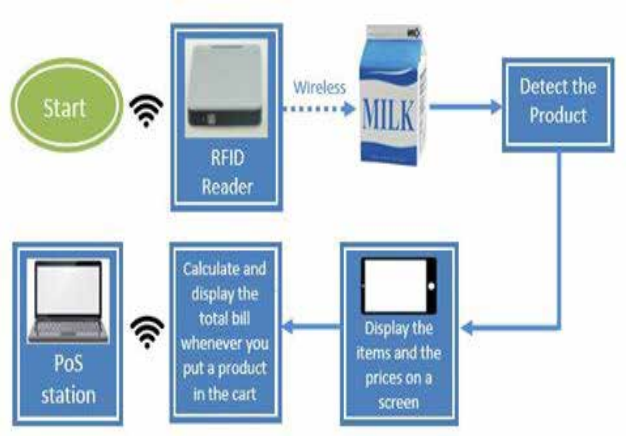


Fig.1: System block diagram



Fig. 2: Intelligent shopping cart

As shown in Fig.1 above, the developed system consists of RFID reader, tags and a display screen. When any selected product is dropped in the cart, the RFID reader reads the tag on the product, extracts the information of the product from the tag, and displays it on the display screen. Multiple products can be placed in the cart at the same time and the system will always display the latest total cost. The shopping cart will send the total bill through Wi-Fi to the PoS when the customer reaches the cashier counter.

The developed system has been tested with different real items and it has achieved all its design objectives. In surveys conducted with shoppers, majority have shown keen interest in this system as it will minimize the long queues at the PoS and also reduce the number of such terminals thus making it more economical for the shopping mall owners.

Identifying and Relocating Redundant Nodes in Randomly Deployed WSNs

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ABSTRACT

Wireless Sensor Networks (WSNs) consist of a large number of sensors that generally have limited energy and communication capabilities. When randomly deployed, the existence of redundant sensors in a given geographic location generally increases message exchanges and therefore lead to higher energy consumption.
In some applications, where sensors are deployed in remote and harsh areas, it is important to reduce communications and preserve the limited energy of sensors. It is therefore important to deal with redundancy and relocate those mobile sensors to other positions where they can be used in order to maintain the connectivity of the network and improve data collection processes. Solving the problem of redundancy in randomly deployed WSNs would be interesting for stakeholders involved, for example, in military, wildfire, and rescue applications.

In order to address the challenges posed by redundant nodes on the network, it is of prime importance to first of all, identify the redundant nodes from the network. Our work will focus on the simulation obtained with network simulator 3 by implementing an IRRWSN (Identifying and Relocating Redundant Wireless Sensor Nodes) algorithm that identifies redundant nodes in a simulated WSNs. After redundant nodes will be identified our aim is to reallocate them.

Our Approach for the identification is based on LEACH, a hierarchical protocol in which most nodes transmit to cluster heads, and the cluster heads aggregate and compress the data and forward it to the base station. Our Algorithm utilizes each node's topology information primarily to decide on node's suitability or for inclusion as a candidate for redundancy in the deployed network. We premised our reasoning on the assumption that the event of interest is occurring within the sensing range of each sensor, so each sensor is capable of detecting the event at the same time. We considered energy which plays an equally important role in most applications of wireless sensor network. To save energy, there is need for a hierarchical approach to data transmission, where the participating nodes organize themselves into dynamic clusters, and each cluster head (a role played by each sensor in turn) is responsible for onward data transmission. The algorithm is composed of the following steps:

I. For any node to be considered as qualified as a candidate for redundancy, the node has to pass a qualifying test to check the energy reserve of the node in that particular round.
II. We set a list of qualifying Nodes. If two qualified nodes resident within the same quadrant with two different distances from the sink, the node with the smallest euclidean distance is selected to represent the network in that round, while the other is considered as redundant.
III. We determine which nodes can be cluster heads. We set a random number and if this random number selected is less than the threshold so the node will become a cluster head for the round.
IV. The cluster heads must transmit the fact that they are cluster heads to the network, this will be a constant transmit energy. During this period the other nodes must keep their receivers on.
V. All non-cluster heads must determine to which cluster they will broadcast and alert the cluster head to that.
VI. The cluster head then creates a schedule telling the nodes when they can transmit and non cluster heads send their data to the cluster heads who then broadcast the data to the base station.

After testing IRRWSN simulation and comparing it with a direst simulation we found that IRRWSN was able to remain viable for more than 10000 rounds allowing transmission to less nodes compared to the direct simulation, where message exchanges between nodes was higher with consequently higher energy consumption. Means that our algorithm was able to reduce communications and preserve the limited energy of sensors.

Remote Flash Memory using Li-Fi Technology

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Supervised by
Dr. Iram Fatimah

ABSTRACT

Every day we hear about new inventions, which are created to enhance the performance of the past inventions. The most widely field that is changing a lot is communication and transmission of data. People are looking for the easiest, fastest and the most secure ways to transfer their data. One of the most used devices to transmit and save the data is "Flash memory", that is based on universal logic gates, NOR and NAND. However, several problems have been encountered when connecting flash memory to PCs, such as damaging the data by either losing valuable information or getting viruses in the memory stick. Therefore, "Li-Fi" is the new technology that overcome these problems in flash memories. Li-Fi is simply the optical version of Wi-Fi with some additional advantages. The advantages are but not limited to using light-emitting diodes as a medium to exchange data. In addition, the transition of data at high speeds as fast as 1 gigabit per second (Gbps), which is almost 100 times faster than current Wi-Fi technology. Li-Fi is already used in electromagnetic sensitive fields such as in aircraft cabins, hospitals and nuclear power plants without causing electromagnetic intrusion. Nowadays, the cost of Li-Fi installation is expensive; it is expected to be ten times cheaper than Wi-Fi, especially when it becomes popular in next few years. To avoid the limitation of existing flash memory, it will be a great idea if the PC can access the memory through special port that send/receive the data using light as a medium to transport the data. This transformation uses radiations by the visible light without physical connection with the device.

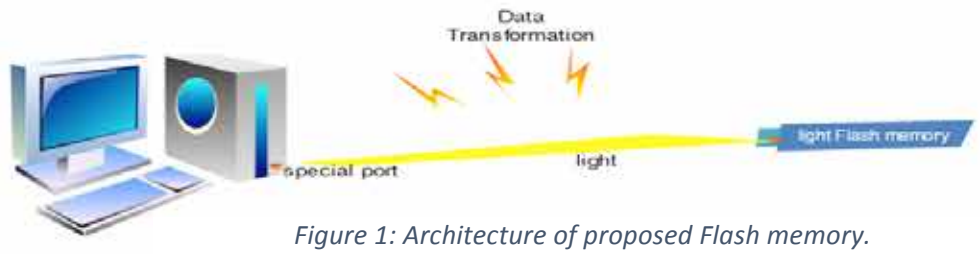


Figure 1: Architecture of proposed Flash memory.

Our proposed solution is shown in the above figure 1. This work is done and implemented with framework and code applied in our proposed model, after installing the required software in PC, turning the flash memory light and without any physical connection the computer's port should collects the light and start transforming the data within few seconds. Therefore, we suggest moving from electronic flash memory to light flash memory, which will support Li-Fi features. The size of light flash memory will be almost same as electronic flash memory. Whereas, the capacity of the light flash memory will be increased to almost 10,000 times the capacity that we have now. The next generation of flash memory will be much better in terms of encryption method time saving and environment friendly.

Home Business E-Market

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ABSTRACT

A business website has the potential of reaching millions of customers throughout the globe without spending or investing huge amounts of money. The number of potential customers contacted via the website and the costs involved puts the return on investment of a website on higher scale when compared to other marketing techniques, such as traditional advertising and on the road sales representatives. E-marketing represents the direction of future trade development. Promotion of e-marketing will bring great benefits to the society and the economy. For example, e-market improves the speed and quality of services of transaction, promotes the globalization of markets, and cuts down cost. For these reasons, this project aimed to design and implement an online shopping website for selling homemade products.

No matter what a website sells it should provide good value and quality, make shopping easy, deliver products on time, and have competent customer support. However, many people prefer to increase their income and fulfill their hobbies by working from home due to some transportation restrictions and many other issues. Therefore, we found that such websites can provide a suitable platform for marketing hand crafted products electronically.

Home business e-market support creative people who can make a homemade product to get financial benefits from selling them in public markets through the internet. This system is designed to cut the cost and efforts of traditional marketing methods. The website is designed to be easy to use so and does not require professional skills to use it. The website includes many categories which supported several kinds of handmade products. The website allows the disabled people, home wives and limited income to produce their products. The special characteristic of our website is making sure that all products are handmade as agreed by all users upon registration. Our e-market system can update customers on our newest offers, products, promotions, events, photos, or many other content.



Smart Dehydration Watch

Wlla Ahmad Afaneh, Noor Sharaf Al-Deen & Fatima Isam

Supervised by
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ABSTRACT

Severe pathological problems can be caused by shortage of water in the human body. This problem can be serious in countries with very hot climate such as UAE; especially in summer months when temperature can by very high. Many people ignore or forget to drink enough water at regular times which can lead to dehydration. The repeated and regular lack of water in the body causes the fluid inside the body to decrease gradually, and become a normal feeling which will lead to the loss of thirst sensation. Severe dehydration will cause skin discoloration due to lack of sufficient Oxygen in the body and can be followed by dizziness and loss of consciousness.

In this project we have designed and implemented a smart dehydration watch will give an alarm when the fluids/water content drop below the normal level in the human body.



Figure (1, 2) CLEVAR DEHYDRATION WATCH

The smart watch measures the fluids/water content in the body and alert /instruct the user to drink enough fluids/water when the level drop below safety level.

The implementation of the system consists of both hardware and software. The hardware part consists of a sensor to sense the water content in inside the skin, while the software part is programmed via C language using Arduino microcontroller to calculate and display the results on an LCD display.

A block diagram of the system is given below:

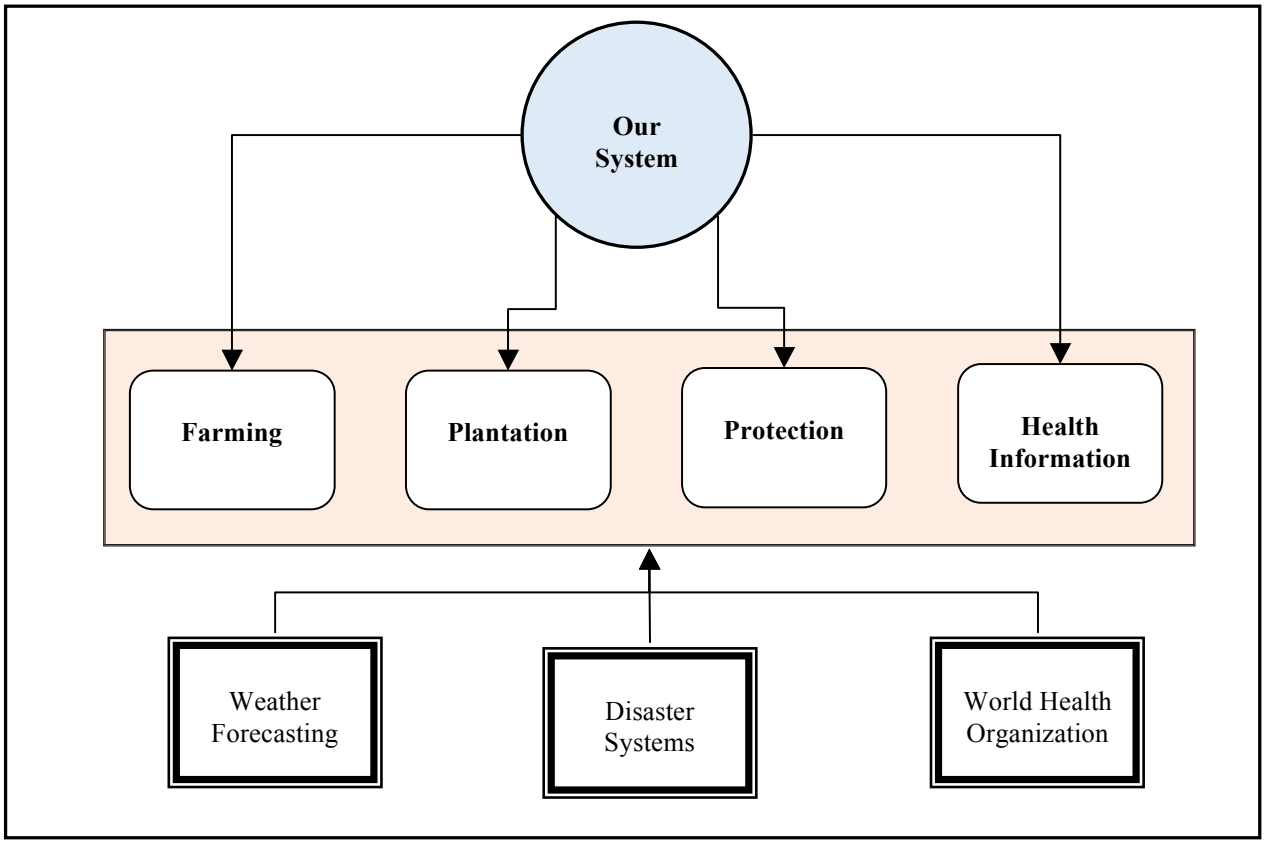


GPS-based System for Supporting Agricultural Services

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ABSTRACT

Currently, there is a great lack in the availability of smart applications which support agriculture sector in the Arab region, in general, and in Saudi Arabia and gulf countries, in particular. In this project we aim to develop smart mobile application which can support different areas in the agriculture sector. In order to provide the users with real-time data, the application will utilize the power of GPS to provide related data based on the current location. The system will be connected with many other sub-systems which are authorized by the government in each particular country. These sub-systems may include weather forecasting, aquatic life support systems, climate solutions, disaster-related systems and many others. Figure 1 illustrates the conceptual model that is being proposed in this project.



The scope of the initial version of the system will support the rules and regulations implemented in Saudi Arabia. Further versions will consider other countries in the gulf area and other regions in the Arab world.

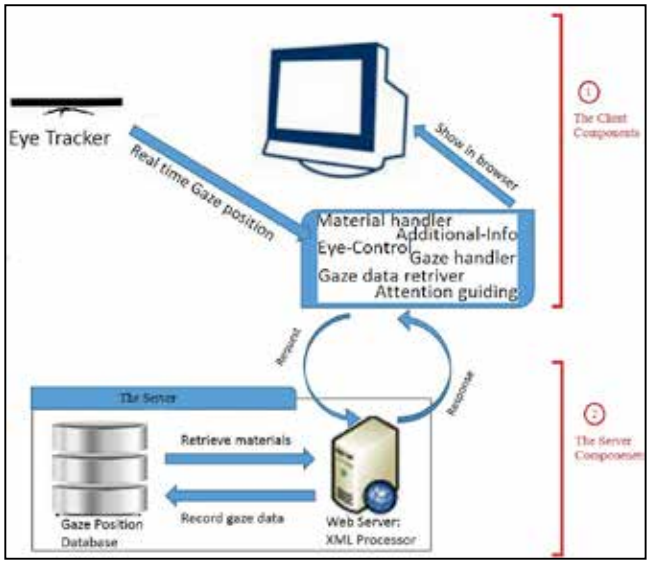
AGEye: A Learning System to Guide Students' Attention via Eye Movements

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Supervised by
Dr. Eman Yaser Daraghmi

ABSTRACT

Research has shown that guiding students' attention improves the students' learning process, and that attention can be analyzed via eye movements. Therefore, this study proposes a learning system integrating eye trackers with a web-based interface to provide an attention guiding function. The proposed system aims at notifying the students about the ignored or the skipped parts from the course material by showing them the important parts in which they ignored while studying.



As shown in the figure, to achieve our goal of guiding students attention, the proposed system consists of two main components: the client-side consisting of the eye-tracker, as well as the AGEye learning system, and the server-side that consists of the web-server and database.

The AGEye system consists of six main modules. (1) The Material handler module displays the learning material on the screen. (2) The Gaze handler module estimates the gaze data (fixation) that will be produced, 30 - 60 samples per second, to identify the object that a student is currently looking at. Moreover, the Gaze handler module records the user's gaze in the database. (3) The eye control module provides the functionality that a user operates via the eye movement. (4) Attention guiding module notifies the student about the skipped or the ignored parts from the learning material. While a student reads, the gaze handler module estimates the gaze data to determine the fixation count on each object located in the content area and thus determining the ignored or skipped the objects located in the content area. (5) The additional-info module provides additional information about the difficult or confusing learning material. While the student reads, the gaze handler module estimates the gaze data to determine the fixation count on each object located in the content area. If an object located in the content area has been gazed many times in short time interval, the module will consider this object as a confusing object and will provide additional information about that object to the student in real time. (6) The gaze data retriever is responsible for retrieving the gaze data and reviewing the student's reading process.

In addition to the MySQL database, the server side consists of three main modules. (1) The material retriever module retrieves the learning material from the database and formalizes the retrieving learning material in HTML format. (2) The AOI retriever module retrieves the area of interest (i.e. important parts) that pre-defined by a teacher. (3) The gaze data manager module manages the gaze data stored in MySQL database. The eye tracker component, Eyetribe, is responsible for obtaining the students' state during the reading process by monitoring their gaze positions and visual path. In summary, the contribution of this research is:

- Improving the students' learning process by proposing the AGEye **A**ttention **G**uidance learning system that aims at notifying the students to the ignored or skipped parts from the course material.

Education Strategies Application

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Supervised by
Dr. Iram Fatima

ABSTRACT

To cope up with educational development it is necessary to reduce the widening gap between educational needs of the students, and the professional capacity of teachers. Still at this time, many teacher use traditional teaching methods to explain the scientific material in a way that constitutes boredom and in some cases this methods are the cause of lack of acceptance of scientific material, discovery capabilities, student interests, and suppression of creativity.

Education strategies application, supporting the development of education through the development of teaching methods and assessment, to attract students to scientific material, develop their skills, and refine their personalities, through the implementation of several strategies depending on what the teacher believes is appropriate. To help the student to think, learn and progress in all humanity, intellectual and social fields. For this purpose, we proposed a smart phone application with following features.

Application features:

1- Contains the most important education strategies, which helps teachers to develop methods for explanation, and interaction with the students. Teachers can get the strategy by writing the name of the strategy in search place, if the teacher want to search for a strategy he /she know its name for example the strategy name is "Brainstorming strategy", so can write the name in search place and press search the teacher will get "Brainstorming strategy" with its definitions, objectives, steps to do and results.

If the teacher do not know the name of strategy can write keyword he /she thinks it is related to a strategy for example, if the teacher want the students to work together, so will write in the search place word " work together" or " group work" and press search, then sets of strategies that include this word will appear you will choose the strategy you want, then it will appear with its definitions, objectives, steps to do and results.

2- The possibility of creating files containing the names of students for evaluating and monitoring the students after applying a particular strategy with the possibility to create a report for each student and his / her skills gained from that strategy.

3- The possibility to create a report for each class in general and monitoring progress according to the result from the report can identify what are the requirements to develop this class.

4- The teacher have the ability to send reports about the students to their parents, also the parents can communicate with the teachers by sending suggestions, inquiries.

5- The students can communicate with the teacher in the class by sending and receiving messages with their teacher according what the strategy require. For example, if they use "Brainstorming strategy" the teacher send a picture or a question which is contain a problem, then ask each group to discuss it and try to solve it.

This application helps to keep up with the modern world in education also, to identify the student's skills and develop it, in addition, focus on the positive interaction among students, and develop the weak skills.



Figure1: the basic components for a teacher.



Figure2: the basic components for a student and parents.

Infants Non- Invasive Multi Measurements Device

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of Science & Technology

Supervised by
Dr. Mohd Nasor and Mr. Mujeeb Al- Rahman

ABSTRACT

We intended to design a device that investigates the patient's health by taking readings from the patient and comparing it to the normal level of each parameter of our project and help them increase their health.

In our design we made sure that this device has an optimum characteristic that includes:

- Cost and availability options.
- Painless and non-invasive.
- Saves time and effort.
- Safe and can be used with adults and infants.
- Repeatable usage (durability).

The main purpose of our project is to design a "three in one" device that can measure non-invasively some parameter in the blood and the heart rate which can give the physician indications about the patient state and whether he/she has health issues or not and will be more concentrated on newborn.

Our Project is to measure those three parameters:

- B12 concentration in the Blood.
- Bilirubin concentration in the Blood.
- Heart Rate measurement.

For emergency cases and softly dealing with infants, the noninvasive technique was suggested to obtain the same result without invading the skin. By using only light with specific wavelength as input and output, the reflectance intensity is used as indicator for vitamin B12, bilirubin and heart rate.

The design would be basically has the following principle, a source sends a green light with specific wavelength to exposure area. And then a reflected light would be received by a receiver located at the opposite direction of the source light. After the receiver sense the light reflected, it will produce current which will be converted to voltage and then amplifier it, and finally measure the voltage. This will give us the required indicator for knowing the concentration of Vitamin B12 and the bilirubin.

PickOne : Where you Can Choose the Right Service

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ABSTRACT

With the fast growing of the Internet, there was a big and obvious effect for businesses and marketing. Internet benefits many people by providing a huge marketplace for whose aim is to advertise and publish items to the people browsing the Internet, Online services are one of these businesses which depend on the Internet. Accordingly, online services facilitate work for service providers and clients in many ways. Clients and businesses do not have to meet physically, and there need be no time limit that may obstruct the service provider as well as the clients.

On the other side, online service providers and their clients face many problems. Many people have experienced making a wrong decision in buying an item or choosing a service. They may have been cheated by dishonest sellers, or have been surprised with unexpected low quality. Finding a service can be time consuming may lead to choosing the wrong service. People who decide to work as freelancers may find problems reaching a large audience consistently or convincing clients to be confident of their services.

Advertisements are the main approach for marketing items or services. Traditional ads are expensive, they are poorly targeted for internet clients, and they are ephemeral when internet products and services tend to be evergreen. So, we need to gather the service providers and the clients in one environment, in which the service provider can publish their services permanently, at low cost, to a wide range of clients, and the client can find many choices of services in an easy way, with known feedback from other clients providing feedback on rates and outcomes.

From this point, PickOne will be implemented. PickOne is a service provider marketplace mobile application works on iPhone devices that enable individuals in certain industries a place to advertise their skills, describe their services, and make contact to discuss details and prices. PickOne creates transparency and ensures quality by providing tools for comparing, rating, and reviewing provided services. In addition, PickOne offers a recommendation system to recommend some service providers based on the client's interests and preferences and to assist clients in finding the right service providers. The recommendation system will be investigated and implemented as part of the project. Moreover, the client will be able to search about the service providers and view their profiles. This will give a chance to know more about the service provider by viewing the experience level, some samples, reading comments, and viewing the rating for the service provider by other clients.

Empowering Future 5G Systems via Millimeter-Wave Communications: Prospects and Applications

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Supervised by

Prof. Raed Shubair

ABSTRACT

In this paper, the future of wireless communication services is discussed in terms of empowering 5G systems. The growth of mobile data demand has been increasing rapidly and explosively in the last few decades, which made the quality of service further improved in 4G networks. With this formidable growth of a variety of booming wireless communication services that need ever increasing data throughputs, the conventional microwave band below 10 GHz, which is currently used by almost all mobile communication systems, is going to arrive at its saturation point within just a few years. As a result, the attention of radio system designers has been pushed toward even higher segments of the frequency spectrum in a quest for increased capacity. The overall global capacity faces bandwidth shortage, which has motivated the exploration of using millimeter-wave frequency spectrum for future broadband cellular communication networks in order to enhance the spectrum along with the data rates and quality of service. By 2020, obtaining this information is vital for the design and operation of future 5G cellular networks.

Taking under consideration the fundamental differences between such a type of communications and existing 4G systems like MIMO and OFDM, in terms of propagation losses, directivity, and sensitivity to blockage. In addition, the characteristics of millimeter-wave communications itself have several challenges, however, knowing that the millimeter-wave communication is a promising technology for future 5G cellular networks to offer very high data rate (multi-gigabits-per-second) for mobile devices that allow enabling device-to-device communications over directional millimeter-wave networks.

Such challenges include the system circuit design, interference and fading control mechanisms, frequency reuse, cellular access, blocking probabilities, and so on. Moreover, to address these challenges, a research survey study is carried out of existing solutions and standards, and provides an overview of basic fundamental guidelines and potential applications to facilitate the deployment of the promising future of millimeter-wave communications in the 5G networks.

Multi-Pose Face Detection and Tracking Using Viola-Jones and Particle Filter

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ABSTRACT

Computer Vision is a field that includes methods for acquiring, processing, analyzing, and understanding images. It also aims to use a camera for analyzing and understanding scenes in the real world whereas its applications have expanded to support smartphones' cameras with multiple technologies such as face detection and tracking. The face detection judges whether there exists any human face in a picture or video sequence and to locate the size and position of human face. The face detection in a video is different from detection in an image in which the tracking step is very important to preserve the face region by simple features during video sequence, and achieve optimal performance rather than conducting the detection operation for every frame. The face detection and tracking have many valued applications either in the real-time systems as in the surveillance systems, or in off-line systems where there is a need to add some of the effects on the detected faces for any propose.



Figure 1: Current results of proposed framework

The proposed system is providing an API to enable Android camera to detect faces regions with multi-pose, frontal, right and left profiles, and track them during capturing operation. The first stage of our project is the face detection. It will be achieved by robust Viola-Jones algorithm because it will not be affected by illuminations easily as in the model of skin color. OpenCV library has ready-to-use Viola-and-Jones function whereas OpenCV does not support the right profile. So, we decided to perform training step by AdaBoost method to detect the lost profile. The applied tracking mechanism is based on Particle Filter algorithm that has been widely used in visual tracking to address limitations arising from nonlinearity of the motion model. The Particle Filter algorithm approximates probability distribution of tracked object, face object in our case, by a weighted sample set. The main three stages of the Particle Filter are sampling, weighting and resampling. The sampling stage can predict the location of window based on the motion model whereas the weighting is responsible to give every generated sample its weight according to the level of similarity with the original object. The resampling stage makes a sample set from the previous samples based on their weights. Color histograms for RGB components were the main features used in our framework because the histograms have the property that they allow changes in the object appearance while the histograms remain the same. On other hand, our observation like hood used to predict the approximated samples is based on standard deviation values. The standard deviation for the resampling was smaller than what we used in the sampling stage to get accurate samples at every sampling iteration.

The current results of the project implementation achieve an acceptable level of accuracy and efficiency where its frame rate is about 8 frames per second. The accuracy term can be expressed by false positive and false negative terms. The false positive is a magnitude of non-face objects that have been detected relative to the actual faces in the video whereas the false negative means the magnitude of undetected faces relative to the total faces included in testing. The false positive of our framework is about 13%, and false negative is about 1%. These results as shown in Figure1are gotten on Sony Xperia z2 device where it has Qualcomm MSM8974AB 2,3 GHz processor and Ram 3GB.

We are looking forward achieving better results in terms of both accuracy and efficiency in Android platform respect the actual mobile phone limitations by using parallel implementation for Particle Filtering algorithm.

Integrated Medical Record System

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ABSTRACT

With the extensive development in the world of technology and communications that have made the world a small village, companies are competing to provide services in new, faster, more comfortable and efficient manner by removing the barriers of time and space and enabling the user to access the service at any time, from any place and with any device he/she wants. The Health Sector is one of the most important sectors in which reflects the amount of development, growth and urbanization of any society. After a long course of study at the University, it's time to try to put what we have learned in these years of theoretical science into practical application that would enhance the humanitarian message and provide benefits and solutions to the problems being faced by many. Our research highlights some of the problems of this sector, taking into consideration the annual reports of Saudi Arabian Ministry of Health that indicate a need for more attention and further development, alongside the data obtained from the common population using questionnaires. The proposed project ***Integrated Medical Record System (IMRS)*** would improve the functionality of the health sector and make it better and more organized. An integrated central database of all healthcare facilities that contains an integrated comprehensive medical record for health biography of each patient with a primary identifier in the form of a digital identification, that facilitates access to any hospital or medical clinic. The IMRS is a framework that would meet the needs of the population for health services through the efficient management of the necessary resources which would lead in the end to maintain promote and provide this service in a comprehensive and integrated way to the population at a reasonable cost and accessible manner. Without the need to enter data each time or list old medical details or make new tests and examinations and other processes that consume a lot of time, effort and money of both the patient and the doctor and the medical centres. The IMRS would be available to all the health centres in the Kingdom, in the form of a website administered by the Ministry of Health. Health centres could use the website to diagnose person directly based on previous history available and patients would have an advantage of saving time and costs and at the same time avail better services using their smart card or fingerprint. The system would provide a huge data bank for researchers to analyse various trends about prevalent health problems in the country.



Platform for Improving Teacher-Pupil-Parent Communication

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ABSTRACT

Any academic process's success depends on the quality of interaction between many stakeholders such as qualified teachers, motivated pupils and involved parents (See Figure 1). Currently, most public schools in KSA use meetings and workbook as regular channels for parent-teacher communication. However, these channels are limited and time consuming. As technology becomes more and more embedded in our lives, we can overcome the teacher-pupil-parent communication's limitations by using (ICT) and providing a scheduled and communication platform not limited by school hours or location.

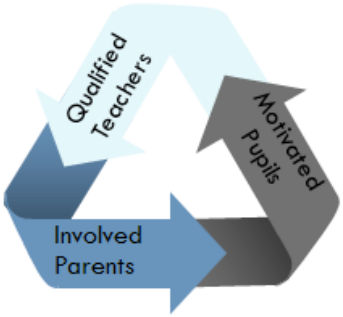


Figure 1 Platform Context

The project is a scheduled platform for public primary Saudi schools that lets teachers, pupils and parents are in one place. Its mission is to improve the pupils' education lives and close the gap between school and home through offering many services. It allows teachers to share the information quickly such as files, links, pictures, assignments, and exams in a timetable format with pupils and their parents. In addition, it provides an efficient way for parents to track their children's class life such as grades, behavior, attendance and participation in the class based on worksheet or through a graphical representation. The platform tackles the following problems:

1- **Inefficient parent-teacher Communication.**
   a) **Paper-Based communication**. In fact, the workbook is the main communication tool between school and home. Sometimes, young pupils may be tear up the papers of workbook or lost it.
   b) **Gender-Based Communication**. In KSA schools, male and female pupils are separated, mother can't go to school and ask about her son and the same for the father who is not allowed to go and ask about his daughter.
   c) **Parents Disabilities**. Parents who have disabilities can't use the standard communication way to assist their children and ask about them.

2- **Inefficient parent-pupil Communication**. Some parents do not use a friendly way to communicate with their children. This attitude may push the pupils, when getting a bad score, to hide it out of fear from the parent reaction.

3- **Inefficient pupil-teacher Communication**. Pupils may face some difficulties to know what they miss when they are absent without any knowledge of the classmates coordinates.

As a result, the platform will fulfill the following objectives: reducing paper-based communication, minimizing teacher-parent meetings, pushing parents to be more involved with their children, preventing pupils from lie about their daily classroom work or academic performance and helping pupils when they are absent to receive accurate information.

Implementation and Testing of E-Tutor for Circuit Analysis Course

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Eng. Uzair Attique

ABSTRACT

The main objective of developing E-Tutor for circuit analysis course is to provide the students a user-friendly software to facilitate their self-learning of course topics covered in the classroom and develop their problem solving and critical thinking skills. It also provides them an opportunity to learn the practical concepts, at their own pace, through simulated lab experiments. It identifies and aids the students to overcome the common mistakes made during problem solving. Some of the core topics covered in E-Tutor are as follow: active and passive circuit elements, series and parallel combinations of resistors, KCL, KVL, mesh analysis, nodal analysis, superposition, Thevenin and Norton theorems, maximum power transfer, etc. The salient features of the E-Tutor for learning and practicing the topics is given below:

1. Integrated media player:

Audio/video files in HD quality using the built-in Media Player can be played in our virtual learning environment. YouTube videos can be streamed without buffering or interruptions. These videos give a comprehensive knowledge from the experts in each topic.

2. Quizzes:

Quizzes are online and embedded with different difficulty levels starting from beginner's level up to the expert level. The quizzes are designed so as to identify user's weaknesses in specific topics. Progress in the quizzes is monitored. Student's overall performance is evaluated every time he/she attempts a complete a quiz. The results are saved in a database and a bar graph can be generated for statistical purposes. A copy of the test results is forwarded to the student and certificates of achievement are issued to qualified students/users.

3. Reference E-Books:

E-books have been provided as a reference for the circuit analysis course. The solution for the end of the chapter odd problems have been given. The students have to solve each problem in a progressive manner to unlock the solutions.

4. Virtual laboratory and experiments:

Experiments are based on MULTISIM and SPICE.to design and implement the resistive circuits. It assists students with designing, prototyping and testing the circuits which they practice in their regular lab sessions. It also explains how to do basic wirings and connections of the circuit elements on the bread board.

5. Online forum

The user gets the opportunity to socialize with other users, friends, students or even the teachers who could assist them with their queries. They could also use this platform to open a discussion and discuss related issues.

While the central focus of this work is on learning, the convenience aspect of this method of delivery has proven to be effective tool for increasing performance as well as enrolment. Such an e-learning approach balances both the theoretical and intuitive aspects of circuit analysis designed to promote active learning by engineering students. The software is currently being updated to enhance the effectiveness of student-to- teacher interaction and include additional circuit analysis topics.

Storing and Sharing Organizational Information Effectively using Existing IT Infrastructure and Open-source Cloud Software

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ABSTRACT

Widespread use of third-party cloud-storage such as Dropbox, OneDrive and the like in the workplace is a huge security risks since the use of such clouds could mean that the organization's most important and often confidential data are being stored and transmitted outside the organization. At national level, it is a potential national-security threat. In terms of bandwidth usage, such sharing of files and online collaborations consume huge corporate Internet bandwidth as data often travels from one country or continent to the other even when the users are sitting side by side in the same location. Many third-party cloud storage offers group-subscription plan which is generally costly as they are based on the number of users in an organization. In this project, we utilize *ownCloud* open source cloud software to develop a private cloud-storage for King Faisal University users (both faculty and students). We aim to utilize existing IT infrastructure of the university, that is, the free hard disk spaces of our lab computers to store user's data. Since ownCloud is also free, we virtually provide file-sharing and collaboration to all KFU users without incurring any extra costs to the university. We envisage that such a cloud-storage solution will not only provide significant cost savings and bandwidth saving to any organization, but it will also contribute to the national security of a country if such a policy is adopted by all organizations in a country. Upon completion of our prototype, we plan to startup an IT Service Company providing customized cloud-storage and online collaboration solutions to companies and organizations in Saudi Arabia and the neighboring region. As part of further development, we aim to explore ways to connect these private cloud-storages together securely when external sharing is inevitable. Such provision will also help any user to share files with other users on leading third-party cloud-storage providers (such as Dropbox, Google Drive and OneDrive).

Keywords: Cloud Computing, Infrastructure As A Service (IaaS), Technology Entrepreneurship

360 Degree Projector

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Supervised by
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ABSTRACT

Nowadays, multimedia content has been evolving rapidly. The change has specifically occurred to both image and video content. It started to include more features of the captured environment for the user to experience. This type of content is described as 360° content. 360° content is recently becoming more popular, especially after the official YouTube support and large creation of the content using GoPro and recently 360° cameras. It is mainly being used in virtual reality applications, giving a personal experience to the user. Moreover, this content can be displayed for people in groups using industry-level projection systems. The problem, however, is the cost of displaying this content is very high or its use is very personal.

In this paper, we will be proposing a minimized, cost-efficient, and socially friendly solution to display this type of content. We will be creating a system that consists of three projection units (as shown in figure #1) that are capable of outputting three separate projections. The outputs are aligned and combined together on the projection surface to give the users an immersive experience of 360° content. The three projection units are combined in a single relatively small device; each consisting of 10.1" transparent LCD Screen, 200W LED light source, 200mm FL Fresnel lenses, and 180mm FL triplet lenses. Installing a wide-angle converting lens to the system expands the field of view of each unit up to 90 to 100 degrees. Furthermore, the system will have a program for splitting and mapping the content to each output, as well as handling image distortion or uneven projection problems.

In order to ensure the stability and feasibility of our system, factors of optical alignment, light control, and ventilation were considered. The LCD, light source, and lenses were positioned as to have their centers perfectly aligned to obtain a proper projection from each unit. Furthermore, to obtain a bright displayed image/video, various light sources were tested and the optimal option was to use a 200W LED source. Finally, as the system will be congested with electronics and powerful light sources, cooling fans and heat sinks were advisable to be used to maintain the temperature of the system and prevent equipment damage.

Our current status of this project is shown in figure #2, where we were able to create a prototype of one of the projector units for testing purposes. Our eventual product we will be a more rigid design that consists of three of these units, providing the massive 360° projections (approximately 300°).

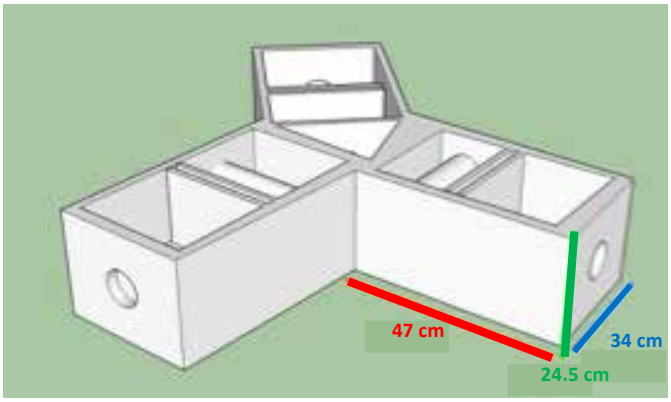


Figure 1: Initial design of the system



Figure 2: One projection unit prototype

IVA: Inspection Vehicle ATARO

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Supervised by
Dr. Detlef Hummes

Sponsored by
Dr. Bernhard Fruth

ABSTRACT

As civilizations grow, the need for reliable energy grows respectively. Power generation plants are the main source for providing large cities with electrical power. Hence, inspection of power plants is essential for a safe and optimal operation of the facilities. Plants age with time and therefore, security assessments are necessary and are even regulated by law. Each power station contains one or more synchronous generators. Synchronous generators has long been one of the most important electromechanical power-conversion devices, playing a key role in the production of electricity. Hence, special attention to these generators' efficiency and safety is required.



The growing attention to ensure the efficiency of power plants has led to the development of many programs for regular inspection and monitoring of such plants. One technique that is commonly used in this effort is to provide manual labor inspection of the synchronous generators every 6 months to ensure a reliable performance against any faults. This manual inspection process costs companies millions of dollars annually and results in a big downtime for power plants which places the loads of electricity generation on other plants. Also, it have been reported in multiple of instances that human labor have forgotten their tools inside of the generator which results in a major safety violation. This problem highlights the need for simple tools to help in monitoring and inspecting the condition of the generators comprising such plants. However, the complex shape of the generator's entrance, along with the very small air gap between the rotor and the stator core (that is 2.5 cm) makes the process of developing such tools very challenging.

After assessing all the information gathered from an extensive literature review, it was presumed that there is no such reliable product in the marketplace till date. This is one of the reasons behind the development of this project. This project was built on the request of an electrical engineering firm, Quartzelec Co. Ltd., in Switzerland as no other suitable solutions were available.

IVA is able to provide visual inspection of the stator surface with the rotor in place cutting down tremendous costs and saving lots of downtime. This is done through using three small endoscopic cameras mounted on board. Moreover, the robot has the ability to move in all directions of gravity using magnetic adhesion to the stator core, has the height of 2 cm, width of 14 cm, and length of 13 cm making it the smallest robotic vehicle created for inspection purposes, adopts to the round shape of the generator along with providing a mechanism to adjust in accord with different generator diameters, bypass the complex entrance of the generator, is light in weight, and has no parts under the risk of falling inside the generator. IVA comes with a convenient user interface where the inspector is able to view all three cameras simultaneously, along with controlling the movement of the robot from the UI. IVA can also be controlled using PlayStation 2 Dual Shock joystick.

IVA design process followed the iterative design approach where the process of prototyping and testing always results in changes. At this stage of the project, IVA is a first of its kind reliable product that can be directly marketed, however there is always a great space of improvement which will be highlighted later in the conference.

Speak to Me: Spatial-Context Aware Glasses for the Blind

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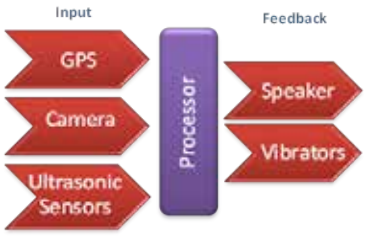
Supervised by
Dr. Adnan ElNasan

ABSTRACT

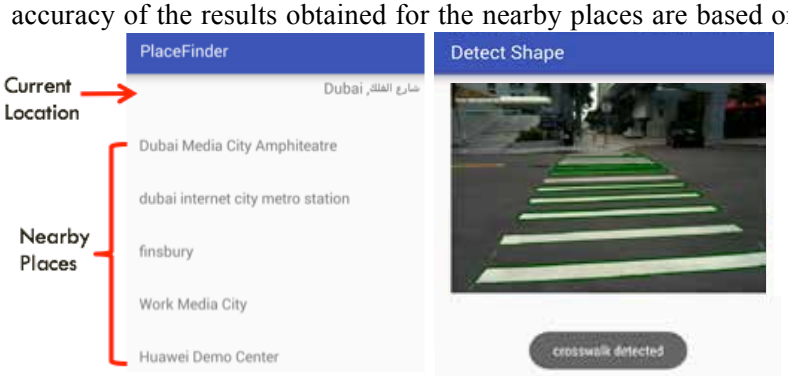
There are over 39 million blind people around the world who struggle to be independent and move around freely especially in unfamiliar places. Many common aids are available, such as the cane and the guide dog; however, over the years more advanced solutions have been developed in order to help the blind be familiar with their immediate surroundings. Such technological solutions vary from simple mobile applications to complicated electronic devices. Although such solutions have a great impact on the life of the blind, they lack the ability to give the user information about their extended surrounding and make them aware of their location. Our proposed solution is the Speak to Me glasses, which are spatial-context aware glasses that aim to help the blind become more independent in outdoor environments by being aware of both their immediate and extended surroundings, as well as being able to move around more safely.



Different functionalities are developed to achieve the purpose of this project; this includes describing personalized points of interest, landmarks, and street names, depending on the user's location through the use of GPS services and available Google APIs. This information will then be provided to the user as audio feedback through only one earpiece in order not to hinder the blind's hearing dependency. The other functionalities add to the safety of the user, and this includes detection of immediate surroundings such as crosswalks, pedestrian traffic lights, etc. These are out of the scope of the GPS services; thus adding more context and accuracy to our device. The detection is implemented through the use of digital image processing algorithms such as image matching and optical character recognition and the feedback through the earpiece. Furthermore, obstacle detection to avoid collisions is implemented using ultrasonic sensors to detect objects at a specific distance and give a feedback to the user using vibrators placed at the end of the sides of the glasses.



The overall product uses a mobile application to benefit from the processing power of the mobile phone as well as a pair of glasses on which the vibrators, earpiece, and ultrasonic sensors are integrated. This implementation helps recycle the devices and services available on the mobile device which decrease the bulkiness of the final design. Generally, the product adds to the well-being and happiness of the blind which was the main motivation behind this project and is more efficient than the available products at a cheaper cost. The accuracy of the results obtained for the nearby places are based on the names provided by Google Places and the GPS receiver on the phone. As for the detection of crosswalks and traffic lights, the developed application returns results that are 80% accurate, depending on the captured images. Finally, for the obstacle detection functionality, the ultrasonic readings are 98% accurate, for which the correct feedback is triggered for obstacles detected on the level of the sensors.



Solar Irradiance Data Logger and Monitoring Station

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Supervised by
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ABSTRACT

With rapid increase in the demand for electricity and the alarming rate of fossil fuel depletion, governments are pursuing new methods to generate electricity, as well as seeking sustainable energy sources, with solar energy having the highest interest in the Middle East.

A 1.5 kW PV system with a battery backup of 8 kWh was previously designed and developed in Ajman University of Science & Technology (figure 1). The load in one of the electrical engineering labs is being partially powered through this green and sustainable energy. Utilizing this PV system, we have designed and implemented a solar irradiance monitoring station which is being used to log and monitor the solar irradiance. A LabVIEW based data acquisition system allows real-time viewing of solar irradiance on a web application as shown in the figure 3. The logged data is stored in an excel format which allows to apply a range of statistical analysis. The data logger also showcases the amount of green and sustainable energy which can be utilized on daily, weekly, and monthly basis.

The second phase of the project consists of designing and implementing a net-metering prototype. The net-metering concept is relatively new in the Middle East region. In the absence of permission from the authorities to experiment directly with the grid, we decided to implement the net-metering on a generator rated 1kVA as a substitute for the grid. The generator also acts as a standalone power generation in the cloudy days or when the battery bank is completely depleted. Net-metering is an essential part of the smart grid and the distributed generation system. It will encourage the users to produce sufficient green energy for their daily needs which reduces the need to produce conventional power through fossil fuels

The monitoring station has the capability to monitor and log everyday solar energy yields form the PV array, power consumed by the loads, battery bank capacity, and various other parameters (figure 3).The database for the solar irradiance can be utilized for scientific research and computations in the city of Ajman. The database acts as a statistical reference resource for up-to-date information on the solar irradiance that can be utilized by the researchers and solar enthusiasts.



Figure 1: PV Array

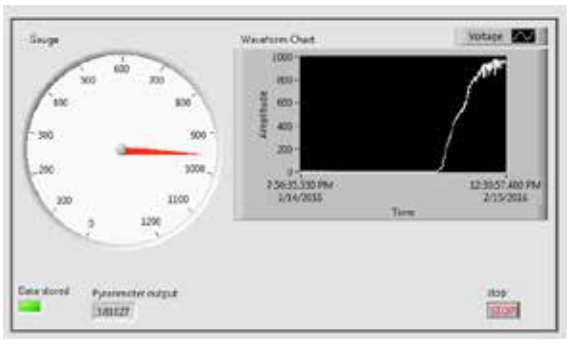


Figure 2: LabVIEW based data logger

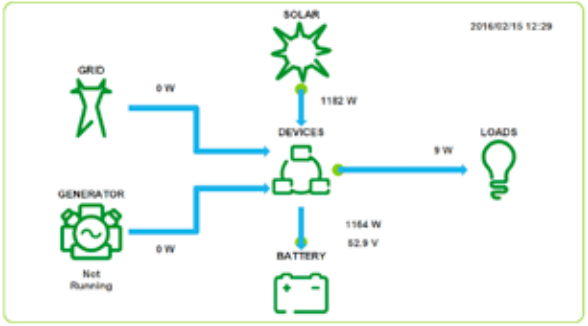


Figure 3: PV System Monitor

Asma'ak: Helpful Application for Deaf Parents

AlHanouf AlSuwailem, Areej AlMohanna, Maha AlDrees
Imam Mohammed bin Saud Islamic University, Riyadh, Saudi Arabia

ABSTRACT



Asma'ak application was initiated after seeing a deaf mother use traditional ways to check about her baby. A question that came to mind was: how does a deaf parent know when his/her baby is crying while they are sleeping? Also, how does a deaf parent care for their baby? After some thought and group discussion on how to make this situation easier for a deaf parent, a feasible idea was generated.

The idea is an Android-based application that uses the built-in mobile microphone to capture the sound levels of a baby and make an analysis – if the sound frequency is found (above the sound threshold) then it sends a signal to the bracelet and makes it vibrate strong enough to awaken them to attend to their baby.

The goal of this application is to help deaf parents to take care for their baby and aims to make life easier for them.

Deaf parents often use traditional ways to be alerted when their baby is crying. One of these ways is for the parent to attach a string between their own wrist and the baby's wrist, during sleep. Any movement will awaken the parent to check on their baby. For deaf parents or parents with little hearing, there are also some devices available to know when their baby is issuing a voice. Some models are very expensive and need charging regularly.
Parents need a lower cost solution that incorporates features for deaf parents to use when they want to be alerted to their baby, also it would be better to use wireless ideas and a frequency levels of sounds analysis techniques. However, using traditional ways by deaf parents to be alerted them can be quite dangerous for both the baby and parents, such as use the cables connecting between devices and use string it brings with it many flaws and other risks.

As a result, the application is a suitable solution because the software used to create the application for Android is easy to use. Furthermore, the hardware (bracelet), is a common unisex accessory that people usually wear every day and it will be affordable, secure, comfortable, and inexpensive. The technology is not dangerous and poses no major health risks for both parent and baby. Furthermore, Bluetooth technology is widely available in modern technologies, and easy to integrate.

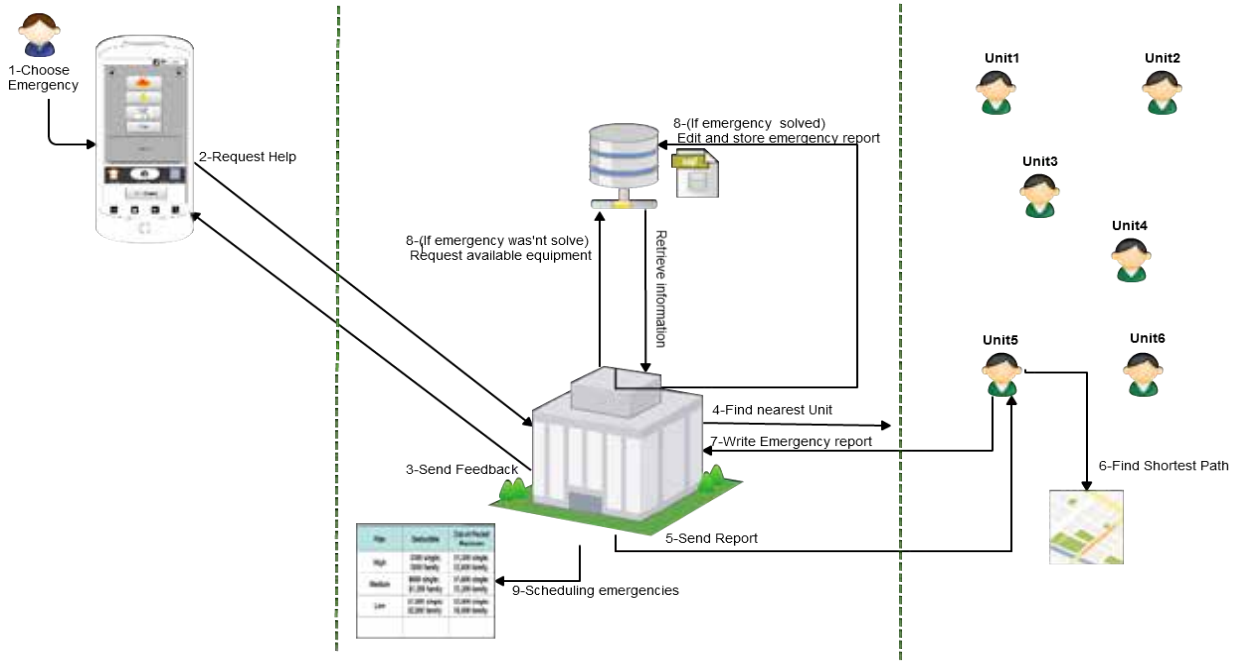
Save Our Souls for Hajj

Hajer Al-Adwani, Ohood Al-Azahrani, Khulood yuossif, Baraah Al-Harthi
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Supervised by
Dr.Saoucene Mahfoudh

ABSTRACT

Millions of pilgrims from all over the world come every year to Mecca to perform hajj. When the pilgrims face an emergency during hajj it may be difficult to contact the civil defense staff due to language differences, also the reporter may do not know the unified Saudi civil defense number. In addition, most of the pilgrims face difficulty in describing their location in the holy places to someone else. On the other side, the civil defense in the holy places have difficulty in finding the reporter's exact location, scheduling the emergencies and having a complete overview of the whole situation. This project proposes save our souls for hajj platform that is called (SOS-H) to solve these problems. SOS-H consists of three parts the user mobile application to enable the users to report an emergency with GPS location, civil defense unit mobile application to guide the civil defense unit supervisor through the shortest path to the user in order to check the credibility and prioritize the emergency and the civil defense center web server to identify the nearest civil defense unit to the emergency and schedule the emergencies. This project would automate the process of reporting emergencies to the civil defense, facilitate the communication between the civil defense and the users and decrease the negative impact of the emergencies.

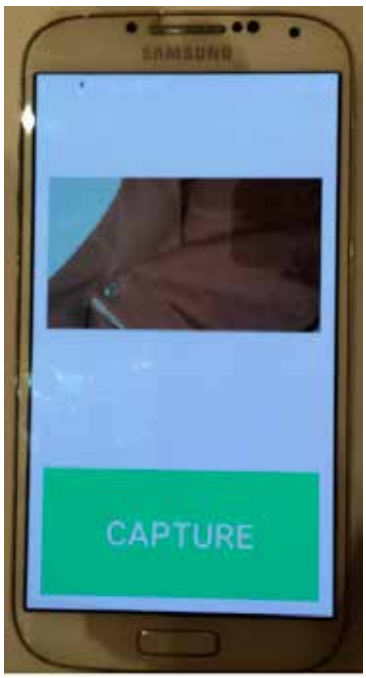


Clothes Eye

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ABSTRACT

Clothes Eye is a Mobile Application that is supposed to recognize clothes with different colors and patterns through apply some feature extraction on the captured image.



Clothes Eye application specialized for visually impaired users. It recognize four categories of patterns (plaid, striped, irregular, and pattern-less) and identifies 11 colors (black, white, grey, red, orange, yellow, green, cyan, blue, purple and pink) with determine the lightness or darkness for every color such as: light red or dark red, light blue or dark blue and so on. It provides a simple interface that contains a button to capture image then it will show the image with the color and pattern result as audio output for users.

Manipulating Android Internal Sensors for Context Aware Applications

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ABSTRACT

Building context-aware intelligent mobile users interfaces (IMU) is one of the active areas of research. An application with an IMU can change its features such as the content, displayed images and font size. This is in addition to the mobile settings. The goal of this project is to develop a mobile context-management tool that can be used to provide mobile context in both raw and usable forms. The tool will provide the following functionalities: 1. The tool allows accessing mobile sensor and mobile features raw data. An example is reading the current system time 2. The tool allows accessing the usable form of the mobile sensor and feature data. For example, the currents system time can be read in the form of: current part of the day (day or night) 3. The tool will adapt to the mobile so that sensors unavailable in a given mobile will be deactivated 4. The tool be provided as an open-source tool to IMU developers wishing to benefit from its functionalities

Smart Phone- based Patient Monitoring System (SPPMS)

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Supervised by
DR. Mohamed Nasor

ABSTRACT



The Smart Phone-based Patient Monitoring System (SPPMS) is a device that improves the quality of life for old people. The system can also help othercategories such as: Patient with chronic heart diseases, athlete practicing outdoor sports, and police officers on duty who work outside.

One of the main objectives of this project is to secure immediate medical help when thereis a serious abnormality in the user vital signs.

The system is comprised of twoparts:Smart Phone Software Application and a Display Watch.

The vital parameters the system measure are, PulseRate and Body Temperature.

The watch contains the following:

1- Sensors (Pulse Sensor and Body temperature sensor)
2- Microcontroller (Arduino Nano)
3- Bluetooth and Battery.



In an abnormal case,the vital parameters values are sent by the watch Bluetooth to the user's smart phone. Then the application on the smart phone will communicate the vital signs immediately to a doctor or emergency service center along with the location GPS coordinates.

The application contains the following screens:

- Screen 1 : logo
- Screen 2 :User name and password
- Screen 3: Bluetooth linklist.
- Screen 4: Admin Password Screen with a pop window to enter the Doctor/emergency service telephone number.

Statistics and Collaborative Knowledge Exchange between Hospitals

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Supervised by
Haifa Alaqel

ABSTRACT

Researchers in hospitals who try to conduct statistics face multiple problems including limited sample size and manual data gathering and manipulation. This process is both time-consuming, and may yield in accurate results due to the limited sample base. To tackle the problem of limited sample space, multiple hospitals must participate. This is challenging because patients' privacy is of paramount importance. Hence, the solution must protect the security and privacy, which every hospital maintain. As a result, researcher must not have direct access to the database of any hospital. Instead, every hospital will be represented by a software agent that acts as a gatekeeper for the hospital's database and, at the same, corresponds with requests coming from all third parties, which could be a researcher or another agent. The solution must also provide continuous updates to the researchers in case the data used was updated. In this project we shed light on getting information and exchanging them by developing a multi-agent system (MAS) in Java Agent Development Environment (JADE) to conduct statistics and use collaborative knowledge exchange to exchange necessary information on behalf of the user for hospitals' researches. To implement the above, Artificial Intelligence (AI) tools such as: MAS, ontology, and semantic search were put into action along with other available smart techniques in order for users to reach optimum usage. Agents should act more like a society to achieve these tasks, they should be able to negotiate and communicate in order to obtain valuable information, therefore the agents will share the same ontology, which allows exchanging meaningful and understandable information for all the parties involved. An agent will represent a user in the system, so the user will have the ability to get specific information from other agents cooperating in the system. The system will be at a high level of professionality by using semantic search for searching for the specified attributes. Collaborative knowledge exchange and multi-agent systems are available in several fields. For example, "The Collaborative knowledge exchange project" (CNE) which is an implementation of a MAS that implements agents to act on behalf of the user and therefore does the required information exchange about a software engineering topic. Another related works are the "Information and Knowledge Exchange in a Multi-Agent System for Stock Trading" (IKNW for MAS for short) and the "Abductive Framework for Information Exchange in Multi-Agent systems" (AFIN in MAS for short). Both proposed a framework for information exchange between abductive agents. The IKNW deals with growth of complexity of stock trading, AFIN in MAS is proposed to create the semantics of a group reasoning activity, where our project goes with hospitals' environment which is considered as a great increment in the search field.

Topological Planning And Design Of Indoor Base Stations Layout Usingcluster Technique

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Supervised by
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Dr. Maysoon F. Abulkhair

ABSTRACT

With rapid growth of mobile data, statistics show that over 70 percent of this data traffic expected to generate in indoor environments, and with the poor indoor coverage, operators of wireless networks are urgently seeking about cost-effective solutions to innovate good indoor coverage with high capacity.

Mobile has become an essential part of our life because people are using their phones, both in their jobs and at home. So, the rapid growth of mobile data and poor indoor coverage, and how these problems will affect the call quality and cause the call drop-outs, noise during a call, and the difficulty of hearing another caller.

LTE Advanced-based Heterogeneous Networks is introduced to improve spectral efficiency per unit area. LTE Advanced-based Heterogeneous Networks use a mix of Macro, Pico, Femtocell and Relay base stations. Heterogeneous networks enable flexible and low cost deployments and provide a uniform broadband experience to users anywhere in the network.

Special people try to solve these problems by adding indoor base stations but other problems appear to them because they are adding them without considering critical constraints such as a number of users, type of base stations, indoor and outdoor interference.

In this study we propose a system using cluster technique to facilitate the process of cell planning, involves locating and configuring infrastructure for mobile networks by modified the original density-based Spatial Clustering of Applications with Noise algorithm DBSCAN. DBSCAN original algorithm has been modified and a new algorithm Clustering Density Base has been proposed by the authors to solve the problem interference in placement of base stations and minimize the path loss and maximum coverage and minimize cost and energy consumed.

Figure 1 shown the high-level design will provide a summary of the whole system and its components. The user scans the building plan. The program gets the points and the coordinates of building and stores it in the database. Then use a modifying DBSCAN cluster algorithm and path loss to find the best place of the base stations.

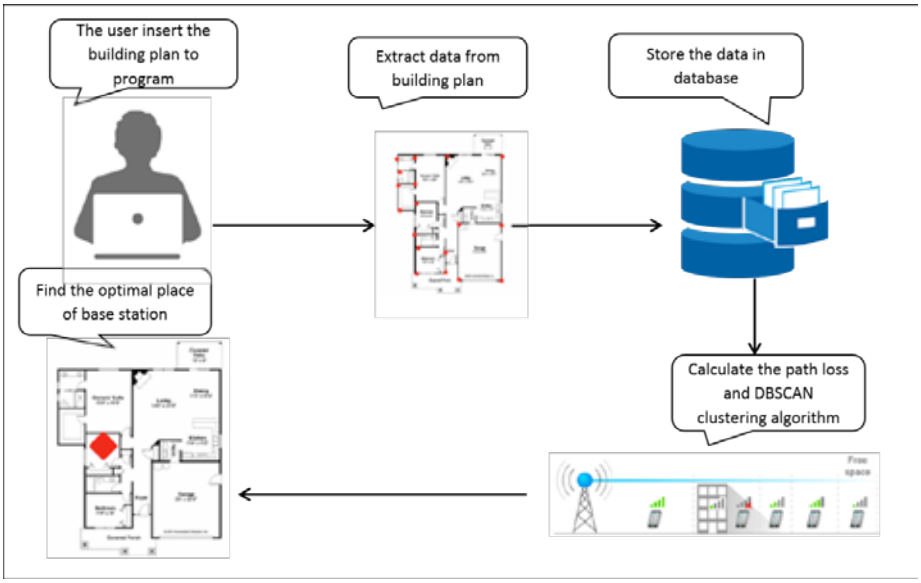


Figure 1: Architectural diagram of the proposed solution

File and Gender Classification Management System

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ABSTRACT

One of the most terrifying things to an average PC user is having a computer that is filled with their messy files. When a user has a computer for any period of time they will definitely know that their folders get disorganized really fast, which can reveal itself in slower performance, and even when the user decides to do a manual organizing, the process will take time and effort. Obviously the files users keep on their computers may differ according to their types, they could be of any general type or image type files. It is possible to have a lot of images in a computer, thinking of a process that does both classifying and organizing can be very helpful, especially when a user has to handle images contain many objects, and wants to classify them according to a certain type of objects which is huma gender in this project.

As a suggestion to solve these problems the idea of this project came to provide some techniques to help the users to make all general type and image type files organized and better yet classified each under certain category according t their types. Considering the process of classifying and organizing, taking a desktop full of variety of documents with many types as an example, the application will start from the desktop as a target folder and tools will be used to organize files according their extensions, each extension will be on a unique sub folder, and if there is still files their extension was not recognized, they will be under sub folder named other, the process continues until each file is in th folder that it belongs to. After that, it will go to the folder that has image extension type and first, by using the digital image processing it will start with processing each image to detect the object on them, to find the images that its object is a human face. And by using some techniques it will identify images according their gender, the images that contain female human face will be in a sub folder named female faces, and any image other than that will remain in the image folder, and the process continues until each image file is in the folder that it belongs to. The workflow of file and gender classification management system is shown in Figure 1.

What distinguishes this research form other researches is that, applications that do classify both any general type file and image type files are rare. And the need of having an application that do them both can make the task of organizir and classifying easier and more efficient. This project suggests an application that combines the classification proces of both types of files, in an only one application, in addition to the direct editing in the computer's files, which preve duplicated files.

What will be used in this project is, we will train a HAAR object detection classifier for the process of detecting the face in images along with classifying the gender after that, for the good rate of accuracy it shows.

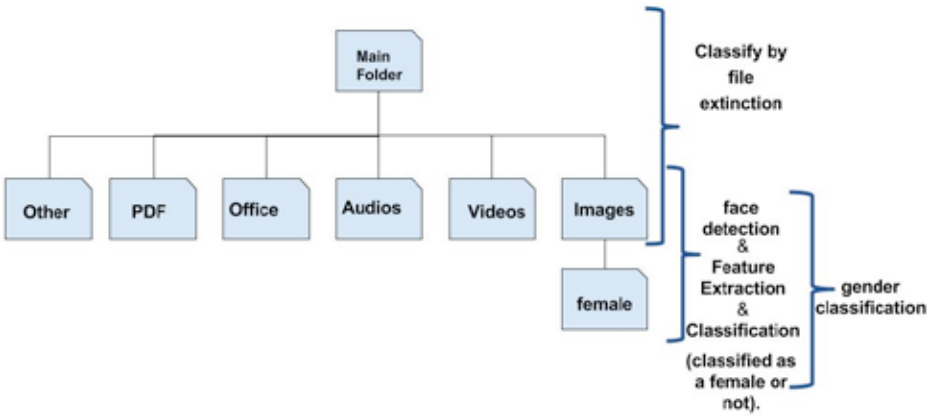


Figure 1: File And Gender Classification Management System

Biometric Keystroke Authentication

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Supervised by
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ABSTRACT

As the dependence on computers and computer networks has been increasing, the need for authentication has increased. Many technologies exist for authentication such as using passwords, smart cards, and biometric. Biometric authentication methods rely on common biological characteristics such as fingerprints, hand geometry, earlobe geometry, retina and iris patterns, voice waves, Keystroke Dynamics KD, DNA and signatures.

In this project, we focus on biometric authentication by using KD. The first appearance of KD was through the so-called "fist the sender" in World War II by military intelligence to find out who sent Morse code [1] [2] [3]. A KD detects a key action of a user on the keyboard and provides timing information details about exactly when each key was pressed and released as the user is typing on a computer keyboard. Additionally, this biometric does not need for special equipment [2] [3]. KD systems work in two different modes: identification mode (training) and verification mode (testing). Identification is the process of attempting to know the person's identity through analyzing a biometric pattern calculated from the person's biometric features. A person's identity is checked in the verification mode. [4]. Keystroke verification techniques divide into two approaches: static and dynamic (continuous). Static verification approaches analyze keystroke verification attributes only at particular times giving extra security than the traditional username/password, for instance through the user login. Dynamic verification, on conflicting, displays the user's typing behavior throughout the progression of the interaction [4]. It implies that even after a fruitful login. Verification phase is decision process in which the system chooses whether the feature extracted from the given typing pattern of password matches with the template of the requested person. In order to give an unequivocal answer of access acceptance or rejection.

Feature extraction is the process of transforming the biometric data to feature vector, which can be utilized for classification. Di-graphs are feature, which are the time latencies between two following keystrokes. It is divided in two types: Dwell Time (DT) and Flight Time (FT). DT is the length of time when you press on the key [2].

In this project, we are using Manhattan distance with standard deviation [5] as key factor. In order to perform user authentication. The analysis of our proposed method reveals it to be more reliable and effective for the authentication process. The software implement the proposed solution using java language, and MySQL.

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Vo802.11: Free Voice Communications over WLAN on Campus of the College of Computer and Information Sciences

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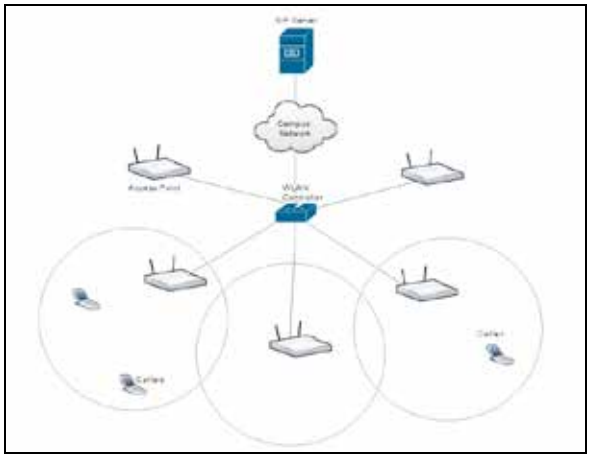
ABSTRACT

Voice over Wireless Local Area Network (VoWLAN) offers significant benefits of providing wirelessly voice applications for universities, hospitals and enterprises. Instead of using traditional intercom system that lacks mobility and the cost will increase according to the number of users and it is a challenge to add a new connection. The primary benefits of the proposed Vo802.11 Project solutions are cost savings, increasing productivity and wirelessly accessing employees anywhere which will enhance the mobility very well, adding new connection simple and smooth even not require any additionally cost. The two technologies of VoWLAN are Wireless Local Area Network (WLAN) and Voice over Internet Protocol (VoIP).VoWLAN requires more than just a WLAN; it needs an Internet Service Provider (ISP) to access the Internet [1, 2]. The proposed Vo802.11 Project aims to provide a facility for making free voice calls with large coverage area. This project will enhance the use of WLAN as a medium for voice transmission instead of a medium for Internet access. The project will only use WLAN technology without the need of an internet service provider. Using free bands of WLAN will provide no cost internal communications in addition to the benefits of VoWLAN. Vo802.11 Project will be applied on a campus of Al-Imam Muhammad ibn Saud Islamic University. This environment is highly mobile with instructors and students moving along classrooms and offices. Communications that the project will offer include voice communications between instructors, which involve voice calls and voice recording messages, and voice storage messages or text messages between students and instructors. The project will offer tremendous benefits by enabling instructors to stay in touch from anywhere on campus. A challenge of deploying this project on the campus of the College of Computer and Information Sciences is that coverage must include a wide area. Therefore, the project needs to extend WLAN by including several Access Points (APs) to ensure the coverage of the area on campus.

Table 1

Technology	References	Free voice calls	Mobility	Message storage	Large coverage
VoIP	[10], [11], [12], [13]	No	High	Yes	Yes
VoWLAN	[14], [15], [16], [17], [18]	No	High	Yes	Yes
Voice Transmission over LAN Using Bluetooth	[19]	Yes	Low	No	No
Voice Call Communication over Wi-Fi	[3], [1], [20], [21]	Yes	Low	Yes	No

Table 1 shows how different references are categorized under various network technologies and also summarizes the comparison between these technologies according to their different features. Note that there is no technology that provides all four features: free voice calls over an unlicensed band, mobility, message storage for unreachable users and large area coverage. Therefore, the proposed project Vo802.11will use WLAN, as a medium for communications within the campus, as there is no need for an Internet access for these communications. In this manner, we would eliminate the cost of VoWLAN. Also, using only one network technology, WLAN, would guarantee higher QoS, such as low delay, high throughput and low packet loss, than the technologies that are using the Internet. However, the challenges for this solution are providing mobility and campus coverage.



Network Campus Coverage Area Deployment

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Measurement of Greenhous Gases in UAE using Low Cost Unmanned Aerial Vehicle (UAV)

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ABSTRACT

The Greenhouse effect is caused by the function of greenhouse gases in the atmosphere, which is absorbing and emitting radiation within the thermal infrared range, this natural effect is contributing to the survival of life on earth by trapping and absorbing the heat of the sun to keep the earth temperature normal. According to the ministry of energy in United Arab Emirates, UAE released 199.65 million tons of Carbon dioxide and other greenhouse gases (GHG) in the year 2013. Primary greenhouse gases include carbon dioxide (CO_2), methane (NH_4), nitrous oxide (N_2O), water vapor (H_2O), and ozone (O_3), each gas has its normal concentration in the atmosphere that will keep the greenhouse effect at normal levels. Human activities such as use of fossil fuels has increased the amount of greenhouse gases in the atmosphere, this causes the greenhouse effect to trap and absorb more heat on the earth causing what known as the global warming which cause lots of changes in our system like Climatic phenomena. It has been estimated that if greenhouse gas emissions continue at the present rate, Earth's surface temperature could exceed historical values as early as 2047, which will have harmful effects on ecosystems, and biodiversity. Carbon dioxide and methane are the most emitted gases from human activities so in order to decrease the effect of global warming we should monitor and restrict the emissions of gases from human activities.

Measurement data of GHG concentration are available in western countries using high technologies (Highly Instrumented Aircraft) which are relatively expensive. For most of the countries in the Middle East like the United Arab Emirates, which is known for its efforts in renewable energy and eco-friendly projects, a full set of accurate data which indicate the temporal and spatial variations of GHG concentration all over the country at different heights is still needed and required to be developed. The aim of the present work is to provide the ability to measure GHG on heights reaching up to 2000 meter using intelligent and low cost system. The design and implementation of the system will be carried out with commercial, but yet accurate sensors and other technologies to get accurate reading in any area independent of its nature.

To achieve the previous requirements, a special unmanned aerial vehicle (UAV) that will have the ability to reach the required height is going to be used. This will make measuring and monitoring GHG concentration easier. The choice of the hardware components depends on the requirements like speed, flight duration and thrust. Also in this stage the transmitter will be configured with the speed controllers. The first stage to the code of the flight controller is done using the Arduino microcontroller, an IMU sensor library, and PID controller algorithm to generate the required code for this project. The second stage is then carried out by testing the PID controller and calibration for PID gains for proper and smooth response.

In order to be able to continuously measure gases concentration on the required heights, we will make use of accurate gas sensors which can be easily integrated with the Arduino microcontroller to measure different gases concentrations at different heights. In addition, parameters like temperature, humidity, and pressure at that height will also be measured and recorded for additional sophisticated calculations. One of the most important features of the present system that all measurements will be recorded directly in a storage device unit (SD card) and will be accessed for research and monitoring purposes.

The obtained results are significant as we believe that our proposed system is an important one for environmental monitoring in UAE. The advances in wireless, microcontrollers, and sensing technologies will open a wide

A System for Detecting the Negative Interaction between Medications

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Supervised by
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ABSTRACT

Detection of *Drug-Drug Interaction* (DDI) is an important task for both patient safety and efficient healthcare management. DDI makes the drug less effective, causes unexpected side effects or increase the action of a specific drug. The number of combinations of drugs is huge which makes dealing with all possible pairs of drugs almost impossible. Therefore, developing a healthcare technology system can be very helpful to discover the DDI, This project proposes an application that helps the patient and doctor to detect the negative interaction between medications.

This project presents the comparison of different supervised classification techniques which already showed good results in the medical diagnostics and other fields using *Waikato Environment for Knowledge Analysis* (WEKA) ,WEKA is a comprehensive suite of Java class libraries that implement many state-of-the-art machine learning/data mining algorithms. It is freely available on the World-Wide Web and accompanies a new text on data mining, which documents and fully explains all the algorithms it contains.

The aim of this project is to investigate the performance and accuracy of different classification method for a set of large data.The data used is Twosides database by Tatonetti Lab at Colombia University Medical Center. This database is a resource of polypharmacy side effects for pairs of drugs. It contains 868,221 significant associations between 59,220 pairs of drugs and 1301 adverse events, .A non-interact drugs and interaction risk rating added in this database to improve the performance.

The data will be used to test and justify the differences between the classification methods or algorithms, Therefore the classification technique that has the potential significantly improve the percentage of correctly classified instances will be used in our application.

Cancer Biomarker Rule Discovery

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Supervised by
Dr. Halah AlShamlan

ABSTRACT

Technology nowadays is dramatically evolving and greatly contributing in healthcare industries for early diagnosis. Early detection of cancer has a huge impact on the percentage of the patient's survival chances. Since it can stop cancer from spreading over the body and destroying the important parts of the human body that would cause permanent damage, and eventually death.

This project aims to develop a Cancer Biomarker Rule Discovery tool to generate meaningful rules from biological dataset, especially for cancer diagnoses. The importance of cancer biomarker rule discovery field arise when biologists struggled from Blackbox algorithm, which is when an algorithm concludes an output without providing any reasons or justifications. Rule Discovery process will prevent such an ambiguity by discovering the dominant attributes produced that output.

However, the biological dataset needs to be prepared, since it originally suffers from noise, redundancy and high dimensionality; that is when a small sample is defined by thousands of genes. The solution of such problems is applying normalization to the dataset, which removes the redundancy and cleans noisy data.

In addition, gene selection will reduce the high dimensionality by selecting only the needed and informative genes; Several methods for Genetic Selection has been implemented, they vary in the performance and the accuracy of the result. The system provides three main Selection Algorithms, are Filtered, Wrapper, and hybrid that combines both of filtered and wrapper in order to extract the rule.

Moreover, the project will support each process with visualization to represent the resulted data in an readable format that is easy for non-technical people to understand. This will dramatically decrease the probability of diagnosis mistakes that could cause fatal problems for the patient health. Finally, all results of the processes can be exported if needed for future observation.

The system will be implemented using Artificial Intelligence and Data Mining Algorithm.

Internet of Things: Automation and Acquisition through GPRS

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ABSTRACT

As the new trends of technology are becoming more advance, the things that have surrounded us are becoming more smart as well. Controlling and monitoring these smart objects "Things" will give us a better approach to comprehend and control these things. However, this project concentrates on controlling and monitoring smart object using internet of things (IoT) through GPRS (General Packet Radio Service).GSM (Global System for Mobile) covers a wide geographical area and it can provide GPRS cellular internet network, so by using the GPRS internet network this project can build communication with the smart objects in any place that has mobile cellular network coverage with a low cost and small bandwidth which leads to a lower energy consumption. Eventually, as an example of practicing this idea of internet of things it could be used as smart link for the remote areas that has only cellular network coverage.

To address this issue, we use a web application or a website in order for the user to control and monitor the "things" in which the user is connected to. As it is shown in figure 1, the user can control and monitor the objects through a direct TCP/IP end to end connection. For this project a MSISDN (SIM Card) with a static IP is used so that the user can connect to the devices whenever is needed.

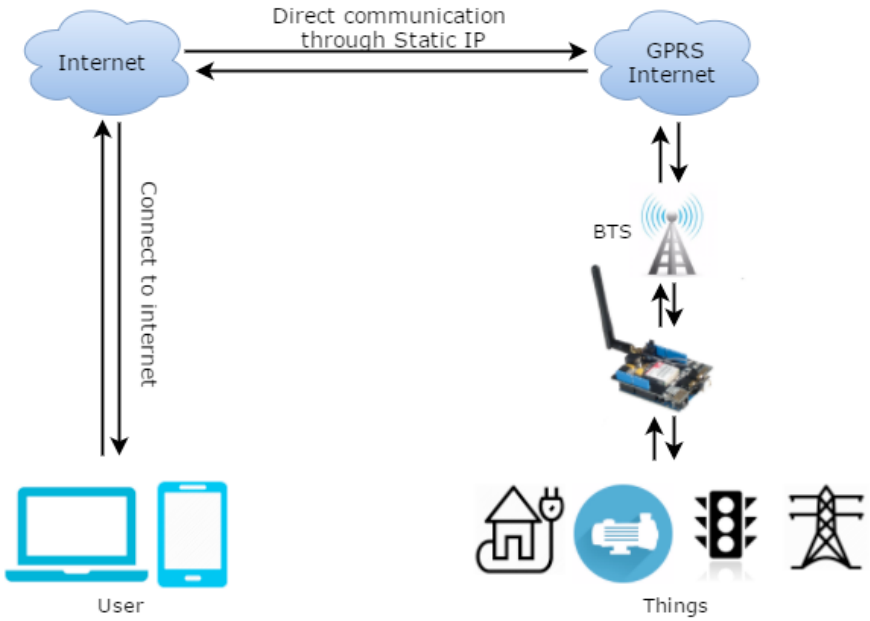


Figure 1 the System Design

In the above system, a micro-controller (Arduino), GSM/GPRS modem, relays and devices are being used as the hardware part and for the software PHP and HTML are used in order to design the website to communicate with the micro-controller.

The advantages of this system is that it is available in many places around the region and it is easy to be implemented in the areas of cost and time. Having such a system in those places which other internet services such as 3G and the internet are not available will help humans to remotely monitor and control the devices. This system can be used in many applications such as agriculture, weather, dams, home automation, medical and many others which are related to controlling and monitoring.

IoT Application: Smart parking monitoring Case

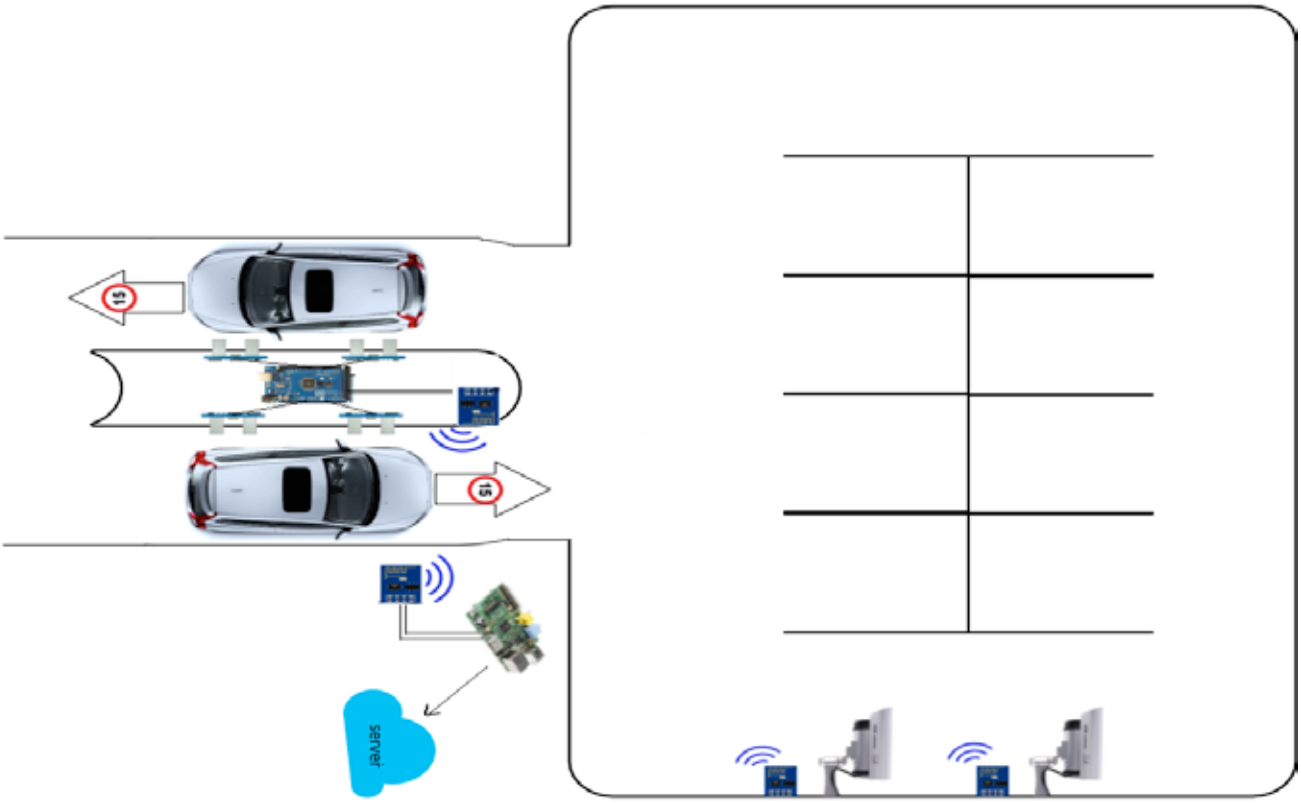
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ABSTRACT

Recently, shopping complexes have started providing services more than just selling and buying. Customers can use banking services, post offices, food courts, cinemas, children's play areas, and so on. Therefore, providing sufficient parking for visitors is one of the main problems in developing shopping complexes (Fishbein and Ajzen, 1975). To address this issue, I present the design and development of a smart car parking monitoring to overcome the problem of counting entering cars or exiting cars, and finding a free place.

In this project the idea of internet of things have been used with the garage gate and camera as things which is the major trend in today's world. The aim of this project is to propose an applicable solution to the problem of counting cars which entered or exited from a garage, and finding a free place to park cars with using cheapest sensors, easy way, and robust algorithm. Basically, this project is divided into two main parts. The first part, consists of counting the cars that are entering or leaving the parking area by using the ultrasonic sensors. In this case, when a car comes or leaves the parking the sensors detect it and send the information to a server through wireless communication. The second part, is to detect or recognize the free car spaces that has been taken from a car inside the parking by using image processing techniques. The techniques that will be used in this part are:

1. Image Enhancement
2. Image Segmentation
3. Object Detection and Recognition



Unmanned Aerial Vehicle (UAV) Target Following and Auto Landing System

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ABSTRACT

One of the biggest challenges facing unmanned aerial vehicles (UAVs) today is landing safely without human control. The ability to make precision landings is important for designing aircrafts that can inspect small targets, do some mechanical job while flying or that need to re-fuel automatically. UAVs normally will rely on GPS systems for movement and to set the flight course. However, UAVs that operates in urban or claustrophobic areas and needs to autonomously land on a specific location or targets must have an image processing system for efficient and fast flying and landing The purpose of this project is to design and implement an integrated navigation system for a target following and auto-landing quadcopter. The system should enable the quadcopter to autonomously hold a position, fly through a fixed course, take pictures, and land on a marked fixed or moving location. There are four final goals of this project: navigate through a specific area following a preset course, take pictures, locate the marked target and land on a marked target.

Our project objectives can be summarized in the project objective tree shown in fig.1. The most important aspects of this project is the program to control the flight course of the quadcopter using images taken from the external camera and then processing those images to determine the location of the target. The flow chart shown in fig.2 shows the steps we will take to write the code, which will send information to flight controller so that the last one can control the movement of the quadcopter.

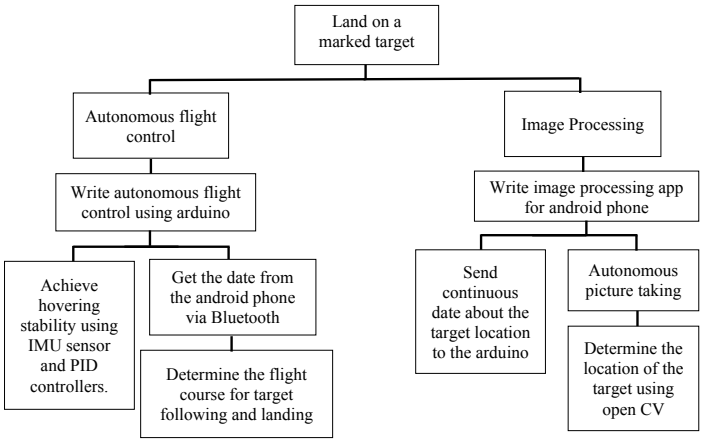


Fig. 1The project tree objectives

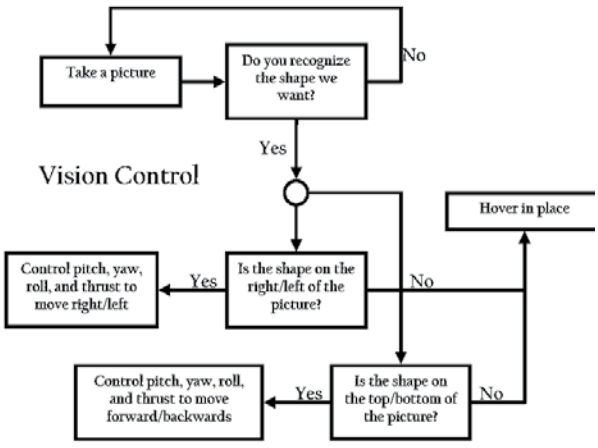


Fig. 2 The program flowchart

To implement the project, the flight controller code written with an IMU sensor library and PID controller code to generate the required code for this project. The camera and image processing algorithm were achieved using Python, which will recognize an object and determine the quadcopter's relative location to that object. For Modeling and configuration purposes the hardware components were selected to match the transmitter-receiver configuration and microprocessor systems. Intensive tests will be carried out to ensure the accuracy and reliability of the proposed system.

Quadriplegic Patient Help System

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Supervised by
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Dr. Heyfa Ammar

ABSTRACT

Quadriplegia occurs when the neck area of the spinal cord is injured. The severity of the injury and the place it occurs determine the amount of function a person will maintain. The quadriplegics face challenges to use the technology such as smartphones, tablets or computers and they are in risk of being socially isolated. Fortunately, the evolution of the technology opened doors for people with disabilities to allow them to communicate and interact with the world around them. Many efforts were invested to help quadriplegics use technology. For instance, QuadStick is a device designed to give quadriplegics the ability to play video games without the need for a traditional gaming controller [1]. One drawback of the quadstick is that the patient is asked to make a lot of effort to move the mouse. That is, he has to puff more than one time. To overcome this limitation, our rationale is to exploit brain signals to allow quadriplegics penitent or anyone who have disabilities in using their hands the chance of using a smartphone. The patient just making some easy facial expression like smiling then the system will recognize the brain waves of this facial expression. The Quadriplegic Patient Help (QPH) system is our suggested solution and is mainly composed of two parts. In the first part, an electroencephalography (EEG) cap is used in order to analyze the electrical activity of the brain signals and recognize the facial expression. The second part is an android application that should be installed in the patient's smartphone. The aim of this mobile application is to receive the facial expression from the first part and interprets it as a function to be executed. The application includes five main functions in the home interface as shown in Figure 1. The first function is the emergency call that allows the patient to ask for help from a predefined person number. The second one is the message function, in which the patient can view his messages and write a new message with special keyboard, the patient navigate between letters vertically by looking right, to move right and looking left to move left and smile to select the required column. Then horizontally by winking left to move up and winking right to move down, also smile to select the required letter. The third function is the call function and helps the patient to call any number from his contacts or enter a new number by using special keypad similar to the keyboard. The fourth function is the alarm function that enables the patient to set alarm using the special keypad. The fifth function allows the user to feel comfortable with our system because it gives the user the chance to choose the preferred facial expression to perform each command. The most important aspect of our system is that it is designed in such a way it can be easily extended to include additional functionalities. Quadriplegic Patient Help (QPH) system developers hope to help the quadriplegic patient and any patient with hand disabilities and facilitate their life in order to use their smartphone.



Figure 1 Home interface of the QPH System



Figure 2: Special Keyboard to write "H" in a message

Reference:

1. "Quadstrick" [Available Online]. http://ww.quadstick.com.

Wireless System for Water Quality Monitoring and Control in Aquaponic Systems

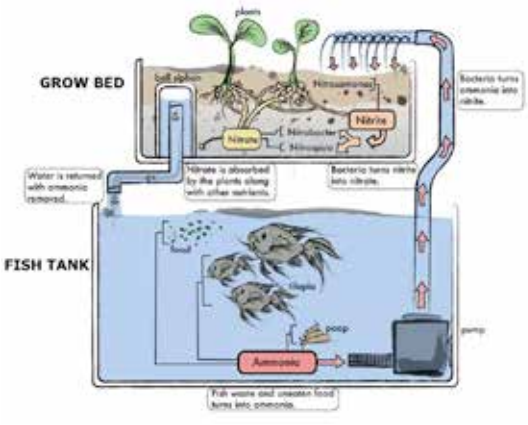
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ABSTRACT

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

The aim of the present project is to design and implement an efficient wireless system which can be used to monitor and control water quality in aquaponics systems and to collect the water quality data in real time environment with a cost effective solution. In normal aquaculture, the animals' wastes being raised can accumulate in the water, increasing toxicity. The aquaponics system, shown in fig.1, is an engineering solution of the problem where the water from an aquaculture system is fed to a hydroponic system where animal wastes are by the plants as nutrients and the clean water is then recirculated back to the aquaculture system.

AQUAPONICS BASIC DIAGRAM



Our prototype system consists of three parts, the sensors, the wireless system, and the monitoring and control unit. The water quality is continuously measured by the sensors, like PH sensor and dissolved oxygen sensor, which are inserted inside the aquaculture system. The measured data are wirelessly transmitted using the wireless system to the monitoring and control unit. If the readings of the sensors are coming out of the allowable range, control signals are transmitted from the monitoring and control unit to start the filtration processes by feeding the to the hydroponic system which acts as bio filter to clean the water and recirculate it back to the aquaculture system. Other processes, like oxygenation process, are also taking place based on the other sensor readings. The previously described cycle will continue automatically with the advantage of saving of power and energy, as the filtration and/or oxygenation processes are only taking place whenever they are required without

No Limit

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ABSTRACT

The recent development of video games and entertainment technology usually concerned with normal people, while special needs people are neglected. For example, kids with Down syndrome have a few applications. Those applications just focus on improving one of their cognitive skills and they don't improve their motor skills.

Our suggested solution is to design an educational Xbox video game with Kinect camera to improve the motor and cognitive skills of the Down syndrome kids. The key elements of the current project are a supervisor (parent/specialist), Down syndrome kid, database system, Xbox and Kinect camera.

Figure1 shows the high-level architectural diagram of the proposed solution. The supervisor can login with his account. Then, he can choose one of the children in the list either to play or to see his progress. The Kinect camera detects the kid's movement through the kid's interaction with the game. Additionally, it sends the progress information into the database system. The user has the ability to see the progress of the kid and send the progress report by email. Our proposed system can be used in the special needs centers or at home.

Once the child enters the game he would find two categories of games. The first category improving the children cognitive skills through colors and shapes matching game. While the other category improving their motor skills by asking them to start moving while trying to avoid dangerous things such as flames or knives. Figure 2 shows a sample of our proposed game.

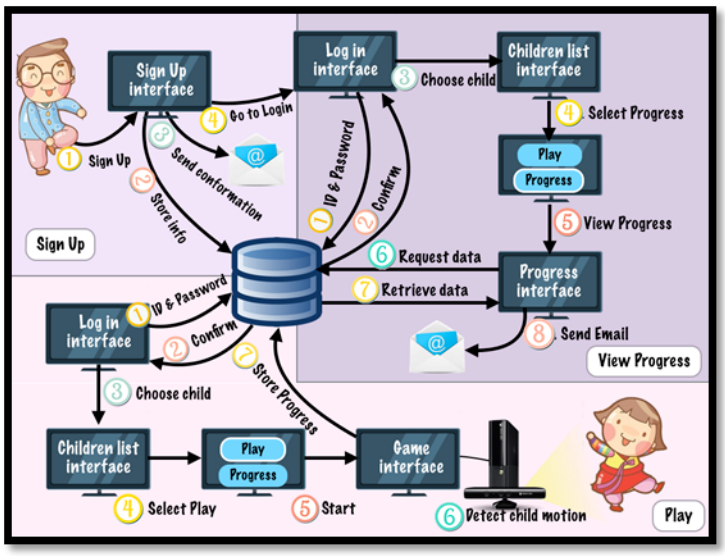


Figure 2: Architectural diagram of the proposed solution.



Figure 1: Game interfaces.

We performed a most of our project phases starting with a very carefully data gathering phase including studying about Down syndrome children training plane obtained from special needs centers. The other data gathering techniques including interviews and questionnaire with specialists, children parents and Down syndrome children. We also performed a moke up with the proposed design to measure the children level of acceptance for it and it was really good. Then we finished the design phase and currently we going through the implantation phase and we hope to show it sooner.

Controlling Various of Applications using Hand Gesture Recognition (Media Players in this Case)

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ABSTRACT

Human Computer Interaction is one of the most crucial areas in computer industry that has a lot of demands on. As we all know, most of the times especially in times that is spent on entertaining, it is not an easy way to approach computers in a direct way. This means, when normal users are trying to watch a movie, playing music, controlling their robot or playing virtual reality games they need a certain distance to do the mentioned activities. For this reason, Image processing techniques can be used to overcome this problem and recognize the gestures of human body to control the computer without enhancing any hardware device to the body. Despite of normal users, the people with disabilities can also get advantage of this project as well and it helps them to perform their activities on the computers much faster. Simply, this project concentrate on the new technology in HCI world called computer vision (CV) which can be achieved through Image Processing algorithms and techniques. The big idea here is; using image processing techniques to detect and recognize different hand gestures that can be used to control a variety of applications. The project consists of two major parts, one is an efficient algorithm that works on the base of image processing techniques and make machines understand/interpret different hand gesture images. Besides, the second part of the project, is to monitor and control the applications based on the output of the interpreted gestures. The whole project is integrated into one interface that facilitate the user to interact with the application and changing parameter based on the application of interest. The idea of this project is different from the previous projects, because it is majorly concentrate on monitoring and controlling media players, since they are used by most of the people on daily basis. For instance, if somebody watching a movie or playing a music and wants to interact with the Media player from a certain distance, then this project can fulfil this gap and solve the problem since it does not require users to hold any hardware devices. Technically talking, a certain algorithm has been used to detect and recognize the hand gestures. At the first stage, we followed the standard algorithm of image processing which is (Image Acquisition, Image Pre-Processing, Image-Segmentation, Morphological Analysis, Skin Color Detection, Hand and thumbs recognition) consequently with major modification in most of the phases. A great algorithm has been chosen for skin-color detection and classification which should work in different lighting and climate conditions. When the skin color detected then the number of the fingers and the direction of the hand should be calculated to make the computer understand the gestures. A great algorithm for process has been chosen which is called Convex Hull Algorithm. The aim of this project is to detect and recognize different hand gestures in different conditions and all the parameters should be set automatically by the software itself. Finally, we can control many applications through the classified and recognized gestures such as (Robots, Video games, Cursor movement, controlling software, safety applications (driving), Writing purpose etc.). Besides, for this project only five different gestures will be detected and recognized since we are concentrating only on Media player manipulation as a demo.

Personal Al-Hajj E-Guide

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ABSTRACT

Our graduate project is Personal Al-Hajj E-guide . It will help pilgrims to complete their Hajj without any errors. It is an Android based a guiding application for pilgrims to access all information about hajj rituals and steps. This application will give location to pilgrims through Geographic Positioning System (GPS) .

There are Many applications working in this filed such as Al Hajj Guide, Interactive Guide for Hajj and Umrah Rituals ,etc providing guide on hajj rituals, information on prayers, tracking their Hajj/Umrah progress but these applications don't inform about errors or wrong location.

Personal Al hajj E-guide will give alert feature that will inform pilgrim if he is in the wrong place, information about counting of numbers of circling times of Al Kabaa and times of running between Safa and Marwa. It will allow to send and receive messages from Alhajj ministry too.

The objectives of this project are as follows: To save pilgrims from being lost or miss any rituals . To provide notification on counts for running between Safa and Marwa circling the Kaba. To facilitate communication between Al-Hajj ministry and piligrims. To implement an android mobile application to guide pilgrims.

To create a database of rituals and prayers for pligrimages.
We work together to produce this app stated by study it and the implementation

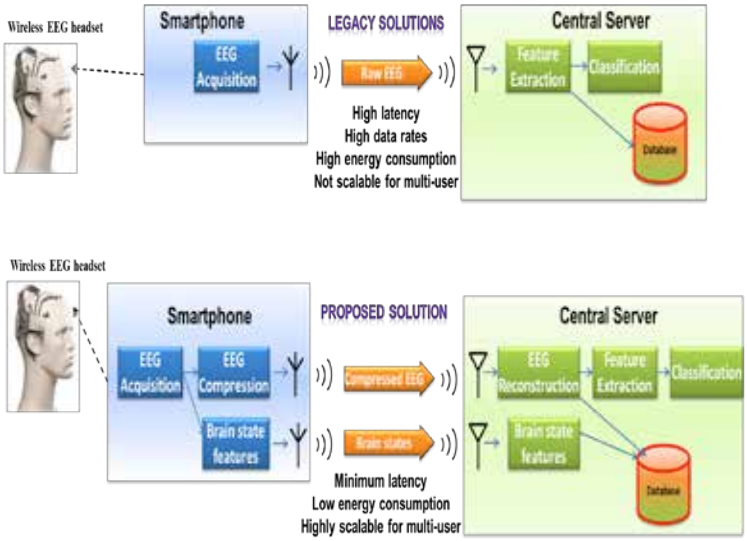
Scalable Realtime Monitoring System for Medical and Brain Computer Interface Applications

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ABSTRACT

Healthcare is a top national interest worldwide because of its importance in promoting human development, and the well-being of countries' citizens. The rising number of Chronic Disease (CD) patients poses great challenges for governments and public sectors, which motivates them to welcome, adopt, and support the development of increasingly innovative healthcare approaches and initiatives. As a result, Qatar's national health sector plans to shift the balance towards a preventive, community-based model of healthcare, focusing on the patient and ensuring access to the right care, at the right time, in the right setting, by the right team of experts. Therefore, traditional healthcare cannot provide the scalability needed to cope with the increasing number of elderly and CD patients as it requires one-to-one relationships between the caregiver and the patient, especially in Qatar, which is one of the fastest growing communities worldwide.



Wireless sensing devices such as electroencephalogram (EEG) EMotiv, provide efficient wearable (non-intrusive) platform for brain data acquisition, which opens the door for several applications related to adverse event detection or brain computer interface applications. However, such devices have limited processing capabilities and battery power that pose technical challenges to program and use for continuous patient monitoring and adverse event detection. In addition, legacy solutions using EEG typically sample brain signals at high sampling rate (300-500 samples/sec/channel), which prohibits the scalability of such vital signals in large applications.

In this project, we aim to develop a scalable mHealth system for effective, remote, and realtime patient monitoring and adverse event detection as shown in the figure. The system leverages sensor and smartphone technologies for *delay-sensitive* applications, targeting elderly and people with severe movement disabilities. The architecture supports multi-user EEG signal acquisition, scalable data processing and delivery to a central server, in addition to detection of patient generated as well as adverse non-intentional events. The proposed platform will provide efficient tool for elderly and people with mobility impairments, adopting a holistic data processing and optimized delivery framework for efficient monitoring and delay-sensitive applications. The proposed architecture will have a number of technical and strategic benefits, which is expected to provide technological advancements towards personal healthcare, where patients play an important role in their own treatment.

Electronic Web for Insurance Industry

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Supervised by
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ABSTRACT

With the advent of the Internet, the World-Wide-Web are replacing conventional system in our society and become the connection medium for the networked world. This evolution in the internet and information technology has also a strong influence of financial services sectors and especially the insurance industry, which would add many advantages for both insurers and consumers. Therefore, we decide to take the advantages of such technology and apply it in our country Oman. Actually, we are planning to develop a web application, which should facilitate the insurance process for both insurers and consumers. This electronic application, which is titled Electronic Web for Insurance Industry (EWIN), is an online web-based system. EWIN is an electronic system, which is used to control, manage, and facilitate the process of insurance marketing among companies and customers. One of the main advantages of the developed system is demonstrating different insurance companies in Oman by providing their services for customers online. In addition, EWIN allows customers to make fast comparison between all companies depending on their prices, ranks, and other features. Moreover, it gives customers the ability of knowing companies' services, companies' details including location, branches, rank, customers' feedback, and prices. Also, EWIN has a unique benefit that provides customers with the recent offers automatically by sending a frequent notification for them. EWIN system is also consisting from a list of tools, which is responsible to provide services for customer such as financial calculator and companies' dictionary. Nevertheless, to reach a degree of automatic processing by EWIN system, Data Mining mechanism will be adopted in its infrastructure, which is used to guide customer and help them to choose the suitable insurance company. EWIN will be developed with one database, which is built within web applications employing Apache Web Server, MySQL, Java Server Pages, and NetBeans.

Glaza: Stereoscopic Telepresence

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ABSTRACT

Telepresence is a widely used technique to interact with the international nature of our world: more people seek the ability to be in a different location without having to physically move. Over the years, the technology to achieve telepresence has constantly been evolving, from simple video conferencing techniques to the use of sophisticated robotics. However, current techniques are not able to capture a full telepresence experience: either due to the limitations of two-dimensional imagery or the incredibly high cost of dedicated devices.

The introduction of stereoscopic viewers such as google cardboard, which turn smartphones into stereoscopic headsets, presented a new low cost opportunity for consumer telepresence. This project describes a telepresence device capable of tracking the head movement of the user, and providing an immersive stereoscopic experience using a google cardboard headset.

The solution we discuss consists of having two main entities: a headset containing a smartphone, and a camera-mounted telepresence device. Both devices are connected wirelessly. The smartphone will be used to send gyroscope coordinates to the telepresence device, and those coordinates will be used to control the motors that direct the cameras, and a video stream provided by two cameras is combined and sent back to the display screen of the smartphone, as shown in figure 1.

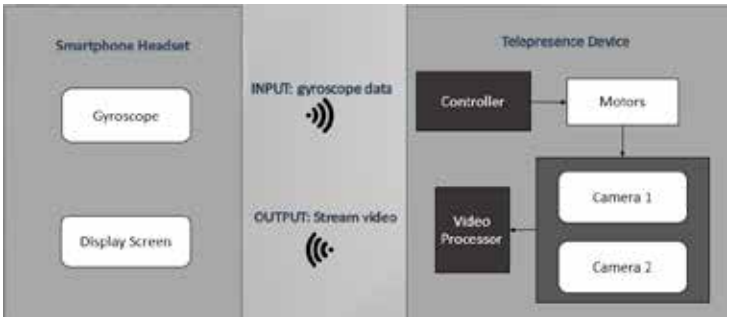


Figure 1: Glaza System Block Diagram

A similar project was created by Jonas Lauener, a student from the institute for 4D-Technologies (i4Ds) of the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) School of Engineering, under the name of Intuitive Rift Explorer (IRE). The IRE is a mobile telepresence device that uses a joystick to move on wheels, and an Oculus Rift virtual reality headset to interface with a pair of cameras on a gimbal to provide stereoscopic vision. The IRE in contrast to our project is a much more expensive build and can only be used at a short range, as it uses wireless HDMI and Bluetooth for its transmission mediums, whereas our project is operated over the internet. Furthermore, the user is expected to own both the IRE and the Oculus Rift headset, where in our case the user only needs a smartphone with the Glaza being handled by another entity [1].

Our Telepresence device, entitled Glaza, which means “eyes” in Russian, will be designed to be stationary, small, and compact. It will use a raspberry pi as a controller, 2 servo motors to provide 2 degrees of freedom (pitch and yaw) with an angle range starting from 0 to 180 degrees, and 2 camera modules connected to the pi to provide a live video stream with the necessary depth information for a stereoscopic vision. Figure 2 shows a simple representation of our proposed device, and the components that would be used in it.



Figure 2: Glaza components

Our project will grant accessibility to people who cannot be at a certain location due to physical constraints and it will contribute to the growing internet of things (IoT) movement. By applying it in the tourism sector, it would give people a stereoscopic view from top of Burj Khalifa or Mount Everest, at any time, and potentially reduce the risks of travelling to dangerous locations for the sights. The low barrier of entry, presented by the stereoscopic headsets, will allow Glaza to become widely accessible to the public at a low cost. People can easily purchase a google cardboard headset or even build one on their own. By downloading an application on their smartphones, they can connect to a stationary Glaza telepresence device in a preferred location, and book a timeslot to start a personal virtual tour.

[1]J. Lauener, "IRE | JoLau", *Jolau.ch*, 2014. [Online]. Available: http://www.jolau.ch/category/ire/. [Accessed: 21- Mar- 2016].

Emergency Evacuation System

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Supervised by
Prof. Lamiaa Fattouh Ibrahim Dr. Maysoon

ABSTRACT

Over years, emergencies have a lot of problem which leads to death. The most important problem encounter every emergency evacuation is a scrambling of people in one place and they go out through one exit during evacuation.

This system plans to find a safe evacuation plan to save user's life. It designed to work with two types of emergencies, in case of fire or floods disaster. It is a mobile application to guide users during emergency situation. It developed for android mobile devices and working in KAU –King Abdul-Aziz University- in Faculty of Computing and Information Technology building, Girls section.

The system starts when admin know there is an emergency situation. Admin will send an alert message to all users and specify whether there is unsafe exit. Users will request a safe exit from the system by sending their current location using IPS -Indoor Positioning System-. DBSCAN original algorithm has been modified and a new algorithm Clustering Density Base has been proposed by the authors to solve the problem of finding group of users. The number of students in each cluster will be equal the minimum of the following two parameters the capacity of exit gate and capacity of escalator. The system used scheduler algorithm and short path to scheduler each group to avoid scrambling of users. Finally, the system notifies the safe exit for each user based on those algorithms.

The notification of safe exit will be differing depends on emergency cases: In case of fire all users must go out of the building, and in case of floods all users must go to the high stage in the building to avoid flood risks.

Figure 1shown the high-level design will provide a summary of the whole system and its components. At the end, the system developed to have an efficient evacuation plan to minimize the percentage of scramble dangerous and save user's life.

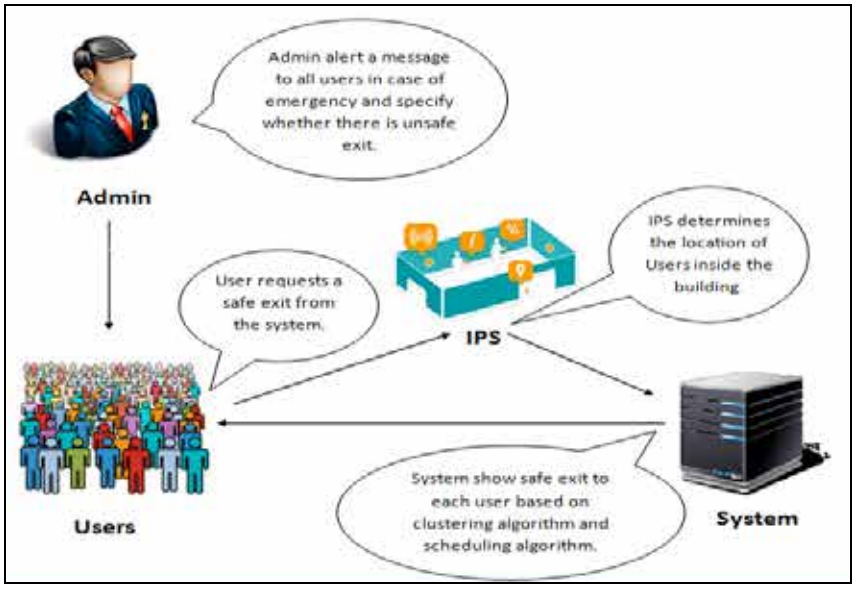


Figure 1: Architectural diagram of the proposed solution

Conceptual Structured browser of the deep web through handheld devices

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Supervised by
Dr. Ali Jaoua

ABSTRACT

The project involves designing and implementing a structured browser that deals with Arabic and English web search results with a suitable interface for small screens. It should minimize the number of clicks for the users by reading website snippets and providing a browsing tree of relevant words, where users can navigate easily to reach their target. Hence, the user is able to postpone clicking on URL links until finding the suitable word the most related to his/her query. Moreover, users should take advantage of the browsing tree automatically built into the targeted system that helps in displaying the results to fit on small screens with a suitable interface for Android phones. The system dynamically intercepts URLs as search results of an initial query submitted to Google, it also uses conceptual clustering and labeling methods for dynamically building a browsing tree of words among which the user may select relevant URLs. Since the time for structuring the results is critical, the browser should provide the results within the minimum waiting time possible while preserving accuracy to maintain decent efficiency. The application will focus on the top 24 results to make the retrieving process faster, as user will not wait more than 3 seconds to get results. The current system might be updated to support a large number of natural languages, with minor additional development cost.

Acknowledgment: This abstract was achieved in the scope of a granted project from the Qatar National Research Fund (Member of Qatar Foundation) through National Priority Research Program (NPRP) 7-794-1-145: The statements made herein are solely the responsibility of the authors.

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Student Activities System

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ABSTRACT

Most of Bahrain government school they use a manual system using papers and files to save school activates. This project involves the development of an Activities Management System for Umm Ayman public school – Ministry of Education, Kingdom of Bahrain because there were problems in managing the school activities between teachers, students and administrator staff. The aim of this project is to figure out some good solutions to make the job easier for them to achieve efficient time management and decision making. The proposed solution provides database system that store teachers, student and administration staff data and allow them to use the system for the registration of activities, to perform needed calculations, editing information and also finalize information in a report.

The proposed solution will be implemented using Apache Web Server, MySQL, and PHP. The system will allow the work to be more effective between all the students, employees and administration it will keep and maintain the data record in a safe manner. The system has an easy and accessible graphical interface as shown in Figure-1 that allows the users to browse through their profile, choosing activities, editing activities, add personal information for employees and students, calculate number of students registered in each activities and generate final reports.

The developed system will be implemented with the following features:

Students: will choose the activities they want through the system and he can choose two activities in two different days.

Teachers: will confirm the students and the system will help them to know how many students are registered in each activities from that he will know if he can add or switch them to the suitable place.

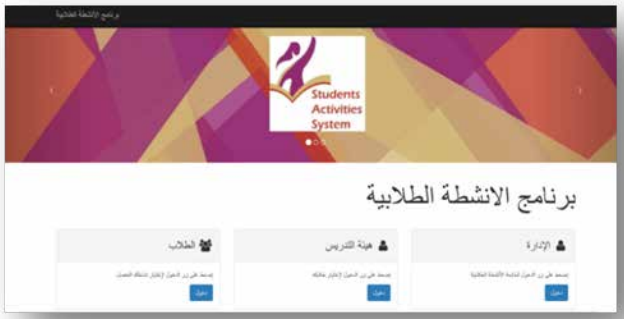


Figure 1

Administration: the system will calculate the final numbers of the students in each activity and will import a report for Ministry Of Education and make sure all the students that need to attend are involve, The system also will import report for (TMSS exams, National exams, tuitions in math and Arabic subject) if they are registered in these activities they will be blocked automatically depend on school requirement.

This system has been developed to the understanding of the idea behind following up Task Management System. As a result of good analysis and design, the developers tried to implement the most significant modules to assurance that the system will fit into any school's requirements. The modules that were applied in the system are two students' module and the teacher module.

Future work tasks will be providing communication channel between students and teachers, between admin and teachers by email, providing timetable for each student to show them the place and time, send recovery password by SMS.

FHD EZ-Inventory System for Ministry of Education in Kingdom of Bahrain

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Supervised by
Dr Minimol Job

ABSTRACT

The project FHD EZ-Inventory system is developed for Ministry of Education, Kingdom of Bahrain with smart technology which save time and row material, it work with RFID environment and focus to save record to RFID Tags with meaning full information about the inventory items in the Ministry of Education offices that the Tag is attached to each item. The system was built to manage, track and inventory items such as PCs, Printer etc. As a pilot phase the system is developed for IT department of Ministry of Education but it can work in other department in future. The developed system has full helping website to do the full function as like Create, Read, Update and Delete. The IT department and Finance department in Ministry of Education, Kingdom of Bahrain working in traditional way by registering the devices' names and the user names of the devices on paper each department was provided with a hard copy of this report. This manual process make a big waste of time and in other hand it will lead to confusing sometime by searching in folder, at the same time there are few old devices need to replace like computer or printer it will take same cycle but in backward way with using a paper again here the user will need more time for waiting for the new PC or any other new device because he or she need wait tell other department take away their PC which need some time two to three weeks, it is big ministry which had around 25,000 employees and this traditional type of work it will waste more and more time from department supplier and user.

The developer take a decision to change the traditional work and work with future needs and save the money and environment at the same time, the best way found is to use the bar code which mean the developer will try to use it as a support for the RFID tag in some cases because RFID tag can be damage some time so we will use the barcode, which was attached together like as shown in figure 1



Figure-1

RFID Tag with BarCode*

The features of both are the easy way to enter the device data and save it share it and search it in other way the easy way to find how many devices available in the store or how many devices available in each department and what it is type like this example As you can see the waste cart counted by system in easy way and updated by handheld unit if it is need to repair or replace, (here they use GPS attachment unit for location) so if each department work like this way they will short the period for waiting to replace the old devices or get new devices which leads to save time and save papers. By using RFID and Bar code technology it will be easy to know quantity of devices in store and out of store in fast searching system which use database to store their data, the ministry will be able to hit the future needs and keep everything smart and managed.

FHD EZ-Inventory system, is a system focus in inventory of items in the ministry of interior to control the bandwidth for it which one in and which one out the system will help for that purpose, as I, the developer work in ministry of education and a lot of devices are going out from the IT department with traditional registration on paper for the client name and is location it will be waste of time and row material and complex management, in this system we aim to solve all those issue and keep easy way to track the devices. By adding some extra feature like a RFID tag with BarCode* we will make it easier to work with it in some location. Many tangible things in myr project such as the barcode* and barcode* readers and in other hand we will use extra RFID tags to make complete solution for the inventory, in other hand we will use databases to hold items data which it will divided to many category for RFID and connected with Barcode* for safety of data loose in future, each technology work similar to other one but with more and less feature than the other one.

A Reconfigurable Connected Health Platform Using Zynq SoC

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ABSTRACT

The demand for medical attention and remote monitoring of elderly is increasing, since around one third of the population aged over 65 years old falls each year. The risk of fall increases proportionally with age due to some diseases, heart problems, or medications causing dizziness and step imbalance, or poor lighting environments, and slippery floors [2]. Other groups require special attention, such as diabetics who could faint because of low blood glucose, spinal muscular atrophy patients and neurological patients, who suffer from imprecise movement, and cardiovascular patients who can have heart attacks and collapses. Some suggested solutions like vision based falling detection used Omni cameras to detect falling events as in [3], while others deploy surveillance systems as in [4]. Another technique is using ambience based devices and sensing through vibrating data [5]. Last approach is using wearable devices like in [6] which uses tri-axial devices with machine learning based classifiers. Moreover, there has been research efforts to accelerate algorithms on hardware, such as implementation on heterogeneous computing platforms as deployed in [7]. Our proposed system aims to develop a reconfigurable connected health platform using Zynq System on Chip (SoC), in order to be used either indoors, or in ambulances to equip them with health monitoring technologies. This wireless system will deploy Bluetooth connectivity to establish communication between SoC prototyping board equipped with the Zynq device such as Zedbaord or MyRio, and a Shimmer wearable sensor that will acquire both acceleration and ECG signals. The system goes through several stages: data acquisition using the Shimmer sensing device, data processing and analysis that is going to be implemented on the Zynq platform, and the last stage is alerting and sending the encoded medical report to the doctor in case of a risk. The report includes time, position, strength, and location of the fall. Moreover, data processing and analysis is performed through the machine learning K-nearest neighbor algorithm (KNN) for fall detection. This algorithm is implemented on the Zynq on the programmable logic (PL) part, with other algorithms responsible for the ECG analysis and processing can be implemented using the processing system (PS) on the board using a hardware software co-design approach. If an abnormality is detected, then the monitoring platform will notify the doctor by sending an email via Wi-Fi consisting of the medical report about the information of the fall, and the ECG signals. Consequently, the medical care can take action to reduce any fall or heart related risks that may occur. The proposed system environment is illustrated in figure 1.

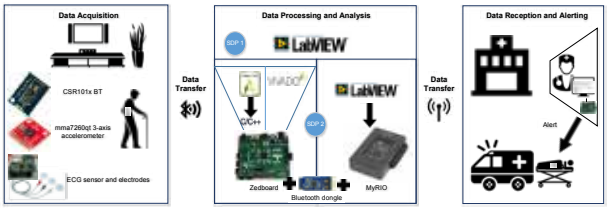


Figure 1 System High Level Architecture

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Conversation Technology via Low-cost Voice-to-Text over IP: VToIP

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Abstract -- In a world of rapid technology development, where smartphones, tablets and computers became a part of our daily life, voice calls service provided by the Voice over IP or (VoIP) becomes a highly costed technique. In addition, most voice chat applications are using VoIP, which is considered costing, unreliable and relatively slow. VoIP is a service that allows users to make phone calls using any broadband internet connection instead of using the phone analogue landline. VoIP requires high-speed internet connection, like, cable, wireless, broadband and DSL. This is how VoIP was defined by the Federal Communications Commission (FCC) [1]. On the other hand, there is now a global orientation towards making VoIP a paid service. Making VoIP a paid service is due to the huge losses of the world's communication and phone companies because of the availability of VoIP services[2] [3] [4]. As per the news, Morocco has banned the VoIP services [5]. Bearing these reasons in mind, we thought of creating a new technology to support VoIP for two reasons. First, improving the services oriented provided by VoIP. Second, reduce the cost of highly needed of VoIP for data communication. In this paper we propose conversation technology via low-cost voice-to-text over IP or (VToIP). The communication method of VToIP is developed to reduce the cost of voice calls using VoIP. VToIP is a technology used to translate the conversation data from voice-to-text, in the sender side, and then from text-to-voice in the receiver side. By doing that, we are able to communicate the voice data as cost-efficient of text data. By communicating the voice data as a text data, VToIP was able to reduce the communication overhead in many ways. First, it will be able to reduce consumed bandwidth between the end users. Second, VToIP will be able to improve the reliability of data communication between the end users by adapting TCP for text communication instead of UDP in voice stream. In addition, the conversation data between the end users can be increased by reducing the amount of communicated data. In addition, VToIP technology will help to implement many friendly used applications, especially for those special needs people. An application that implements VToIP is relatively small in size and does not require huge memory resources, as those in original VoIP applications.
An Android chat application was designed. This chat application is considered to be one of a kind that it takes voice as input and turns it into text and sends the text over the internet. On the receiver side the text received is read using a Text-to-Speech utility. This chat application has a main goal that is to reduce the costs. The Chat application supports that the user says his/her message and it will automatically convert it to text and send it. Also, when the user receives a message the application will present it as voice so the user hears it and then he/she are prompted to say his/her reply.

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Interactive and Immersive Lectures using Virtual Reality

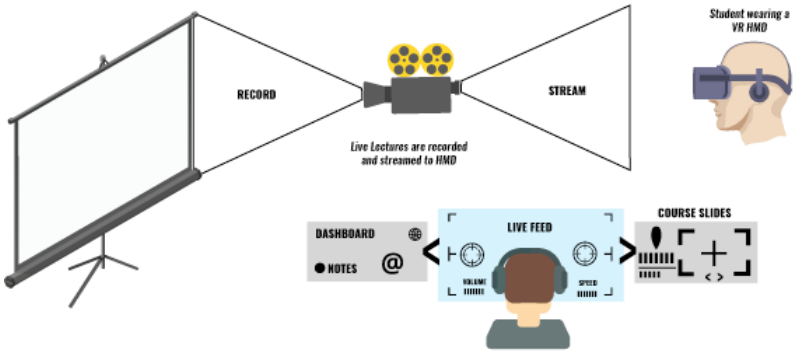
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Supervised by
Misbhauddin Mohammed

ABSTRACT

In the current education system, we expect that the comprehension level of the students in a classroom is the same. But in reality, this is not the case. There are many factors that may affect the comprehension of lectures in the classroom including class size, visibility of the whiteboard, student's level of concentration, student's level of comprehension to name a few. Educators are constantly striving to provide technology rich solutions to enhance student's learning experience in the classroom. One in-class technology that has added the aspect of interactivity inside classrooms is clicker systems. Teachers are able to get immediate feedback using clickers inside the classrooms and tune their lectures and customize them to the learning capabilities of the class. Although this is a significant improvement over the traditional manner of offering courses, clickers are still a very naïve way to assess student's comprehension.

Our main aim is to find a better way to offer the best education experience for students using the latest innovative solutions in technology. In this project, we plan to create a Virtual Reality (VR) Application that enhances the learning experience of students who face difficulties in the classroom. VR has evolved since its conceptualization in the 1960s. We are in an era where immersive VR technology that gives the perception of being present in a non-physical world. With new devices being developed for VR that are more usable, a number of domains have started developing applications using this technology. VR solutions are currently in development stage for architecture, design of automotive, big data visualization and management and education. Virtual Reality in education is not a novel idea. Two years ago, a school in Czech Republic launched the World of Comenius application that used VR with skeletal hand tracking technology and allowed students to participate in virtual biology and anatomy lessons. A number of research works in the past two years have studied the usability, applicability and adaptability of using VR in education.



Our solution to the above-mentioned problems is to create a Virtual Reality application that makes learning immersive, interactive and narrative offering high motivation to students. The solution setup involves setting up cameras in the classroom to capture the whiteboard. Visuals from the whiteboard augmented with the course material uploaded by the instructor are compiled together to create a virtual space for the students. Students can interact with the learning objects in the virtual space enhancing their overall learning experience. Students will be able to adjust the speed of a live lecture for better comprehension and pause it to make voice notes. The recall feature for the application is intended to allow students to revisit their lecture and listen to their voice notes during the revision process. The application is developed for Oculus Rift with a joystick controller that will allow the students to interact in the virtual space.

Utilizing ERP System in a Higher Education Institution: A Case in the UAE

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ABSTRACT

The potential adoption of Enterprise Resource Planning (ERP), a system that integrates functional and cross-functional business process of an organization is increasing in different sectors. Its use has evolved in economic sectors as well as higher education institutions (HEIs), but few studies about ERP were conducted in the United Arab Emirates' (UAE) universities. This case study focuses on one university in the UAE. The methodology used in the study is qualitative method with using three semi-structured interviews instrument that were conducted with managers of university's few departments. The data collected will be used to 1) provide baseline data on the use of ERP system for educational organizations; and 2) highlight administrators' perceptions of the advantages and challenges an ERP system may present. The analysis of the empirical data will allow the researcher to investigate the following research questions: 1) How do administrators in this HEI narrate their perceptions of the potential limitations and strengths of using ERP? 2) Do these perceptions align with the operational advantages and difficulties that an ERP may present to universities? The study highlights the lack of integration and use of ERP system in the various departments in universities. The initial findings suggest that the interviewed employees do understand the benefits of using ERP, but few believe that it is preferable to implement the ERP system in the university. However, based on the other participants' answers, the university does not need an ERP system. Furthermore, answers indicate that financial constraint represents a massive barrier toward implementing ERP system in the university administration. Insights gained from this research may benefit other universities when deciding whether to implement ERP system or not. Future research should explore the differences between governmental and private universities' utilization of ERP systems.

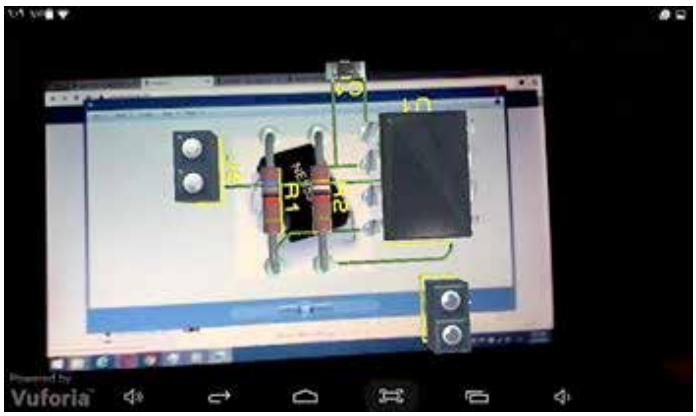
PseudoEye : Interactive Mobile Technician Assistant using Augmented Reality

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Supervised by
Dr. Eman Yaser Daraghmi

ABSTRACT

In this paper, PseudoEye, an interactive technician assistant application for Android platform is presented. This application meets the highest standards and provides the most rewarding environments for users seeking technical assistant when using electronic components, such as timer, microcontroller, etc. PseduoEye provides important functionalities in order to answer two main questions, what is the description about any electronic component and how to wire that electronic component in a complete electronic circuit. All the functionalities of PseduoEye will be provided via Augmented Reality. Augmented Reality (AR) is a live, direct or indirect, view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data.



The assistant process starts with the “camera capture mode” from the smart phone device camera. The live pictures frames (i.e. scene) are analyzed in real-time to detect and track well-known markers. These markers must correspond to high-contrast planar objects, and are thus assumed to be static. The image detection process is accomplished with Qualcomm’s Vuforia SDK, which delivers the distance and 3D orientation of the image marker. The target orientation and posture are further used by the AR layer to overlay 3D virtual objects that merge seamlessly with the scene in the camera capture mode. The software implementation was modular, based on an object-oriented software architecture. The mobile App was implemented in the sony smart phone with the official Vuforia SDK (Software Development Kit).

PseduoEye App combines several features including: image-based visual search, 3D AR technician assistant. The image-based visual search recognizes the objects (i.e. electronic pieces, such as microcontrollers, timers, etc.) by a camera and displays information about the recognized objects. In other words, it shows description about the recognized electronic object. The 3D AR technician assistant function shows how the electronic piece object detected by a camera can be wired in a complete electronic circuit. The detected object is used by the AR sdk to overlay 3D virtual electronic circuit that merge seamlessly with the scene in the camera. Moreover, “clickable” or “touchable” property, provided also by the technician function, was implemented as it allows for visual interaction with any electronic pieces appear in the electronic circuit, and used for information retrieval. The 3D object data can be downloadable, this makes the system portable and easily reconfigurable, as the 3D data is obtained on the fly. PseduoEye was tested in Palestine Technical University as one of the assistant technologies in electronic classes to be used later in an intelligent class environment.

Knock-Knock System

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Supervised by
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ABSTRACT

Necessity is the mother of invention. Traditionally, when a guest comes to your house, she rings the gate bell and waits your response. Then you might speak to her through the intercom, or coming to meet her personally. However, most of the time people are outside of their houses. This causes a coming guest to wait a long time until you come back home, or she most often loses meeting you. Additionally, Parents may forget the state of their house gate, when they hurry out work. Child protection and security is another problem that parents care about in their absence because children may attempt to get out from the house. This may expose them to an accident, kidnapping or get lost. Also sometimes a member of your family might need to enter your house in your absence.

In this project we developed the "Knock-Knock" system. By which a house owner can remotely interact with a coming guest who rings the gate bell. This interaction means that the owner can speak and see the coming guest. Additionally our system will enable the house owner to control the gate. The house owner can then let the guests enter the house that he wants and to check the gate state.

In our system the house's gate is supplied with camera, speaker, microphone and a bell. The bell activates these system components once it is ringed. A web server in the house enables the owner of the house to remotely login to the system and uses all of its functionalities. Checking the gate state and Controlling it will be through a micro-controller that gets its order from the house server.

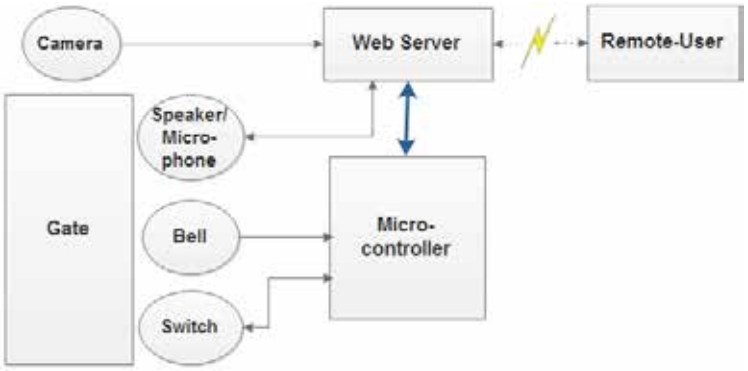


Figure1: System Block diagram

The block diagram in Figure 1 illustrates the system components: The guest rings the bell what causes the system to activate the camera and captures a photo for her which will be saved with the time and date. After that a messages will be sent to the Remote-User's device. Who in turn can log in to the application. Hence he can see the guest live, speak to her and may allow the her to enter the house. This system allows the house owner to use it any time he wants, for example to check the gate state if it is opened or closed. In addition, to give commands to open/close it. Also the user may review the taken photos for previous guests and so he may know all the coming guests during a specific day.

QU-Digital Slide Scanner

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ABSTRACT

Digital slide scanners are automatically controlled scanning microscopes which are used to efficiently study and analyze tissues and cells, as they transform tissue slides into whole-slide images (WSIs). They are used by scientists and pathologists in the developed world for research that involves tissue samples which can help in discovering new medications for several diseases and epidemics. Moreover, pathologists are able to diagnose tumors, infections and viruses using the results of analysis of large multi-gigapixel digitized images produced by the scanners. However, digital slide scanners are extremely expensive as the scanning process must be precise and accurate since critical decision may be made by pathologists and scientists based on the scanning results. At present, tissue samples from Hamad Medical Corporation (HMC) are being scanned outside the country. This project aims to build an automatic scanning microscope - the QU digital slide scanner. The QU slide scanner will have an automatic moveable stage that is controlled via computer. The stage will be controlled in such a way that it is moving in identical consecutive steps. At each step an image will be captured for a part of the slide until the whole slide is scanned. Then a full image of the slide will be constructed from the images that have been captured previously. The full scanning process will be completed in a timely manner in order to produce an accurate image of that slide that can be analyzed easily by pathologists and scientists.

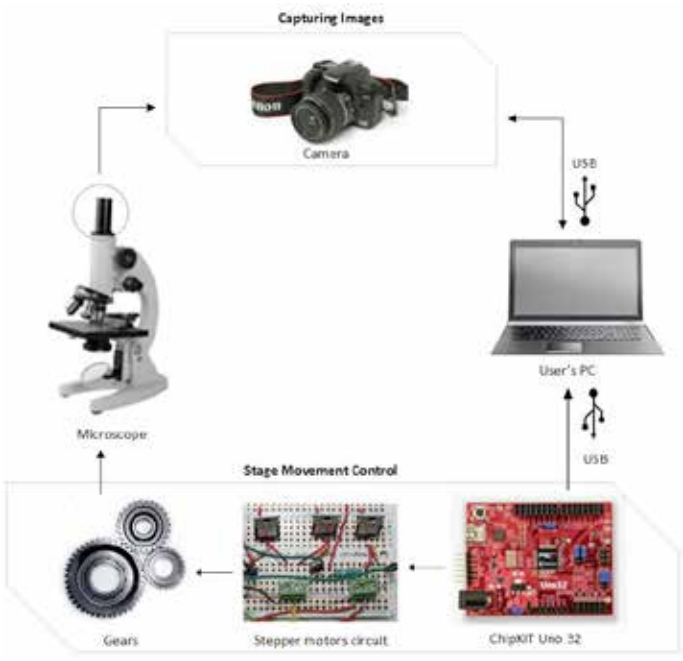


Figure 1: High level architecture

The solution proposed is accomplished in two aspects hardware and software. Regarding the hardware the PC is connected to the camera with good (high) resolution which is used to acquire images of the slide on the microscope and store them on the PC. Arduino ChipKit Uno 32 is used to control two stepper motors with combination of many gears to control the displacement and the position of the microscope's stage (X and Y directions). Together with the software that are used to achieve our goal are the Arduino development kit, to interface between the PC and the Arduino chipKit Uno 32. The LabVIEW is used to control the whole process of slide scanning, where it is used to control the stepping of the microscope's stage, capturing the image in each step and finally the whole Slide Image (WSI) of the slide will be constructed through an algorithm.

Interactive Android App for Learning Java

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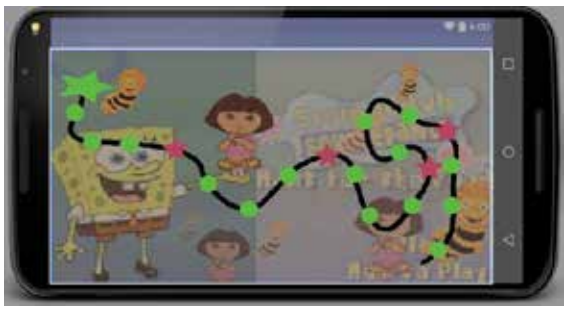
Supervised by
Dr. Eman Yaser Daraghmi

ABSTRACT

Learning aids are essential tools for programming courses taught in school since they assist students in improving learning skills. In programming courses offered by schools, teachers conduct numerous learning activities and use different tools in order to improve the students programming skills. For example, students are given a partition of a java program where they can read comments and fill in the blanks with the appropriate java statements that has been taught. In other activity, students are asked to identify the missing java key word in a dialogue. These tools and activities are interactive and fun ways that help students to practice java skills effectively. There are already many free mobile apps, based study tools available in Google play store, aim at helping students learning languages, mathematics, science, etc. However, few apps are available for learning programming, such as java.

This paper introduces an Android application designed for students (i.e. 7 – 12 years) who are learning java programming language. This application encourage students learning java by using cartoon characters. The application is fun and interactive and provides an interesting way to learn java. The app has 64 lessons cover the following main java topics: java basics, such as variables, operators, etc., conditional statements, loops, arrays, and objects. The app interfaces are designed in such a way that they can work with phones that have small, normal and large screens. The main screen asks the student to select the favorite cartoon character to start his/her java learning journey. The app consists of two main games, the Ordering Game and the Multiple Choice Quiz. When the Ordering game button is clicked, a menu interface appears which requests the user to select a java lesson numbered 1 to 64 from a dropdown list called a spinner. The game displays disordered java statements and the student should re-order them in specific time. Note that, the game difficulty increases steadily along the course of the game. When the Multiple Choice Quiz button is selected from the main interface, a menu appears which requests the user to select a java lesson. The Multiple Choice Quiz interface contains a text view, which reveals a question, and radio button to allow a student selects an answer among the four answer buttons.





The App was tested in a school class as one of the technologies to be used later in an interactive learning environment.

Portage Center: System for Diagnosis and Development the Mental Skills for Children with Down Syndrome

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ABSTRACT

Portage Center is a diagnosis and development of mental skills System designed for children with Down syndrome, children who have difficulty to understand the basic skills, especially children who do not go to special centers. Portage Center is an expert system helps children with Down syndrome to develop their mental skills without specialist.



Portage Center goal is put all attention on this group of children with Down syndrome from birth to the age of nine for developing their mental skills through finding the side image of the children via diagnosis their mental abilities and evaluating their capabilities to identify the concepts and activities that should be given to learn new skills. Portage Center also help families, who have difficulty to getting advice from specialists to know the mental capabilities of their children needed to develop their child mental skills.



Portage Center created based on a global scale called "Portage". The Portage Program is a home-based teaching program for children ages birth to nine who have special needs. It has six skills, and taught new skills and parents are shown how to stimulate their children with special needs with the same needs and rights as all children. Portage Center contains important parts that is mental abilities test for each skill, it divided to three sections (cognitive skill - self-help skill – motor skill) which is a comprehensive all aspects of a child's life, upon completion of the test, show the child's mental age in each skill of the three skills, this is the first and most important part of the system. Based on mental age, Portage Center will be shown proper activities of each skill for child (motor skill – cognitive skill - self-help skill) and the parents can choose any of these activities, which will help the child and improves the mental level.

As result, a child with Down syndrome can be improved and developed like any normal child. Potage Center is keep the children under the scope of continuing education with the help of parents, Portage Center available as an IPAD application and supports Arabic language to make it easier for parents to interaction with it.

Portage Center was developed with strive to support and develop the mental skill of Down syndrome children in an easy and enjoyable way. The results indicate parents of children with Down syndrome desire to be there system to help them on the development of their children and break the constraints that block children with Down syndrome to understand the normal children of their age group. In future Portage Center will support all six skills of Portage program.

Intelligent Home Control System Satisfying Privacy, Preferences and Protection

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Supervised by
Yousef-Awwad Daraghmi

ABSTRACT

Electronic home control systems aim at increasing the comfort of people at their houses by allowing them to control doors, windows, curtains, electric appliances, and furniture. However, these systems do not sufficiently address three concerns: privacy, protection and preferences (3P's). This project proposes an intelligent home control system that allows users to control their houses and simultaneously maintain the 3P's. The privacy concern is important to everybody particularly for conservative people. For example, a home control system may open the curtains to let light comes in but it ignores that people inside do not dress very well. Our system handles this concern and allows users to set up more concerns. The protection concern is related to protecting the electrical appliances from damage caused by the drop or the increase in voltage or current. The preferences concern is allowing users to feed the system with what they like and do not like. For example, users not only can select to open the curtains or close them, but also to set the degree of opening. Also, users can set the amount of light by controlling light bulbs and temperature by controlling air conditions.

The system consists of Hardware such as microcontrollers, motors, and sensors. The hardware is controlled by android application with interactive and easy to use interface. The most recent results show that the system is usable and have more benefits that existing systems.

Security Framework for BitTorrent Protocol

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Supervised by
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ABSTRACT

Peer-to-Peer (P2P) networking is an architecture where the users of this system are both clients and servers. P2P networks are widely used for illegal distribution of copyrighted content. In this paper, we propose a security mechanism for the BitTorrent protocol. BitTorrent is a protocol for the communication between peers in a system. We integrate security mechanisms into Vuze, a popular BitTorrent software. Our aim is to add security authentication, authorization, confidentiality and data integrity to the BitTorrent protocol and implement into Vuze.

Companies are reluctant to use a P2P architecture because of the lack of security mechanisms in it. There is a lot of potential in P2P networks because of its distributed nature. Indeed, most organizations use client-server architecture. The problem with this is that it is a single point of failure. If the server is compromised, the whole system goes down. In P2P, it would be less catastrophic if a few peers are compromised. In order to promote the power of P2P networks, we will build the basis of the security mechanisms and deploy them in a P2P architecture.

In a typical scenario of using the system, a user, who has a public key certificate to prove their identity, will purchase some content before being able to use it. Our architecture introduces Marketplace agents. Marketplace agents sell software, movies, songs, etc. to end-users and provide them with a receipt or proof of purchase. This receipt is actually a different type of certificates: an attribute certificate. An attribute certificate contains the ID of a user (same as the one in the user's public key certificate), and contains a mention of their access rights (e.g. authorized to download Redhat Enterprise Linux 7.0). Both public key certificates and attribute certificates are unforgeable as they are signed with private keys held by software owners and distributers.

Once a user has the attribute certificate that proofs its ownership of the purchased content, it uses it to connect to the peers that are currently downloading/uploading that file. "Swarm" is the BitTorrent term used to describe such set of peers. Our architecture defines a swarm agent that is responsible to authenticate users and authorize them to download files. It is also responsible to act as a permanent "seeder" (i.e. a peer who can upload the whole file to others). A swarm can contain one of more agents.

The new peer has to prove its identity (authentication using public key certificate), then its right to access the file (authorization using attribute certificate), before it obtains a token. This token contains a confirmation that it is now authorized to access the file being exchanged. It also contains a symmetric key. This symmetric key is used to encrypt the exchanged file, ensuring confidentiality and data-integrity.

We implemented our proposal using Vuze, a BitTorrent client that has been downloaded more than a half billion times. A part of our code was implemented as a plug-in, the rest was implemented by directly modifying the source code of Vuze. We used the Bouncy Castle cryptography API (security provider) to implement all attribute certificate generation and verification code.

Our work's aim is to encourage organizations to use a P2P architecture in order to benefit from it. The lack of security mechanism in the protocol discourages organizations from using this architecture.

Firefighter Mobile System

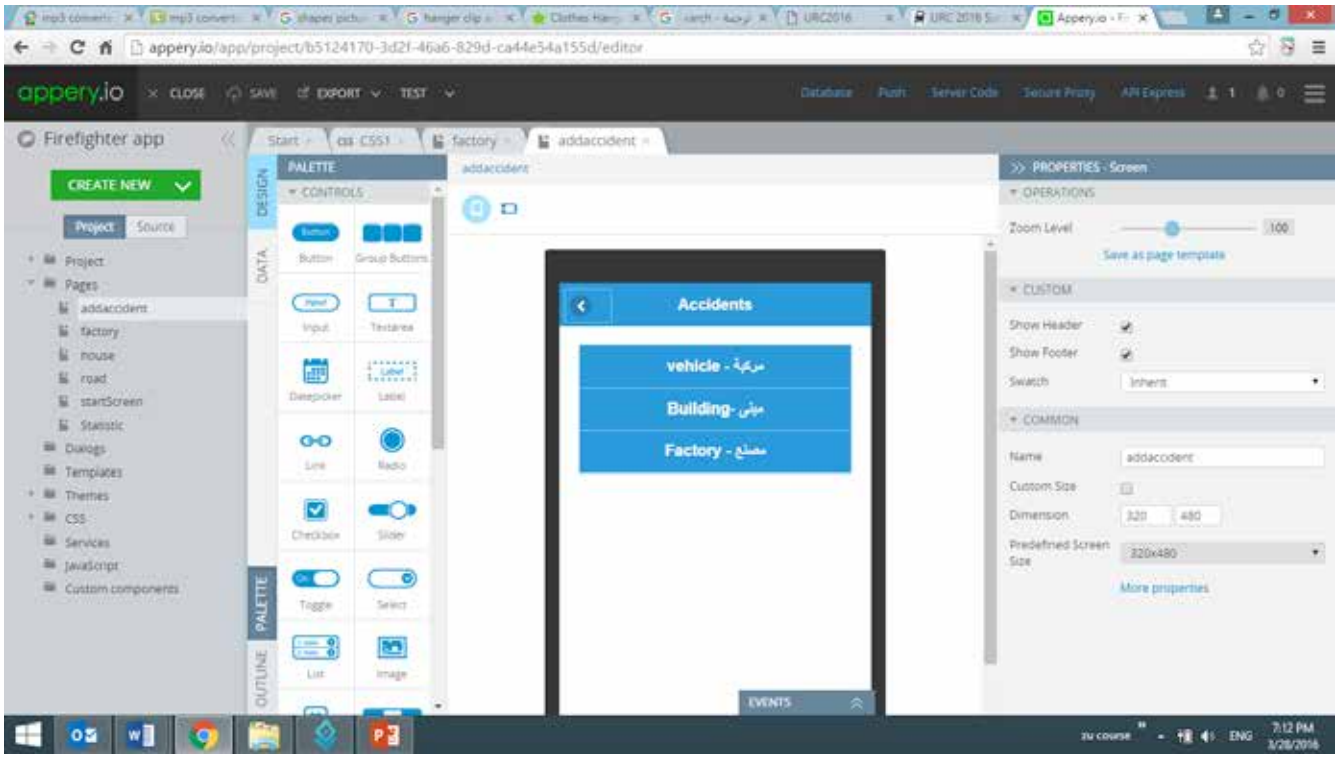
Maryam Al Hammadi and Alyazyeh Alnaqbi
Zayed University, Abu Dhabi, United Arab Emirates.

Supervised by
Dr. Omar, Dr. Feras and Dr. Asad

ABSTRACT

The firefighter mobile application system will the firefighter input the data from each accident. The application will help organize all data that they take and also transform the data to monthly statistic and diagrams. The application will record various type of data. Mainly, there are three type of accidents roads accidents, house accidents and factories accidents. For each type of accident different type of data is collected. The roads accident data include type of vehicle, insurance number, car code and burned parts. Secondly, the house data include the owner name, address, phone number, insurance type and number and the burned part. The last type is factories which owner name, address, phone number and burned parts. In addition, there is some fixed data such as how many trucks were participated in the accidents, numbers of firefighters and the amount of water and foam used. This application will help organize all kinds of data on the accidents. Moreover, the application will ease the fire fighters job because it will input data in more efficient ways and will transform the data into useful diagrams. In addition, instead of writing down the information and reporting them back to the department, the information will be sent back immediately after the accident. The pervious way was to write down the information in blank paper and submit each paper after the accident. Moreover, there are many problem because they can lose the paper easily and they can miss some information when they are writing. This application will aim to help the fire fighter in the seen to enter the data more quickly in formal way using mobile technology because it's light and easy to carry.

We are using a cloud-based builder to build this application.



QUShop Portal

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Dept. of Computer Science and Engineering
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ABSTRACT

The main objective of this work is to develop and deploy a complete platform for online transactions for Qatar University faculty, staff and students. Usually at the end of each academic year, many employees leaves the University and would like to sell their furniture, vehicles and other items. They post advertisements in bulletins boards in Malls or in local newspapers. Finding the right buyers that can offer proper prices is somehow problematic. In fact, these buyers propose always very low prices and continue bargaining when visiting the sellers which waste their times and constraints QU faculty and staff to accept the underestimated offers simply as they don't have enough time and efforts to spend. We propose to build a complete solution to this problem, where sellers and buyers are from the same community and they can understand and trust each other in a very good manner. In the first step of this work, we designed a questionnaire about the objectives and outcomes of this project and distributed it to QU community. We were surprised when analyzing the data collected from the questionnaires. In fact, almost all of them were highly interested in such a platform and wanted to see it online in a very short time. Some respondents were also ready to pay for this service. The proposed platform will be deployed in Qatar University internal network. Users can login in using their email and private password as used to access other services in QU like emails or blackboard or banner systems. The interface of the platform is based on QU official website where users can feel familiar when using it. The users can post images of the items they want to sell with several options: (1) general to all QU people; (2) for faculty only; and (3) for students only. The users can be contacted either through emails or by direct telephone calls. The items can be brought to QU premises which can save a real headache to sellers and buyers. The platform has several categories: to sell; to buy; donation; and exchange. The users can also register to receive emails of posted items on selected categories. They can also search the platform by prices and items categories. The first prototype of the system was designed in Joomla which support the Arabic language. The sellers can update their data which includes adding new images, reducing the prices, or any other useful information. The information can be either controlled by a moderator or simply by the sellers and buyers as the portal is currently dedicated to QU people only. We have added a feature for bidding for items with "must sell" label. The sellers can also launch an auction on the merchandise or stuff they want to sell quickly. The sellers can also ask the moderator to take photos and generate multimedia for the items they want to sell in a professional manner against some fees. The platform is the first private shopping website to buy, sell or exchange products in a secure environment in Qatar University. Below are snapshots of the platform.







A 3D-Nano-GSI Brain Implant Chip for Detection and Prevention of Seizures in Epilepsy

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ABSTRACT

Nearly one-third of patients with epilepsy continue to have seizures despite optimal medication management. Systems targeted for the detection and prevention of seizures may have the potential to improve the quality of life and day to day activities of epileptic patients. Automated seizure detection and prevention requires algorithms which employ feature extraction, computation, subsequent classification and feature normalization. Different methods have been developed to detect seizures utilizing scalp and intracranial EEG, electrocardiography, accelerometry and motion sensors, and electro-dermal activity. However preventive mechanism has not been reported yet. This article describe an implantable semiconductor three-dimensional integrated system for the detection and prevention of seizures in epilepsy.

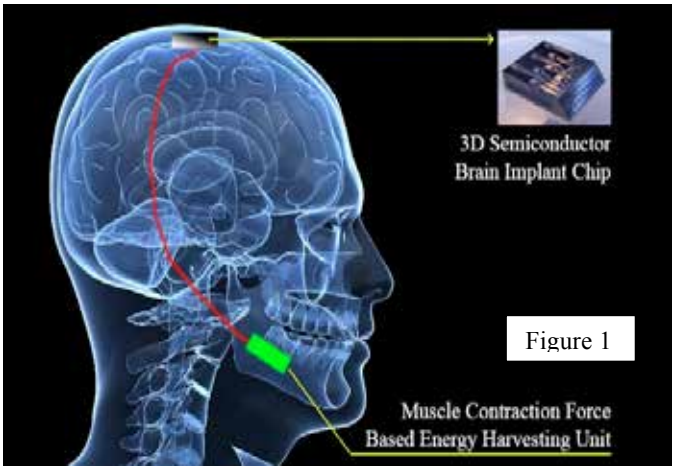
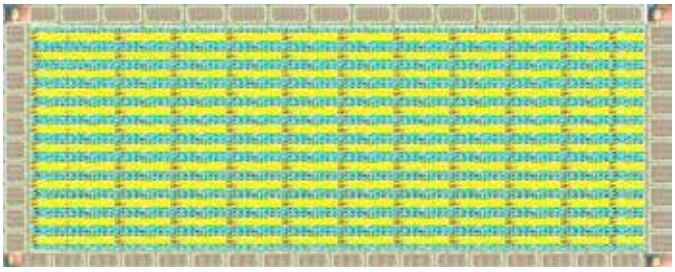


Figure 1



The epilepsies are a common heterogeneous group of disorders linked by a tendency to recurrent seizures in affected individuals and which have no respect for age, gender, or race. An epileptic seizure is defined as an intermittent disturbance of consciousness, behavior, emotion, motor function, or sensation that is believed to result from irregular cortical neuronal discharge. The recent research demonstrated technologies that have the ability to rapidly and accurately detect seizures early and anticipate their onset prior to presentation. Such technologies [2] provide a great therapeutic opportunity for the prevention and normalization of cortical neural discharge in over 50 million people estimated to suffer from epilepsy worldwide.

As illustrated in Figure 1 the epileptic seizure detection and prevention system will be implanted in the brain in an identified position that needs to be regulated. The automated seizure prevention system will draw power from a standalone muscle contraction force based piezoelectric energy harvesting unit implanted in the jaw area using the movements of the jaw muscle as a stimulus for energy conversion. We use a home grown three-dimensional (3D) nano-GSI (Giga Scale Integration) technology for the design and implementation of the compact and high performance brain implant chip [1]. The 3D nano-GSI integration platform is a promising and critical approach for meeting current and future design criteria, such as high performance, functionality, lower delay, and power consumption. Through-silicon vi a (TSV), i.e., thin metal structures that pass vertically through whole dies, are short, low-power interconnects; they are key enablers for high-performance 3D chips, also known as 3D integrated circuit (3D-IC). As the brain implant chip requires a large number of interconnects and I/O channels, we propose a massive interconnect and I/O structures using 3D integrated circuits to increase communication capabilities for large-scale signals and logic integration. For Nano-GSI design and implementation, we use a combination of low Vth and sub-threshold CMOS logic families to optimize speed and power consumption. An automated 3D thermal analysis module is also included to monitor the dynamic thermal profile of the chip. This is to avoid the brain implant chip raising the temperature beyond 38oC as this can cause discomfort to the patient. The activity based thermal analysis module runs a fast and accurate 3Dresistive network to extract thermal profile and dynamically manage the internal temperature of the implant chip. The detection and prevention of seizures in epilepsy is an ongoing process. We believe the epileptic disorder may change from person to person. The design and application may include all possible solutions, nevertheless it is possible to design dedicated solutions. The project goal is to design a 3D closed looped detection and prevention system which include all possible solutions. The design technology is progressing with 3D-Nano-CAD design platform along 3D-physical design tools from Micro-Magic.

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[2] S. Ramgopal et al. Seizure detection, Seizure prediction, and closed loop warning systems in epilepsy Elsevier journal 2014.

A 3D Nano-GSI Receptor Implant to selectively control Brain's reward System in Obesity Patients

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ABSTRACT

The rise in obesity rates poses one of the most significant public health issues facing the world today. The natural drive to eat and the surplus of readily available food are together partly responsible for this modern epidemic. The source of this problem is the interaction of molecular and neural mechanisms by which the brain regulates food intake. This lays the foundation for systematic dissection treatment of obesity and related disorders. This article describes how food intake can be controlled selectively by implanting 3D-Nano-GSI receptor chip on brain's hypothalamus area, to act directly on dopamine releasing neurons of brain dopamine centers to modulate feeding behavior as illustrated in Figure 1. Over-consumption induced by the high palatability of the modern diet in general and individual differences in responsivity to palatability in particular may contribute to obesity. This is because highly palatable foods, such as preferred ***fast foods*** and snacks, are often high in fat and sugar content, and are therefore high in energy density. The observation that foods' palatability is sufficient to stimulate eating beyond homeostatic needs demonstrates the particular importance of food **reward** as a determinant of excess food intake and development of dietary obesity. Among the most studied putative reward substrates is the dopamine system and considerable evidence implicates its role in natural and drug-related reward processes. The 3D GSI implant chip is designed in such way to selectively stimulate the brain's rewards and motivation system to provide a selective control over food-intake in receptor deficient obese patients. This chip will be powered by a muscle contraction force based piezoelectric implantable energy harvesting unit as illustrated in Figure at the right corner. The signal processing module of the chip stimulate the dopamine neurons of brain dopamine centers to artificially generate the reward signals based on the normal intake levels.

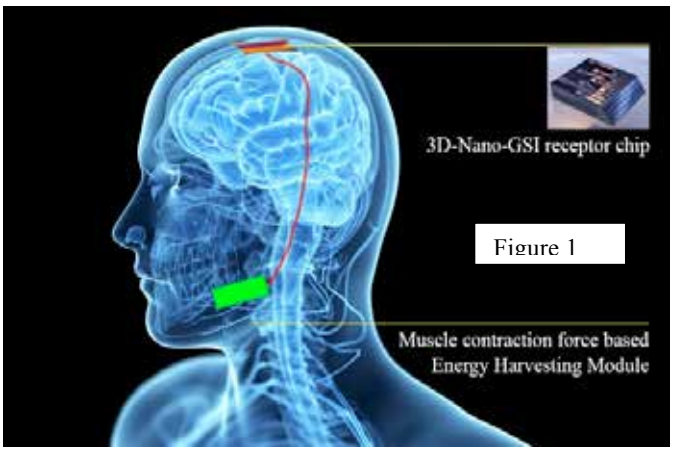


Figure 1

The automated brain reward system will draw power from a standalone muscle contraction force based piezoelectric energy harvesting unit implanted in the jaw area using the movements of the jaw muscle as a stimulus for energy conversion as illustrated in Figure 2. We use a home grown three-dimensional (3D) nano-GSI (Giga Scale Integration) technology for the design and implementation of the compact and high performance brain implant chip. The 3D nano-GSI integration platform is a promising and critical approach for meeting current and future design criteria, such as high performance, functionality, lower delay, and power consumption. Through-silicon via (TSV), i.e., thin metal structures that pass vertically through whole dies, are short, low-power interconnects; they are the key enablers for high-performance 3D chips, also known as 3D integrated circuit (3D-IC). As the brain implant chip requires a large number of interconnects and I/O channels, we propose a massive interconnect and I/O structures using 3D integrated circuits to increase communication capabilities for large-scale signals and logic integration. For Nano-GSI design and implementation, we use a combination of low Vth and sub-threshold CMOS logic families to optimize speed and power consumption. An automated 3D thermal analysis module is also included to monitor the dynamic thermal profile of the chip. This is to avoid the brain implant chip raising the temperature beyond 38oC as this can cause discomfort to the patient. The activity based thermal analysis module runs a fast and accurate 3Dresistive network to extract thermal profile and dynamically manage the internal temperature of the implant chip. The detection and prevention of seizures in epilepsy is an ongoing process. We believe the epileptic disorder may change from person to person. The design and application may include all possible solutions, nevertheless it is possible to design dedicated solutions. The project goal is to design a 3D closed looped control system. The design technology is progressing with 3D-Nano-CAD design platform along 3D-physical design tools from Micro-Magic.

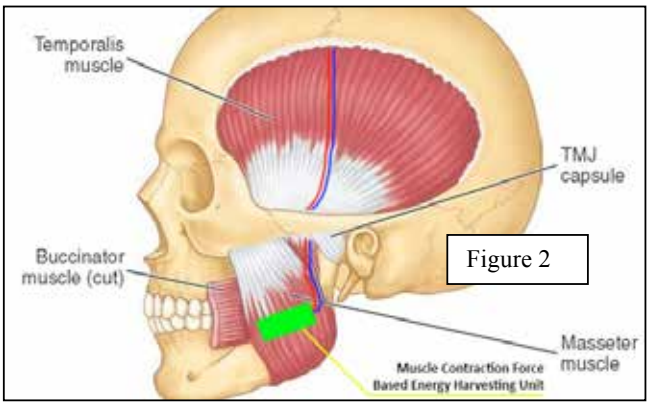


Figure 2

Big Data Analysis in Drilling Operations

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American University in Dubai, Dubai, United Arab Emirates

ABSTRACT

The oil and gas industry is paradoxical: it is described by some as indispensable, and condemned by others as a threat to the environment. Regardless of which view one follows, one cannot ignore the luxury it offers. While the world saw ground-breaking technologies in various fields these recent years, the gas and oil industry has not been subject to major innovations. That being said, efficiency remains a challenge that oil and gas companies face. Form improving the extraction, to improving the production, to improving the distribution, this challenge could be tackled from various angles; however, the issue that **Prime** approaches, is that of drilling.

Drilling operations are extremely complex processes dealing with huge amounts of data, in the aim of setting the most suitable drilling parameters. Nowadays, these parameters are chosen manually: given an oil well, engineers drill exploratory wells, which gather huge amounts of data, characterizing that particular well. Once this data is obtained, it is compared to that of previously drilled wells in the aim of finding a well having the similar characteristics. If matches are found, the drilling parameters of the previously drilled well are modified in a way that they fit the current oil well's characteristics. The process of going over previous data manually is time-consuming, inaccurate, and prone to errors. In addition, it is almost impossible to analyze the huge data. Consequently, if the non-optimal parameters were used, damages can vary from losing time to losing an oil well in extreme cases, which in both cases leads to the loss of millions of dirhams. Fortunately, **Prime** is here to help avoid such events, by predicting the most perfect drilling parameters, given a particular oil well, through the use of Big Data Analysis, which gathers the data, and then clusters it. The biggest benefit of **Prime** is the predictive nature of the system as it can assist geologists and field engineers in choosing the most suitable parameter values which are to be used in new drilling operations that are scheduled to take place in different wells.

The diagram, shown in figure 1, demonstrates the system's simple method of use. Once the characteristics of a new well have been decided, the geologist or engineer working on the new drilling operation can enter the new file of characteristics into the system. Afterwards, **Prime** will search through every server's "characteristics file" in order to find the closest match. Once the desired match is found, the system will return the files containing the parameters. For this reason, **Prime** will significantly narrow down the number of values in which the geologist or engineer may need to review manually, returning only the closest and most suitable parameter values for the new operation being evaluated. Moreover, **Prime** should also be able to identify irregularities in the behavior of the data by rejecting any erroneous values being entered into the system; therefore, avoiding any future errors in parameter values.

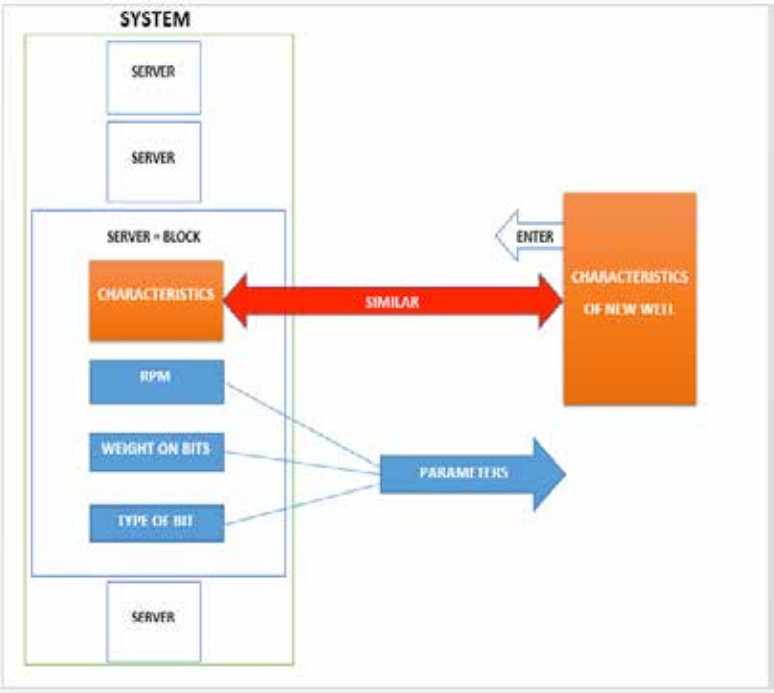


Figure 1: Prime's Method of Use

Face-Centric Multimodal Biometrics System and Creation of Middle-Eastern Facial Database

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Supervised by
Dr. Noushath Shaffi

ABSTRACT

In the recent times, Biometrics has become a field of extensive research. Biometrics can be precisely defined as 'the automatic recognition of a person using distinguishable traits'. Biometrics suggests the ways of identifying a specific person using unique features. The main key of Biometrics is to verify and then authenticate a person using some measurable features. When a system is using Biometric verification system, the password to that will be the human body itself. Some unique features that can act as passwords are Iris, Retina, Face (Whole), Voice, Fingerprint and Signature Verification as shown in Figure.1. Here, the subject itself has to authenticate its identity and proceed further. In this project, emphasis is given to face recognition. Face Recognition finds its applications in surveillance and authentication systems. It is also helpful in human interactive systems and multimedia. Many consumer products have been developed using this technique. It is to be noted that the growing consumerism has paved way for constructive developments in this field. Of late there are laptops and smart phones which authenticate the user using his/her face as password and that too even if the face is occluded. Many security systems using CCTV's majorly use face recognition for authentication purposes. This technology is also used in many real time systems that use biometrics as a mode of authentication. There is quite a lot of experiments being carried out on Video based image recognition. Face Recognition systems can also be used for criminal identifications, image processing and also film processing. It is also applicable in automating colors in film development. Other applications are subsets of these larger applications.



Figure 1

Though face recognition provides hopes of being the best automated recognition system, there are many unsolved challenges that are being encountered. By and large, the challenges are all due to uncontrolled environment. The system fails to recognize the input template under different conditions such as Uncontrolled Background, subject's non-cooperation, variation in pose, lighting variations and also facial feature variations.

Aims of our project are two-fold: (1) to develop a face-centric multimodal biometric system (2) to develop a facial image database comprising of middle-eastern people. To start with, we have implemented several state-of-the-art face recognition algorithms to know their fundamental limitations/capabilities. We would like to demonstrate performance of algorithms under various testing conditions. Figure.2 shows performance of Eigenface algorithm on ORL face database for varying dimension of Eigen vectors. These kinds of experiments help us to choose best performing face recognition algorithm when we develop a face-centric multimodal biometric system.

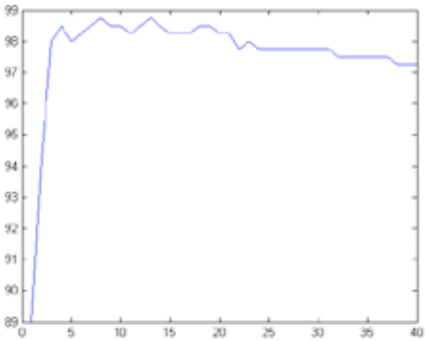


Figure 2

On the other hand, we would also like to create face database comprising especially of samples of middle-eastern region. To the best of our knowledge, the existing publicly available databases comprise samples of Western people. In creating such a database, we can capture different types of variations (such as variation due to occlusion from turbans/abhaya/Sheila etc, huge variation in the facial images due to the presence/absence of beard/cosmetics etc) that are seldom seen in the existing databases. We would like to capture such region-specific variations in the database in addition to usual variations in facial image such as variations due to lighting/expression/pose etc. Furthermore, this will help us to determine the best algorithm from the state-of-the-art for these regions so that a real-time robust algorithm could be deployed for enhanced security purposes.

Keywords: Face recognition; Biometrics; Multimodal Biometrics; Eigenface; Comparative Study

Model of Stationary Vending Machine that supports the Student Community

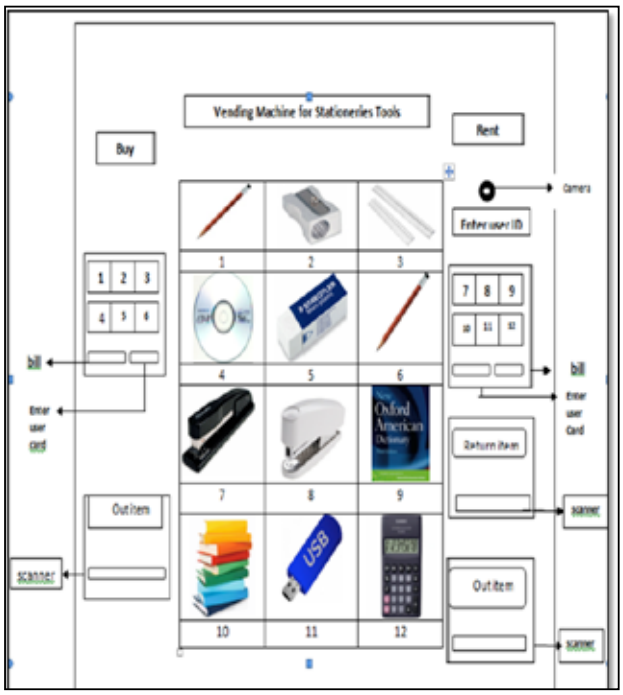
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College of Applied Sciences, Sohar, Sultanate of Oman

Supervised by
Faizal Hajamohideen

ABSTRACT

A vending machine is normally to provide fast and easy services to consumer choice oriented products depends on the environment such as Vending Machines in dispense Colleges/Schools to Juices and Chocolates, Sports Clubs to Energy drinks and Hospitals to Tea/Coffee and beverages. There are many other vending machines that help consumer in different way to get their requirement fulfilled such as lottery, tickets, sweets, etc. The following paragraph discusses and emphasis the important of redesigning vending machine for student community. Also no significant studies have shown to help the student to buy and rent stationaries on campus. This project starts with logical design, usage methodology and end with security issues.

Aim of this project is to enhance the student life inside the campus, there are vending machines inside the campus but not providing the students required stationaries timely manners. Also during the examination majority of the fellow students are disturbed due to absents of stationaries for the respective exams by their colleagues. It is one of the reasons that the student communities have been affected significantly toward their exam fallouts in the schools/college/Universities. It is difficult and expensive to build a shop for selling and renting stationeries stuff in schools and universities location. Alternatively the selling or renting stationaries in a secure way are a big challenge in the area of vending machine business.



This research proposes an unique vending machine for stationeries like pencils, pens, rulers, eraser, Note books to sell whereas calculators, digital dictionaries to rent at times. This vender machine will be located on schools, universities and colleges to support the student's community and to increase productivity in their studies. The experiment begins to study of different vending machine algorithm and redesign to suit the requirement for vending and renting mechanism. This project redefines the vending machines capabilities to rent stationaries in secure way. This research ventures new embedded systems application that supports the vending machine to support for renting scheme besides selling stationaries. The implementation of the application using Java and Database considered as major development phase of the venting machine's redesign. A multidimensional security measures also will be incorporated inside the vending machine application to expel the fraud on vending machine such as duplicate coin or shape look like of the coins and to remove false identifications of the students by advanced ID scanner and Image processing methods.

Privacy in the Workplace

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Supervised by
Dr. John Beachboard

ABSTRACT

In today's workplace society, a vital and dynamic issue that affects both workers and employers is work place privacy. Employers have the ability to monitor the activity of the worker. For example, managers can use some tools to know about their employees during their work hours.

Currently, all organizations have the ability to monitor their employees in the work places. The percentage of companies using technology is increasing from day to day and most workers use technology during their work hours. Managers can track and know various types of information about their workers by using these technologies. For instance, managers can trace company emails, monitor phone calls and even keep aware of employee minute to minute activities. According to The Week article, "A survey from the American Management Association found that at least 66 percent of U.S. companies monitor their employees' internet use, 45 percent log keystrokes, and 43 percent track employee emails " (The Rise of Workplace Spying, 2015). The reasons for a company to "spy" on their employees can be as simple as perceiving lapses in productivity or as complicated as searching for evidence that employees are thinking of quitting.

Radio Frequency Identification device is a small electronic device that utilizes a small chip and an antenna. The tags for the RFID have the ability to store all of the information about the worker. These chips have a potential to hold a massive amount of data about the employee. The RFID tag has a unique recognizer for the purpose. For example, employees carry scanning cards that contain RFID tags, which must be scanned upon entering their workplace so from these tags any specific information can be retrieved about the worker. Employees are aware that the organization has the ability to monitor so it will help to improve their productivity and performance. According to the article "Swedish office gets under employees' skin with RFID microchips" on CNET, a Swedish employee who works at a cutting edge technology office campus, has the ability to interact on many levels at the workplace using RFID tag such as opening doors, accessing smartphones and photocopiers.

Privacy is a very important issue in today's workplace. On one hand, organizations should have the right to use monitoring devices and software in the workplace in order to protect themselves from criminals and to increase productivity of the employees. On the other hand, employees have the right to know that managers will be able to hear their personal conversation or see what they are doing during their time at work in order to ensure the confidentiality between the manager and the employees and to avoid potential problems. The above mentioned case of the government officials illustrates the need for further education of workplace privacy rights and possible further regulation of allowable measures. Sensitive Islamic principles regarding these issues need to be taken into account in all instances.

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