جامعة زايد
ZAYED UNIVERSITY

The 3rd Annual Undergraduate Research Conference on Applied Computing (URC 2011)

College of Information Technology
Zayed University
Dubai, United Arab Emirates

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Book of Abstracts

Undergraduate Research Conference

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Zayed University Research جامعة زايد البحوث
Innovative Research to Support the National Development of the UAE
بحوث مبتكرة لدعم التنمية الوطنية

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Message from Vice President Zayed University

Welcome to Zayed University and the rrd Annual Undergraduate Research Conference on Applied Computing! I am pleased by the conference theme focusing on undergraduate research, since Zayed University future plans for further development of its research agenda were laid out in our university plan.

With the launch of the third edition of this successful conference, Zayed University has set out on an exciting path that provides students from Zayed University as well as universities in the region with an exceptional opportunity to capitalize on our solid research capacity and on our ability to organize unique collaborations to help in mobilizing research for maximum impact in the region.

Universities in the area have a great potential for collaborative research with each other and with companies in the technology sector. I expect this conference will serve as a forum for encouraging collaborative research. We need to accelerate the research engine in the region and this conference is a step in the right direction to encourage young researchers to get involved in research projects.

Research is important not only to advance the state of knowledge, but also to engage with the wider community in order to apply that knowledge so that we can solve social, cultural, and economic challenges facing societies today. University research, indeed, touches every aspect of human life.

I thank the College of Information Technology for taking the initiative to organize this conference, and a special thanks to all the students for their contributions. If last year's conference is any indication, I expect this year's conference to be a great success.

Dr. Sulaiman Al Jassim
Vice President, Zayed University

Message from

Conference Chairs

Welcome to the 3rd Annual Undergraduate Research Conference on Applied Computing (URC 2011) whose objective is to provide a forum for undergraduate students to present their research ideas and prototypes and to interact with other young researchers, faculty members, and technology leaders from the Arab region.

In addition to students from local institutions, this year we are particularly excited to welcome student researchers and their faculty advisors from other educational institutions in the Gulf region and other Arab countries, namely from Bahrain, Egypt, Jordan, Lebanon, Oman, Palestine, Qatar, and Saudi Arabia.

Contained within this booklet, you'll find over one hundred abstracts presenting undergraduate student research projects from many universities in the region. The abstracts reflect the multidisciplinary character and wide spectrum of emerging technologies.

The program contains a wide selection of events, including keynote speeches, oral and poster presentations, a panel discussion, and an evening reception. We will also present a total of six awards for the best three oral and poster presentations.

We would like to thank everyone involved in this conference. Without your paper submissions, and the volunteers who reviewed them, this conference would not have been possible. We would also like to extend our special thanks to the keynote speakers and members of the panel for taking the time out of their busy schedules to participate in this conference.

We are grateful to our sponsors, Telecommunications Regulatory Authority (TRA) and Zayed University Office of Research, for their commitment to make this event possible. Your generous contribution helped make the conference a reality. Thank you.

Our thanks go to everyone who has contributed in making this conference extraordinary. We would like to extend a heart-felt thank you for the rest of our team: Zakaria Maamar, Abdallah Tubaishat, May AlTaei, May El Barachi, Mona Bader, Nagarajan Chandrashekaran, Huwida Said, Mario Guimaraes, Hind Al Dosari, and Arwa AlNuaimi; we couldn't have done it without you.

Finally, we take this opportunity to thank Zayed University for providing the needed resources.

We hope you enjoy the conference.

Conference Co-Chairs

Qusay Mahmoud and **Leon Jololian**

URC 2011

Conference Organizers

The conference is organized by the College of Information Technology at Zayed University.

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We're grateful to the following people for their help with the review process:

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Proxy Bypass and Cyber Crime Engagement: An Exploratory Study

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ABSTRACT

Many countries have been employing the Internet proxy for different reasons. At the same time, activities of cyber crime have been on the rise. The research covers an extensive literature review on global definitions and examples of censorship, its effects, as well as perceptions and how they could be manipulated; so the technical aspect is covered in a generalized way and so is the psychological view. This research project helps in exploring and understanding peoples› engagement in bypassing the Internet proxy and how it can be related to cyber crime engagement. Another issue that is covered in this study is how level of knowledge in computers relates to the engagement of proxy by pass and cyber crime.

The different variables that are investigated in this study are self-reported proxy bypass engagement, perception of the proxy, and self-reported cyber crime engagement. Figure 1 demonstrates the relationship between the variables where order for the independent variable to have significant value, predictors must become apparent or valuable to the participants:

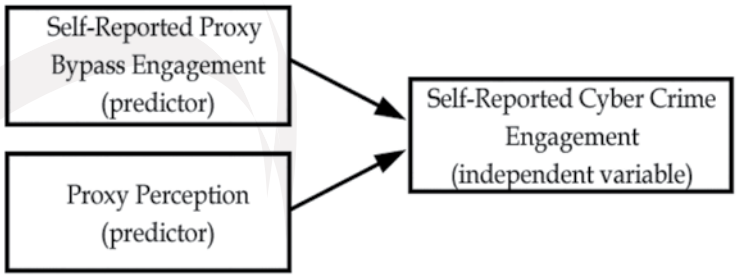

Figure 1: Theory Diagram

Through the conducted survey, participants were asked to self-report their rate of proxy bypass and cyber crime engagement. In addition, biased manipulation paragraphs were inserted in two of the three surveys in order to assess the effect of this inclusion. The survey was randomly disseminated to three separate groups in which the “manipulation page” was phrased in a manner that either advocated the employment of the proxy (Group 1), criticized it (Group 2), or the survey was distributed without any prior effort of manipulation (Group 3, control group). The aim of the first two groups was an attempt to create a biased opinion, in a positive or negative manner, so as to find out whether the “manipulation page” would influence participants’ perception of the proxy.

The methodology was extensively focused on all the data that was gathered being tested for accuracy and reliance using Cronbach alpha method and other reliability testing tools. Following the conduction of the survey, results started to surface. The first result showed that a positive relationship between self-reported proxy bypass engagement and self-reported cyber crime exists. Secondly, the included manipulation paragraphs had an interesting effect upon the participants, revealing that participants without a manipulation paragraph (control group) were more revealing of their self-reported activities. Finally, those with a better knowledge in computers were more likely to engage in cyber crime and bypass the proxy. The final paper discusses an in-depth analysis of the findings and correlations.

Towards a Tutorial-Based System to Assist Children with Special Needs

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ABSTRACT

We propose to develop a communication system for children with special needs that supports collaboration, data exploration, communication and creativity. The main objectives of our work are as follows: (1) To develop Arabic tutorial-based system for children with moderate intellectual disability (MID) and those with moderate learning disability (MLD). We can then unveil the hidden potential within these children and improve their skills. Shafallah center children subject of this study can be reintegrated in normal schools and compete with their peers. We mention that there are several eminent scientists such as Albert Einstein, and Nelson Rockefeller who have achieved stupendous success in science and technology despite their reported with some disabilities. The contents of our tutorials are set according to the curriculum used in Shafallah center for children with special needs. The topics include: Simple arithmetic, Dealing with money, date and time, measurements; reading and listening of simple texts and answer the questions, arrangement stories events using pictures, animals and plants, foods, clothes, safety and personal care. Our tutorials give short and simple sentences with clips, images and sounds. The system allows also Arabic words prediction and abbreviation expansion. Whenever the children begin to type a word, the system will display a list of frequently used words that begin with those letters. The children can select the appropriate word (or images) from the display. We can then improve the understanding and writing skills of these children; (2) To enhance the thinking and memorization skills of children. We propose puzzles of different levels associated with the tutorials. Children can try to solve them and improve their thinking, writing and memorization skills. Intelligent algorithms are used to guide the children in their selection of the moves; (3) To involve parents in the learning process in addition to teachers. The system is customizable and flexible thus allowing parents and teachers to add contents according to specific rules. The involvement of parents in the learning process contributes positively in improving the skills of children and helps them acquire academic skills more easily so that they can take pride in themselves. In fact, the school day is limited and if the children can use the software at home, there is a greater possibility of use; (4) To assist the children improve their understanding of electronic text. We integrated some tools to extract keywords from electronic text and we link them with appropriate images, sounds and clips that will be proposed to the children. The skeleton and the interface of the system is developed using Visual Studio.net. The system allows the teachers to create accounts, create groups, and add students to the groups. They can also add contents using the predesigned templates. MS-Access database is created to store and mange the contents.

Local Search for the Satisfiability Problem

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ABSTRACT

The Satisfiability (SAT) problem is defined by a set of conjunction clauses, where each clause is a disjunction of literals. A literal is a positive Boolean variable or its negation. The Satisfiability problem concerns of determining whether a total assignment exists (The assignment of each variable to TRUE or FALSE) that satisfying all clauses of the problem. If such total assignment exists, the problem is said to be SATISFABLE (sat), otherwise it is deemed UNSATISFIABLE (unsat). This problem was proven NP-complete and serves as a measure for other NP-complete problems. SAT has many real applications in several fields such as electronic circuit design, timetabling, scheduling, planning, etc. The importance of the SAT problem could be shown by the numerous researchers working on it around the world in addition to many international SAT competitions. There are two different kinds of SAT solving strategies, those that solve the problem in “complete way” by using various techniques, like Truth tables and Davis Putnam procedure, and those that solve it in “incomplete way” using local search techniques, like GSAT and WalkSAT.

In this project we will shed light on the local search technique for SAT problem which is an incomplete method for finding a solution. It is based on iteratively improving an assignment of the variables until all clauses are satisfied. We will focus on two classes of local search algorithms. The first one is that of greedy or non-randomized algorithms (GSAT). These algorithms proceed by changing (flipping a variable from TRUE to FALSE or inversely) the current assignment by always trying to decrease its cost (the number of unsatisfied clauses). The main problem of these algorithms is the possible presence of plateaus, which are regions of the space of assignments where no local move decreases the cost. The second class of local search algorithms, WalkSAT, has been invented to avoid this problem. In order to escape these plateaus these algorithms called randomized local search algorithms are doing random moves.

The local search technique for SAT is a theoretical and practical problem. It found its place in artificial intelligence and algorithm domains. It is fundamental in solving many problems in several real applications as database, robotic, computer architecture design, automated reasoning, scheduling, etc.

In our project we look forward to finding a faster solution with less number of flipping using the best Data Structure to improve the functioning of the two algorithms. Eventually, we try to merge the two algorithms to produce an efficient algorithm in order to benefit from the properties of the two algorithms by combining their powerful tools and embedding some heuristics of variable flipping.

By the end of the project we will have implemented the two algorithms and try to perform experimental evaluations of the efficiency of the implemented algorithms by testing them on some benchmarks of the SAT competitions. Also, we will have conducted a comparison between these algorithms .The comparison is based-on two factors: the percentage of how many times each algorithm found a solution if one exists, and the running time.

Avatar-Based Approach for Teaching Arabic Sign-Language Part 2

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ABSTRACT

Sign language is the natural mean of communication between deaf, almost as talking is for healthy persons. To communicate with the community around them deaf need a translator in order to translate signs to equivalent words and vice versa. To facilitate this task, computer programs have been developed to assist deaf persons acquiring their independency.

This application was aim to help the deaf persons to be able to translate his text to the sign language, and contribute to educate sign language to the community in order to facilitate communication with the deaf.

Methods for visualization of signs by using computers have been evolved from images to video-clips and finally to 3D technology called Avatar. Virtual Human Signing as 3D format is designed to display the signs through the internet or other applications. Sign-dictionary has firstly to be transformed to animated forms and stored in appropriate file-formats, using special editors allowing the manipulation of avatars. These animated-signs can then be visualized by an application that can read the corresponding files (The avatar software). These files are very much smaller than videos and images, thus the amount of storage space required is minimal, and the download time (or visualization time) is very fast.

This project is the second part of project that was successes in the previous Dubai conference for students.

Our objective in this part of the project is to continue building our learning system for Arabic sign language by adding more features. We will focus on how to sign a sequence of words structured as separate sentences, short stories, etc. This means, development of a translator that can transform an input text to a corresponding sequence of signs. Morphological analyzer will be used to segment the input text before a mapping takes place.

This can be done throughout the following phases:

a. **Collection of new signs:** our sign dictionary created in the first part need to be enlarged to include more signs for good language coverage. We depend on Sign Dictionary Standard to create the signs.
b. **Creation of sign-animations:** an animated version of the new signs has to be created using the same avatar software as previous part: eSign.
c. **Selection of a morphological analyzer:** an appropriate morphological analyzer will be chosen and used to segment words in the input text.
d. **Development of the translator:** it's done by call morphological analyzer to return the root and suffix for each word, and then assign the word and its suffix to appropriate sign depending in sign translating rules, finally play all signs as sequences.

Main Tools used in the implementation:

- **eSign editor:** for creating animated-version of our selected sign-dictionary.
- **SigmlSigning player:** for playing animated-sign files.
- **Java:** as environment of development.
- **JavaScript:** for programming & controlling some events in the system.
- **Internet Explorer:** The browser that should be used.
- **Buckwalter:** morphological analyzer to segment the input text.

Adaptive Counter-based Broadcasting Scheme in Mobile Ad Hoc networks

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ABSTRACT

Mobile Ad hoc Networks (MANETs) are formed by wireless devices that communicate without necessarily using the pre-existing network infrastructure such as base station/access point. In such a network, each mobile node operates not only as a node but also as a router so that it can send and receive messages as well as forward messages for others. The self-configuring nature of MANETs make them suitable for a wide variety of applications. One of the applications of these networks is communication within groups of people with laptops and other hand-held devices. Moreover this type of communication paradigm stimulates the desire for sharing information among mobile devices furthermore in the situations such as disaster sites, battlefields, temporary conference meetings, uninhabited field searching, etc., applications typically do not have central administration or infrastructure available. In such areas where there is little or no communication infrastructure or the existing infrastructure is inconvenient to use, wireless mobile users can communicate through the formation of a mobile ad hoc wireless network. For example, in the network shown in Figure 1.

Figure 1: A sample mobile ad hoc network

Broadcasting is a common operation in wireless Mobile Ad Hoc Networks (MANETs) that can be simply applied by using flooding. However, this technique suffers from a number of drawbacks in terms of high redundancy, collision, and contention. This phenomenon is known as the broadcast storm problem. Many schemes have been proposed to address this problem. In this paper we examine the performance of counter-based scheme with adaptive threshold to increase the reachability percentage of the transmission packets which receive the broadcast message to all nodes with high reachability and increase the throughput of the network by using ns-2 simulations. We evaluate the performance of our approach by comparing it with the simple flooding. Simulation results show our approach performs better than simple flooding in the average end-to-end delay (Latency), The Packet Delivery Ratio, and Routing Overhead.

ALPRS: An Arabic License Plate Recognition System for Real-Time Car Monitoring

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ABSTRACT

Most of the existing cars monitoring systems which control the entrances of governmental and private facilities depend on a security guard that uses visual verification techniques to identify authorized cars. Human faults, such as guards allowing unauthorized cars, may occur. Therefore, this paper presents a full automated Arabic License Plate Recognition System (ALPRS), for Real-Time Car Monitoring. ALPRS includes a combination of edge technologies from both fields of computer vision and decision support systems. The idea depends on developing an information system that is responsible for monitoring cars at entrances using license plate recognition technique (LPR). LPR is an image-processing technique used to identify vehicles by their license plates. There are many LPR systems for processing English, Chinese and Hindi license plates, while there is a lack in finding LPR systems that deal with Arabic license plates.

Figure 1: Typical Structure of LPR System

Figure 2: Samples of Car Images Acquired

ALPRS starts by capturing car image and then remove possible noise using the morphological processing technique. Consequently, the license plate extraction stage is carried out using the connected components analysis algorithm. After that, the system will label and extract the connected components, in the binary image, to get an effective character and number segmentation. After the extraction process, the license plate is automatically recognized using the Support Vector Machine algorithm (SVM). Results are compared with images stored in a pre-defined database. As a result, the decision of whether to allow or reject the car from entering the facility is generated. For the purpose of this paper ALPRS was implemented based on Saudi license plates.

The main objectives of this project are to transform the existing non automated system to a computerized system. The proposed system provides a fast and hands free access to facility, high security and reliability, and easily manage cars. ALPRS was implemented using MATLAB and VB.NET .The performance of the system has been investigated on real images captured with different resolution, and the recognition rate is found to be about 92.85%.

Assistive Technology for People with Hearing/Speaking Disabilities

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ABSTRACT

The community with Hearing or Speaking Disabilities represents a significant component of the society that needs to be well integrated in order to foster great advancements through leveraging all contributions of every member in the society. When those people cannot read lips they usually need interpreters to help them communicate with people who do not know sign language, and they also need an interpreter when they use phones, because the communication will not be done easily if they are not using a special aiding devices, like a Relay Service or Instant Messaging (IM). Building bridges of communications between Deaf and Hearing community or the different authorities and institutions is essential, to deepen the mutual cooperation in all aspects of life. The problem could be summarized in one question: How to construct this bridge to allow people with hearing and speaking difficulties to communicate?

This project suggests an innovative framework that contributes to the efficient integration of people with hearing disabilities with the society by using wireless communication and mobile technology. The main goal is to give those people privacy. Therefore, this project is completely operator independent unlike the existing solutions (Captel and Relay Service), it depends on an extremely powerful Automatic Speech Recognition module and Text To Speech module. The project provides two-way communication using a web server.

First, The Automatic Speech Recognition module is speaker independent, it recognizes the voice regardless of the person's voice characteristics, and it converts the speech to text then sends it to the server. On the other side there will be a Text To Speech module, which will take the text sent to the application server and transmit it as speech. The second aim is to develop an iPhone/iPad application for the hearing impaired. The application facilitates the reading of the received text by converting it into sign language animations, which are constructed from a database. We are currently using American Sign Language for its simplicity. Nevertheless, the application can be further developed in other languages like Arabic sign language and British sign language. The application also assists the writing process by developing a customized user interface for Deaf to communicate efficiently with others that includes a customized keyboard.

Some of the various challenges we faced in this project. First, the Automatic Voice Recognition system may not understand the person's pronunciation; the person should speak clearly in the proper English language. Moreover, the mobile application interface has to be highly customizable and relevant for people with Hearing/Speaking Disabilities to simplify the use of the application for communication. Also, The full-fledge database of the whole sign language is not available; therefore we are starting with limited dictionary of most common words.

Provision of Wireless Services in KSA using High Altitude Platforms

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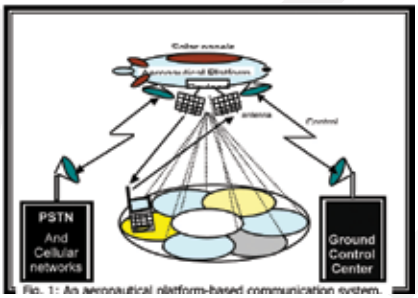
ABSTRACT

It is not possible to surpass the progress achieved in developed countries to bridge the digital divide with traditional means. Furthermore, the Kingdom of Saudi Arabia is vast and rugged. Extending wireline networks to isolated areas is economically infeasible and may be impossible. Wireless may be the unique alternative for nationwide coverage of the territory. Although wireless could be established with terrestrial and satellite system, what is needed is an ambitious approach alleviating the drawbacks of these traditional terrestrial and space-based communication networks. Recently there is a great interest in a novel approach called high altitude platform (HAP) operating at an altitude of 17-22 km in the stratospheric layer. A HAP could cover a service area of up to 400 km diameter depending on the minimum elevation angle accepted from the user's location. Its position in the sky would give them many of the favorable characteristics of satellites, but without the distance penalty. Its position in the sky would also let them avoid the radio ground scatter of terrestrially based systems, while still being about as close as terrestrial antennas. Deploying a network of HAPs in the sky of the Kingdom with interplatform links (IPL) will swiftly bridge the information gap through soft infrastructure, fast start-up time, gradual growing, on-demand capacity assignment, low capital investment as well as low ongoing operating costs. HAPs represent a perfectly suitable alternative infrastructure for long-term provision of broadband access to fixed or mobile users. In addition, HAPs are particularly well-suited for temporary provision of basic or additional capacity requirements, due to the possibility of rapid deployment and controlling the flight path in compliance with changing communication demands, providing network flexibility and reconofigurability. HAPs, also, are well suited for serving remote regions with low user density, short-term large-scale events and establishment of ad-hoc networks for disaster relief. Typical services to be offered from aerial platforms include basic voice, video and data communications, as well as more advanced services such as telemedicine, news gathering, localization and navigation, news and emergency message broadcasting, videoconferencing, remote sensing, etc.



aFig. 1: An aeronautical platform-based communication system.

The HAP, depicted in Fig. 1, is a helium-filled solar powered airship, carrying the communication payload which is mainly composed of:

- Two phased-array antennas for transmission and reception.
- Processors that handle switching, transmitting and receiving functions.
- Solar lightweight panel and fuel cells that feeds the HAP by the required power.

Multiple GPS receivers and station-keeping technologies (electric motors and propellers) are used to move the HAP to its desired location. Those will enable the HAP to remain in a fixed position in all 3-dimensions too.

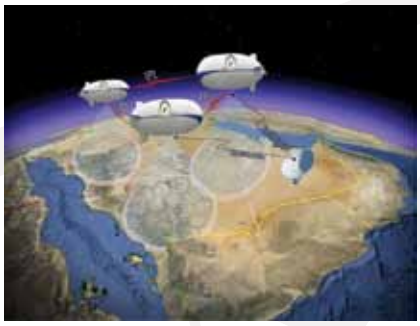


Fig. 2: Clarifying figure of the HAP system

Choosing an altitude of 20km, and elevation angle of 5 degree, the footprint then will be about 400km diameter. The area of KSA that equal to 2,270,000 km^2 can be then covered by 18 HAP. The position of each one will be determined depending on the population density. Figure 2 shows the semi-final installation of the HAP system over KSA.

Swine Flu Detection Using Nearest Neighbor Generalization

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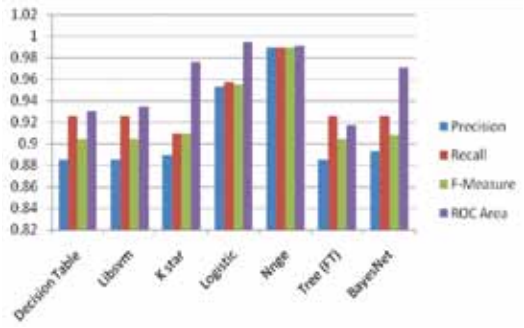
ABSTRACT

Influenza A (H1N1) virus is a subtype of influenza 'A' virus and was the most common cause of human influenza (Swine flu) in the recent years. The disease was first detected in people in Mexico and United States of America before starting to spread up globally [1]. According to the World Health Organization (WHO), swine flu is moving into the post-pandemic period after being widespread in 2009. This does not mean that the disease came to its end; it means that the disease is rather continued to circulate for some years to spread again. Being a favorite tourism destination makes the UAE vulnerable to the swine flu which resulted in recording few conditions. To avoid the death of thousands of people various solutions and vaccines were proposed to fight H1N1, however most of these solutions are proved to be ineffective in advanced stages of the disease. Tedious traditional laboratory ways for detecting the disease and the possibility of human errors in evaluating H1N1 symptoms makes the computational solutions essential. However, most of the existing computational solutions [2] focused on classifying H1N1 depending on its evolutionary origin. In this paper, we take different approach by proposing a method for detecting the disease based on patients' symptoms. The method starts by extracting features which are basically the condition of the patient with respect to a number of symptoms such as fever, runny or stuffy nose, cough, throat infection, exhaustion, and headache. The datasets are retrieved from the H1N1 online self-assessment websites available at http://www.mayoclinic.com/health/flu-symptoms/FU00013. This data is developed by experts in the field of swine flu. Each of the 188 instants in the dataset is a different patient condition suffers from different symptoms. According to the training dataset, the system classifies the instances into three different classes: have swine flu, possible to have swine flu and don't have swine flu. These features are then used in conjunction with machine learning techniques to detect whether the patient is infected, healthy or in risk to be infected.



The performances of several machine learning techniques where analyzed and the experimental results show that the proposed method was able to perform significantly well when using Nearest Neighbor generalization (NNge). The performances of several machine learning techniques are measured in precision and recall as shown in Figure 1. In this case, the proposed method demonstrated fast and accurate prediction results of a precision and recall equal to 0.989 and 0.989, respectively.

Fast and accurate detection of H1N1 through its symptoms can prevent patients from reaching the last stages of the disease. The study has also demonstrated the power of NNge in classifying H1N1 through its symptoms.

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Twitter Trends

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ABSTRACT

Twitter is basically a simple and a real-time information social network that connects you with the latest information about what you find interesting. All twitter users can send and receive tweets.

The foundation of Twitter is short messages commonly referred to as “tweets”. A trending topic is a word, phrase or topic that is posted (tweeted) multiple times on Twitter social network service.

Twitter trends are the way to see the hottest topics, news, products and events discussed around the world in real time and get the highest rating view according to most users interacts with.

Twitter allow users from several countries and cities to see their related trends such as USA, Canada, Australia, UK, Spain, Italy, and India... etc. here is an image captured from Twitter.com describes a group of countries which twitter support their trends, user can select any of these countries to display their related trends

The problem is that twitter website doesn’t support trends for Kingdom Of Saudi Arabia; it doesn’t allow users in KSA to see their trending topics and deal with. The reason behind absence of trends in KSA is because the small number of tweets traded between local users. In addition, through our researches we did not find someone who developed trends for KSA on twitter, or even previous sufficient solutions. Here, the idea came to be one of the first who develops trends for Saudi Arabia.

From this point we came with our project idea. We decided to build a website (an online system) that will display KSA trends, by collecting all tweets from KSA users. We chose this online method because the browser applications can be accessed by everyone from everywhere.

In order to make it clearer, here is the explanation of our system. First, we should monitor the most tweets that Saudi users interact with. Second, withdrawn these tweets, and then watch the most frequent tweets that got users attention. Finally, we will filter these selected tweets and convert them to top10 trends to be displayed on our website.

This way we will be able to view the trends, and allow users to do comparison between the trends of KSA and trends in the worldwide.

The importance of our project lies behind the people’s interest and the benefits they may get. It has been found that the number of Twitter users had reached 200 million users around the world, generating 65 million tweets a day and handling over 800,000 search queries per day, as they prefer to see news on one of the most popular websites such as Twitter. On the other hand, trends in Saudi Arabia can serve many groups; Marketers, researchers, and businesses that are interested in monitoring Saudi markets, users, and how they target them and spread their businesses through these trends. Twitter is one of the biggest beneficiaries of our project as they explained to us previously.

In conclusion, the goal of our project is to analyze content and properties of Twitter Saudi community. We will determine the extent to which we can accomplish the tasks required in the specified period.

Intelligent Transport Systems: Traffic and Speed Monitoring System using Wireless Sensor Networks

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ABSTRACT

Based on many studies, speeding is the main cause of accidents on highways and in city roads. Law enforcement authorities enforce speed limit using traditional speed guns and speeding traps. Recent high tech solutions use automated cameras and speed guns to report speed violations. The problem with these approaches is the coverage area where only a small area of the roads are usually covered as trap points. In this project, we plan to use wireless sensor networks to create a solution for monitoring speed violations across a section of a road and not through a single point. The section of the road can be a highway, in city routes or small streets. In addition to monitoring the speed in the section, the solution also can alert law enforcement about congestions in roads which will help in preventing delays and accidents.

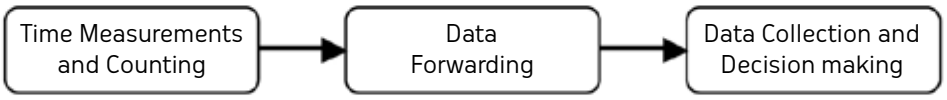

Figure 1: Main components of the Project

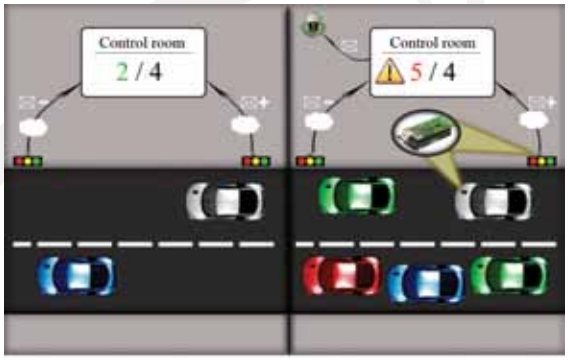

Figure 2:Traffic Monitoring Scenario

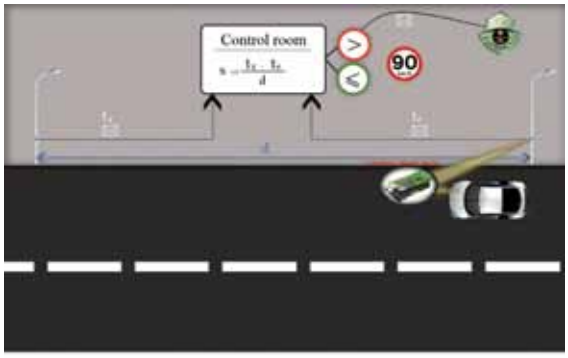

Figure 3:Speed Monitoring Scenario

For the implementation of this project, we are using the generic Telos-B sensor motes and TinyOS as an operating system. We assume that every car has a sensor node able to communicate with road side network devices. We justify this assumption by knowing that late models cars are hi tech and have many communication devices (GPS, Bluetooth, mobile phone signal, etc) that could be utilized to track, detect and communicate with the car. Our approach is to have two sensor motes at the beginning and the end of a road section. When cars enters the section, the sensor mote records the time of entrance and increment a counter representing the number of cars inside the section. At the other end, sensors records the time of exit and decrement the car counters. Law enforcement are notified when a car cross this section in a shorter time than estimated by the idle speed limit. Also, they are notified once the counter reaches a threshold indicating that a congestion is most likely to build up in designated section of the road.

Intelligent Transport Systems: Real-Time Accidents Notification System using Wireless Sensor Networks

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ABSTRACT

Based on recent studies, road accidents lead the causes of deaths in the Arabian Gulf region. Law enforcement accidents notification time greatly depends on the interactivity of the victims and witnesses. It might take couple of minutes until the victims realize the situation, look for their phones and call the police or until the witnesses find a safe place, stop his car and call the ambulance. In this situation, every second count to save the life of a victim or protect others from consequent accidents. There are couple of GPS-based automated accidents notification systems such as ONSTAR that are useful in such cases. However, those systems only works for cars subscribed to the service. Moreover, it inherits the limitation of GPS based systems such as poor signal quality within high building areas, no signal in tunnels and under bridges. In this project, we are implementing a real-time accidents notification system using wireless sensor network by automating the notification process and eliminating the human factor using easy to deploy road side networks that can cover all areas including tunnels, under bridges and high raise areas.

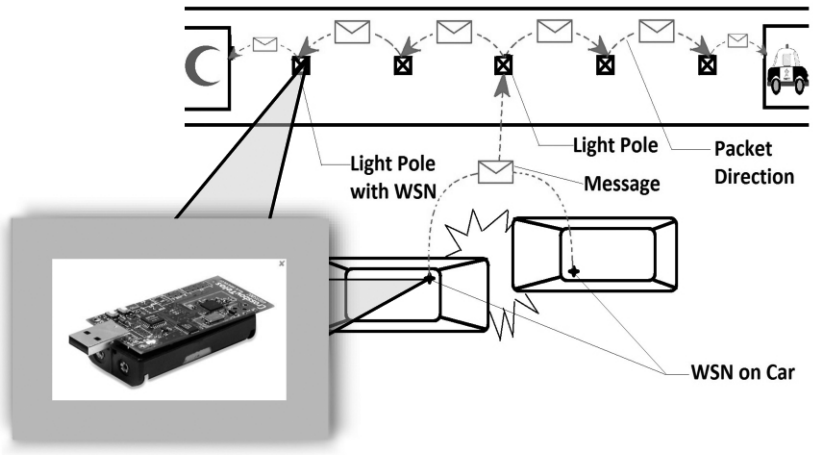

Figure 1: Illustration of Accident Notification System

For the implementation of this project, we are using the generic Telos-B sensor motes and TinyOS as an operating system. We assume that every car has an accelerometer equipped sensor node that is able to communicate with road side network devices. We justify this assumption by knowing that late models cars are hi tech and have many communication devices (GPS, Bluetooth, mobile phone signal, etc) that could be utilized to track, detect and communicate with the car. Our approach is to have two sensor motes distributed on road side. Once an accident occurs detected by the accelerometer in the sensors, distress messages containing cars' information is sent to the road side network which delivers them to the nearest law enforcement office. In our project, we can extract information like location, number of cars involved in the accidents, speed at which cars were running and other information to predict the severity of the accidents. These data will help in providing a fast accidents response time to increase the safety in highways. In future prototypes, we can connect these sensors to air bag deployment sensors for more accurate results.

Indoor Framework for Patient and Medical Staff Tracking using RFID-based System

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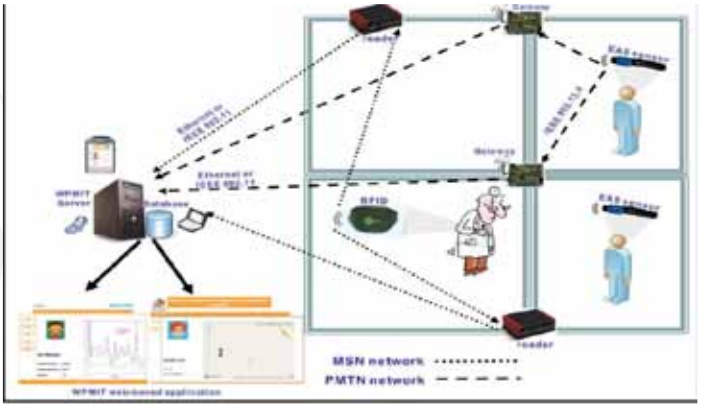
ABSTRACT

In convalesces period of patients' recovery, patients are allowed to leave their room and do some activities in the hospital. For this reason, some hospitals have special buildings for activities. It is important for the medical staff to track the patients so that they can provide fast medical treatment when a patient accidently needs it. That's make indoor localization of both patients and medical staff one of the new systems that are being employed in health care systems. Localization is achieved by using an algorithm called trilateration. This algorithm uses Received Signal Strength Indicator (RSSI) values in order to calculate the position of an object. In this paper, Radio Frequency Identification (RFID)s were used to get Link Quality Indication (LQI) values that will be converted to RSSI values. Several indoor experiments have been done on the RSSI readings to show how accurate the system is. Results showed that an average error of 50% has appeared which is initially acceptable. To increase the accuracy of the system more experiments are required by getting more RSSI readings and apply them on the algorithm. The following figure shows the expected final system and illustrates Patient Monitoring & Tracking Network (PMTN), Medical Staff Network (MSN), and WPMIT Application Server (WAS).



Challenges in managing the smooth process of patient care (especially those in critical situations) and utilizing technology that enhance health care were the motivation of this project. Generally, helping patients and saving their lives is the main concern of the proposed framework. Localizing the patients would help doctors to respond fast to solve urgent cases by monitoring vital signs. In other words with patients often scheduled for multiple procedures, or patients recovering from cardiac surgery, real time monitoring and location tracking become crucial in detecting and addressing adverse events as soon as they happen. With such system hospitals can improve and increase the level of health care by being more organized in the process of collecting data. As a result, this system is implemented to provide a stored database, which is continuously updated with the patients' information. It alerts the medical staff with sudden events and emergencies in order to response in a fast manner.

In this project, localization was achieved using RFID network through the use of LQI values supplied by the RFID tags as part of the patient and medical staff RFID network. To improve the accuracy of the system RFID network with a higher sending rate should be used. For the system described, more work could be done to improve the system's accuracy. Tracking system can be extended to include medical staff position localization. This will help optimize the care process by finding the appropriate medical staff that is qualified to provide the medical assistance where it is best needed. The web application can be improved by adding security features in it, for instance, forcing the user to provide login name and password to make sure that the access is restricted to the medical staff only.

Detecting Spam Emails using Machine Learning Techniques

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ABSTRACT

Email is a very common tool of sharing, communicating and exchanging information through the internet. It provides a great way of sending million of advertisements at no cost for the sender. This result in getting unwanted emails that are known as spam or junk emails. Spam emails are annoying to most users; they waste time in deleting them, consume traffic between servers that caused delay in delivering legitimate e-mail and waste space in the email overall size. In the UAE it has been recently recorded that over 80 million spam attacks received daily 2010, which is a huge increase when compared to 2009 where it was under 20 million. To solve this problem several computational techniques have been developed. However, the nature and structure of the spam emails differ from region to another which makes it necessary to develop our own spam detector system.

In this paper, we propose a method for spam email detection. The method starts by extracting features from 513 English personal emails (229 spam emails and 172 legitimate emails) which characterized the type of spam emails usually sent to this region. Emails with graphics or attachments are ignored in this case. A java program was built to automatically scan each email and extract 11 different attributes which are related to keywords appear in the email. These features are then used in conjunction with several machine learning techniques to detect whether each email in the testing dataset is spam or legitimate. The overall algorithm is shown in Figure 1.

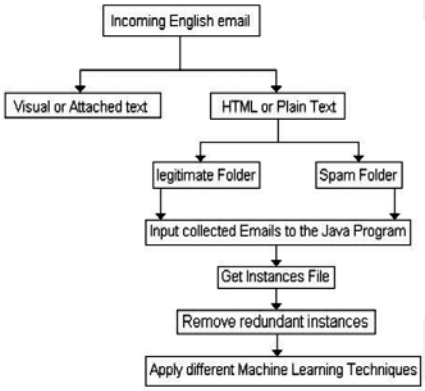

Figure 1: The overall algorithm

The performances of several machine learning techniques (shown in Figure 2) were analyzed and the experimental results show that the proposed method was able to perform significantly well when using Support vector machine (SVM) technique with true positive rate (spam emails that were classified as spam) accuracy of 84%. It has been observed that SVM perform the best with setting the parameters in a way that the kernel type is linear and using 5 fold cross validation. The result of correct classified instances was 83.97%. Furthermore, precision was approximately 0.829 and about 0.84 for recall. Moreover, area under ROC which is frequently used as a measure for the effectiveness of diagnostic markers was 0.716. However, Naïve bayes technique was superior in terms of lowest false positive rate and ROC. The success of the proposed method is due to the meaningful features extracted and the usage of powerful machine learning tools such as Decision Tree, Neural Network (RBF Network), SVM, Naïve Bayes, KStar and Nearest Neighbour (NNge).

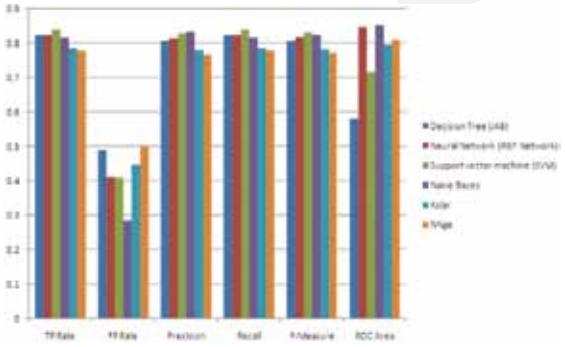

Figure 1: Illustration of Accident Notification System

UAE GIS-based Road Accidents Analyzer using Google Maps API

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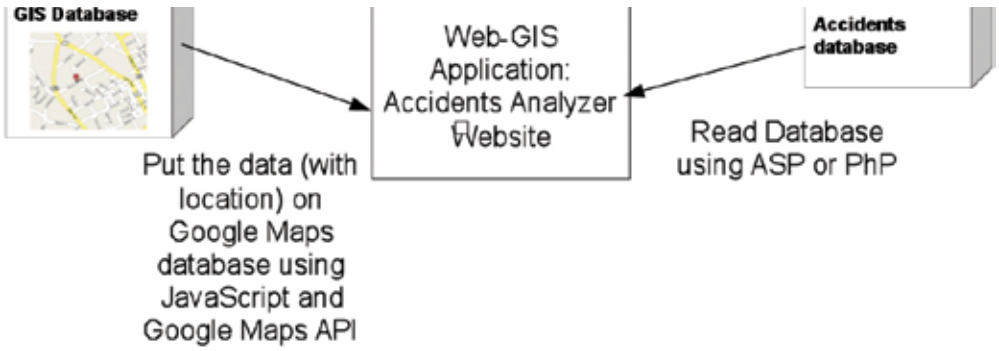
ABSTRACT

Increasing road accidents and fatalities has made "Road Safety" a major issue, with more accidents, health facilities are overloaded and nation is suffering economic loss. This makes it very important to understand the traffic flow, incident scenarios, etc. before application of any hardcore planning. Application of GIS in road accidents analysis can help in understanding the traffic scenario and hence provision of smart solutions. A road section might experience many accidents over a period which might be due to driver's error, faulty road design, environmental factors, etc. Analysis of road section can be carried out by using GIS technology. The UAE continues to experience rapid growth, which is characterized by increasing population, trade, vehicle ownership and traffic movements. These factors have increased road accidents over the past few years. In our research, we try to benefit from GIS technology to develop an application which can be used (1) to record the exact locations of road accidents in UAE and (2) to analyze the data in order to determine which road section is a faulty in other words hazardous location. This application can be used as a decision tool to help decision makers to make decisions and take actions concerning the road safety in this country in order to decrease the rate of traffic accidents. Our web-based application is based on two main types of data: (i) spatial data (the exact location of the accident) will be saved on Google Maps database through Google Maps API and (ii) the non-spatial data (type of the accident, cause of the accident, involved people, etc.) will be saved in a classical entity-relationship database. We have selected Google Maps as GIS to store the spatial data (through Google Maps API) because we don't hold a GIS data of the UAE and because Google Maps is a free database that can be update/programmed through Google Maps API using programming languages such as JavaScript or ASP. Our application contains two main modules: The first one is a reporting module where the user reports a road accident and the second one is an analysis module which can be used to analyze the accidents data and to help the user to take strategic decisions and actions. The application users, especially the Police and transportation agencies, can benefit a lot from our application.

The architecture of the application is presented in the following figure:



Application Architecture

Classifying Pima Indian Diabetes Using Machine Learning Techniques

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ABSTRACT

Diabetes is recognized as a disease causing an inability to control the level of sugar (glucose) in the blood and it's currently the fastest growing exhausting disease in the world. According to a statistics released by the Imperial College London Diabetes Centre at the Arab Health Congress show, the UAE has the world's second highest number of diabetes cases per capita with about 19.5 per cent of the UAE's population. It's inefficient to use the traditional manual data analysis anymore in the modern hospitals and medical community as medical information system become larger and larger. It has been proven that introducing machine learning (ML) into medical analysis have some benefits such as increasing diagnostic accuracy, reducing costs and reducing human resources. However, deciding which ML technique to be suitable in recognizing diabetic from non-diabetic patients is yet to be solved. In this paper we utilized the standard Pima Indian Diabetes dataset in conjunction with several ML techniques such as Decision Tree (D-Tree), RBF Neural Network, Support Vector Machine (SVM), Naïve Bayes, KStar and Nearest Neighbour (NNge).

The features which were used in conjunction with the above mentioned ML techniques are retrieved from the UCI Machine Learning Repository. This data set is extracted from a larger database originally owned by the National Institute of Diabetes and Digestive and Kidney Diseases. It's a collection of medical diagnostic reports from female population who are at least 21 years old and living near Phoenix, Arizona and USA. The dataset contains 768 instances with 8 attribute values (number of pregnancy, glucose, blood pressure, skin fold thickness, serum insulin, body mass index, diabetes pedigree function, age) and two possible classes (Diabetic or non-Diabetic) as shown in Figure 1.

The performances of the above mentioned ML techniques with different parameters settings (kernel type, cost, cross-validation fold, etc) were analyzed. Several evaluation measures were used such as precision, recall and overall accuracy and the results indicated that SVM is superior in terms of the classification ability and efficiency. SVM is a set of related supervised learning methods used for classification and regression analysis. The standard SVM predict the class for each input of a set and determine which of two possible classes the input is a member of. The SVM was able to achieve an overall accuracy of 77.60%, precision of 0.771 and recall of 0.776. The performance of all the ML techniques is shown in Table 1.

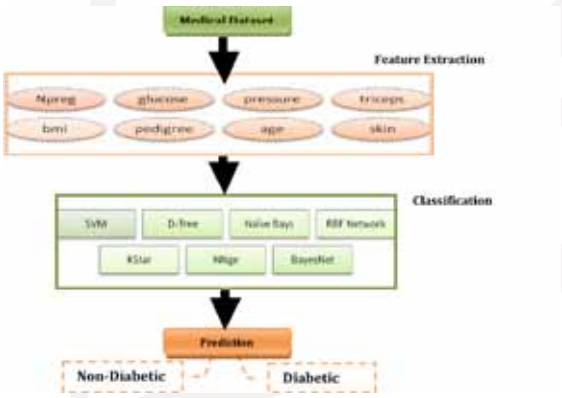

Table 1: Performance comparison of different ML techniques

Method/Weighted Avg	TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Accuracy
SVM	0.776	0.319	0.771	0.776	0.769	0.728	77.60%
Dtree	0.712	0.338	0.715	0.712	0.713	0.729	71.22%
Naïve Bays	0.764	0.306	0.76	0.764	0.761	0.818	76.43%
RBF Network	0.738	0.334	0.734	0.738	0.735	0.781	73.83%
KStar	0.697	0.415	0.685	0.697	0.686	0.718	69.66%
NNge	0.74	0.32	0.738	0.74	0.739	0.71	73.96%
BayesNet	0.747	0.317	0.744	0.747	0.745	0.804	74.74%

Auto Embauche

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ABSTRACT

In the last few decades the great advancements and innovations in technology have changed the way business is done in today's world. Technology has prevailed in almost every sector of the business world getting tasks done faster and efficiently. One such sector where technology can be used for carrying out tasks efficiently and effectively would be a system to enable hiring of a vehicle. Basically the manual procedure for hiring a vehicle is a time taking task that has to be backed with apt resources. It is difficult and a strenuous task to keep track of the operational details of such a system. We propose to develop a solution that would aid in operational management and at the same time reduce the overhead cost and time spent in carrying out various tasks for such a system. The Auto Embauche is an automobile hiring system developed for renting out vehicles quickly and effortlessly to customers. The proposed system is a completely integrated online system, which serves the registered users. The user can book any kind of vehicle for a required period as well as keep track of them. It facilitates viewing the types and details of vehicles being hired. It also allows the users to mark their destination location on the map provided so as to reduce the communication costs in the process. The booked vehicles can be tracked by the customers using a personalized scheduler. In today's fast world where it's difficult to meet deadlines, the system would provide with a beneficial feature to send a reminder to the customer via email or SMS. This project can be easily used in the process of decision making. Different types of reports may be generated which would aid the management to take apt decision.

This in turn would reduce the time delay and reflect positively on the company's work standards and influence the economical state of the company. The purpose of the system is to facilitate its users anywhere, anytime, anyplace with just a connection to the internet. It proposes that future work could be done on the system to implement it as an entire and complete application for vehicle management for smart phone users.

iDiet

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ABSTRACT

Countless health problems nowadays are directly linked to, and mainly caused by obesity. It is not only a cosmetic problem; it is a real threat, and a crucial cause of death. Being 40% overweight doubles the chances to die earlier than being a normal-weight person. The reason behind this is that obesity can be the main cause of numerous serious medical conditions, including: Heart disease and stroke, high blood pressure, diabetes, cancer, breathing problems, etc. Doctors came to an understanding that the number of health problems one might have is directly proportional to their overweight. Moreover, being overweight or obese places you at increased risk for chronic disease compared to normal-weight individuals. These people can gain significant health benefits from losing weight.

What we are trying to achieve in our research project, is to develop an easy way (application) to help people achieving and maintaining healthy lifestyle and ideal weight in an easy way. The idea of this project came from the need of healthy and obese individuals to have a guide that helps them find out the exact need of their bodies from calories and macronutrients each day. Not only that, because many available applications can do so. This software is going to suggest a meal plan that matches the amount of calories calculated for each person individually.

The application will:

- Tell the users if they are in the range of healthy weight, underweight, overweight or obese phase; accordingly, it will either increase the amount of calories needed (if underweight) or decrease the amount of calories needed (if overweight) to facilitate further weight loss, and encourage reaching a healthier weight. All of the calculations in the application are based on scientific equations, and are approved by the World Health Organization (WHO).
- Going to ask users to provide their weight, height, gender, age and physical activity level. According to the numbers given, some calculations are going to be done, and the amount of calories that need to be consumed per day will be calculated. According to the amount of calories, the number of servings from each food group will be provided, and will also suggest some meal plans.
- Concentrate on Arabic foods, and will also be in two languages “Arabic and English”, as almost all diet applications are not available in Arabic, and it is a little hard for older people to translate them.
- Be so EASY to use, even for people who are not familiar with soft wares, or even for new dieters, it does not need any background in nutrition and macronutrients needs.

There already exists many applications to calculate calorie needs, and others that provides meal plans for the amount of calories you desire, but there is no such an application that will do both. iDiet that we are proposing can do both! And that’s not the only unique feature. In other application, most meal plans are based on western foods, where in ours, we are going to include foods that matches what people consume in the Arab world.

We think that iDiet is going to be an effective guide for many people if developed and used in academic and scientific ways. In the future, the application can be updated to be used by diabetic, hypertensive and even people with renal problems.

OpenAPI WEBOS

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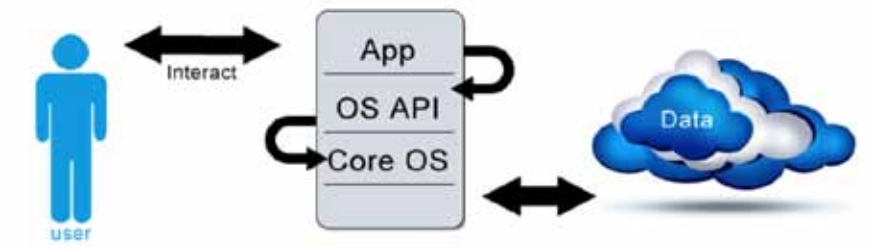
Supervised by:
Dr.Bahjat Qazzaz

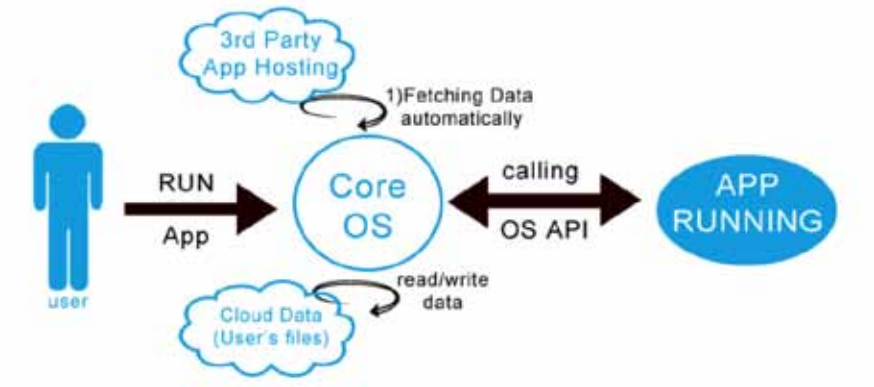
ABSTRACT

OpenAPI WEBOS is a web application that allows the users to do most of their tasks online with no need to regular OS, and will be open for developers to contribute and introduce more efficient applications. OpenAPI WEBOS will be connected with a cloud space for each user.



Users can install registered apps through AppStore, which is basically very similar to iPhone AppStore.

WEBOS is responsible for fetching app from a 3rd party automatically, and connect the result with the core API as follows:



OS API would help the developer to build Apps faster, and more reliable and produce more convenience UI, and allow the developer to interact with user's files.

Users are working on cloud, and by this they can share, send, and collaborate works and data. This could also be used for entertainments and games.

OPENAPI WEBOS will be portable and cross platform, no need for special device or special OS. You can reach your files from anywhere smartphone, PC, Linux....

By introducing HTML5 a lot of dreams may comes to true in WEB OS world.

UAE Crime Mapping Using Google Maps API

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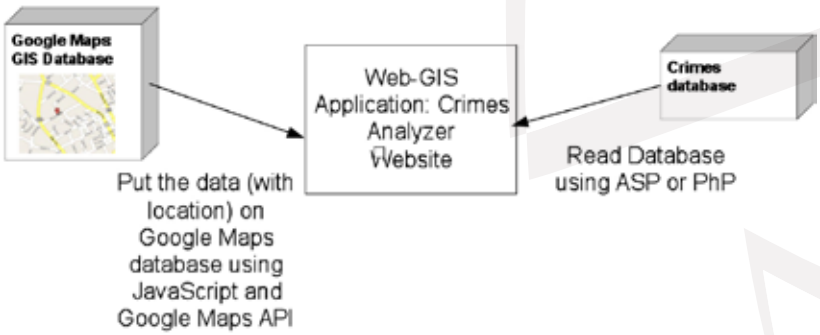
ABSTRACT

The growing potential of GIS for supporting policing and crime reduction is now being recognized by broader community. GIS can be employed at different levels to support operational policing, tactical crime mapping, detection, and wider-ranging strategic analyses. GIS helps crime analysis in many ways. The foremost use it to map crime occurrences, visualize them, and analyze them. This allows low enforcement agencies to understand exactly where crime is occurring as well as determine if there are any patterns. Areas of high crime density are known as hot spots. Hot spot analysis is a valuable tool as it allows police to not only identify areas of high crime but also explore variables that are affecting crime patterns. With this information, law enforcement agencies can be more efficient in their fighting tactics from increasing patrols around such locations or by proactive measures in these hot spots.

UAE continues to experience rapid growth, which is characterized by increasing population, trade, etc. Most of the population in UAE are immigrants and coming from all over the world. This situation has increased the number of crime occurrences in the country. Several years ago, crime fighting became a serious concern for many people and government in order to reduce the crime incidences.

In our research project, we want to benefit from the advantages of GIS in order to develop a first prototype of Crime mapping tool which can be used to (1) record crime occurrences in the country, (2) save the exact location of the occurrence on the GIS map of the country, and (3) analyze the data and report the results in order to make strategic decisions by the law enforcement agencies in the UAE, example the Police. The web-based application is based on two main types of data: (i) spatial data (the exact location of the crime occurrence) will be saved on Google Maps Database through Google Maps API and (ii) the non-spatial data (type of the crime, involved people, etc.) will be saved in a classical entity-relationship database. We have selected Google Maps API as GIS to store the spatial data because we don't hold a GIS of the UAE and because Google Maps is a free GIS Database that can be updated/programmed using programming languages such as JavaScript or ASP through Google Maps API. Our application contains two main modules: The first one is a reporting module where the user reports a crime occurrence and the second one is an analysis module which can be used to analyze the crime occurrences and to help the user to take strategic decisions and actions. The application users, especially the Police, can benefit a lot from our application.

The architecture of the application is presented in the following figure:



Application Architecture

Used rsources:

* GIS and Crime Mapping, Spencer P. Chainey (The Jill Dando Institute of Crime Science, UCL, UK) and Jerry H. Ratcliffe (Department of Criminal Justice, Temple University, USA)

* Crime Analyst, ESRI: http://www.esri.com/library/brochures/pdfs/crime-analysis.pdf

* Crime Mapping: GIS Goes Mainstream: http://gislounge.com/crime-mapping-gis-goes-mainstream/

Cooling the Airbus A380, The World's Largest Airliner

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Supervised by:
Dr.Bahjat Qazzaz

ABSTRACT

'Cooling The Airbus A380 – The World's Largest Airliner' was proposed in conjunction with Emirates Engineering. The hot climate of Dubai and the size of the A380 cause major cooling issues with the aircraft when on ramp at concourse being prepared for flight and when in the hanger under maintenance.

When the aircraft is in the air, the wind cools the skin of the aircraft and the Auxiliary Power Unit (APU) cools the cabin. But when the aircraft is stationary on the ground and the APU switched off, external cooling needs to be provided.

Emirates Engineering provides cooling with external Pre Conditioned Air (PCA) supply units which goes through long ducting before reaching the cabin. Because of the sheer size of the aircraft, this cooling method is inadequate to cool the aircraft even with an additional PCA unit attached. The same problem is faced while the aircraft is under maintenance in the hangar. During maintenance, pre conditioned air from the units is supplied directly into the cabin through the doors. Substantial cooling is lost from the ducting due to the PCA unit being more than 75 meters away from the aircraft.

Boeing and Airbus limit the temperature and airflow that Emirates Engineering is allowed to supply via the PCA connections.

To understand why current cooling methods are insufficient and to investigate where the cooling is lost, Computational Fluid Dynamics (CFD) analysis was done on a model of the aircraft cabin, and the cooling load of the aircraft cabin was calculated so that accordingly the required amount of cooling calculated can be delivered without any waste of energy or space around the aircraft. A Computer Aided Design (CAD) model of the aircraft cabin was created using a 3D CAD software, Solid Edge ST. Using Solid Edge ST, cabin models of a section of the upper deck and lower deck of the aircraft were created after extensive research was done to acquire accurate dimensions of the Emirates Airbus A380 cabin and the seating program.

CFD Analysis was done on the CAD models using the Ansys12.1 software provided by the University.

Using the FLUENT commercial code from Ansys 12.1, the airflow through the aircraft cabin was analyzed and the change in velocity and temperature through the cabin was predicted for the initial velocity inlet boundary conditions of the PCA units used by Emirates. From the results acquired, the loss of cooling through the cabin was investigated and the required temperature and airflow needed to cool the aircraft cabin was calculated. The existing system used delivers air at 11.6°C after which the cabin temperature is still at a high temperature of 31°C.

It was concluded that the inlet temperature of the air should be at -18°C using the existing system, where the air is delivered at 6.5kg/s, to cool the cabin to 22°C. Therefore the required specifications to propose a new successful cooling system have been acquired.

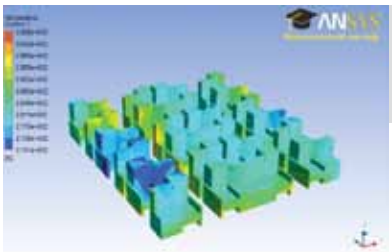

Figure 1: Temperature contours on a section of the Business Class cabin seats (iso view), showing the change in temperature across the seats after the required cooling is distributed.

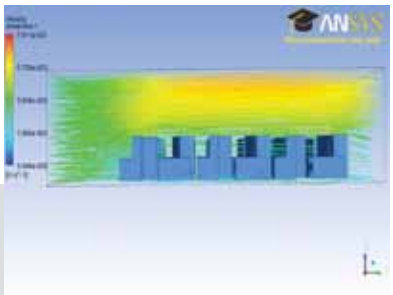

Figure 2: Velocity streamlines through a section of the Business Class cabin (side view), showing the change in velocity across the cabin after the required cooling is distributed.

Quick Overview of Service-Oriented Architecture

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ABSTRACT

Today's organizations face various challenges due to regular changes in business requirements, which results in changes in these organizations' IT systems. Knowing that these systems are usually distributed and heterogeneous, making these systems work together has always been a challenge for IT practitioners. Indeed these practitioners have to understand the capacities and limitations of each system so they can deploy business processes whose execution spreads over these systems and hence, is capable to cross organization boundaries. Service-Oriented Architecture (SOA) has recently been hailed for its appropriateness for tackling this challenge. SOA exposes IT systems through a set of loosely coupled services and is built upon the following principle: I offer services that somebody might need and I require services that somebody might have. To achieve a successful adoption of SOA and quick return of investment of this adoption, there exist number of design principles that define the way services should be developed, used, and maintained. These principles include loose coupling, reusability, abstraction, and composition. Loose coupling is seen as the core principle of SOA which refers to the components of a system that depend on each other to the least extent and can be easily broken. This facilitates changes include adding, removing, reconfiguring, modifying components in a system. To see the benefits of SOA adoption, Web services are among the technologies that implement SOA principles. A Web service is XML-based designed to support interoperable application-to-application interactions using widely accepted and used standards, for instance Web Services Description Language (WSDL) for description needs, Universal Description, Discovery and Integration (UDDI) for discovery needs, Simple Object Access Protocol (SOAP) for binding needs, and Extensible Markup Language (XML) for defining messages. These standards facilitate the communication between clients and services across a wide variety of platforms and applications over the Internet. To understand the use of these standards, Web services are defined and described using WSDL in order for developers to use these services. UDDI serves as a way of discovering Web services. UDDI provides organizations with the available Web services that they need. The communication between the clients and Web services is done using XML-based messages. SOAP which is a communication protocol is used for interchanging these messages. As part of our capstone project we aim at experiencing the design and development of applications based on Web services. Two deliverables are expected out of this project: report and proof of concept. The report will cover different aspects related to SOA, Web services, SOA governance, Web services composition, and Web services Security. The proof of concept will correspond to a student/course registration system to manage students'/courses' records. In order to develop and deploy our Web services, we will use NetBeans IDE, JDK, and application server such as Tomcat Web server, GlassFish Server, or Oracle WebLogic Server. To develop our database for students'/courses' records, the needed tools are MySQL database server, JDBC Driver, and MySQL Connector.

Multi-purpose Speech Recognition and Speech Synthesis System

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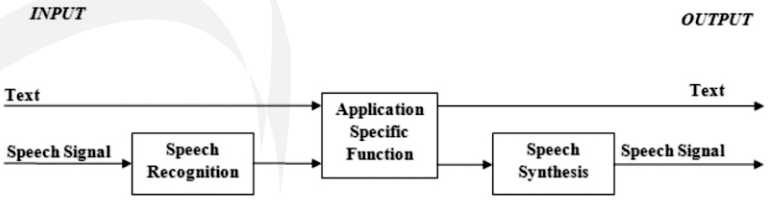
ABSTRACT

The software system includes applications that employ Speech Recognition (speech-to-text) and Speech Synthesis (text-to-speech) technologies. The input of the system is speech signal, and can also be typed text. The output can be voice signal or text, along with GUI forms. The applications are:

- Dictionary: looks up for the meaning of the input speech/text.
- Calculator: returns the result of the input speech/text mathematical expression.
- News Reader: returns the news as speech/text.
- Speech-based Search Engine: searches for results for the speech/text input.

The significance of this system is based on the fact that it provides a fast retrieval of information and can also be used by people with physical challenge as well. Fast retrieval of information can be attained by adding few databases that can save information obtained by previous Web queries. Also, the system has an object oriented architecture, which makes it easy to extend with more applications. Many additional applications are being under implementation. These applications include weather forecasting application, social networks (Facebook and YouTube) access applications, movie guide, and some others. The diagram below shows the typical structure of a typical application. The second bottom figure shows a screenshot of the main menu of the system.



The unique feature of this application is the integration of different modules for speech recognition and synthesis and of a collection of different applications together in one system that has a user friendly interface. This makes it accessible to a very wide audience of different academic levels, ages, physical status, and occupations.

However, the precision of the system is limited by the effectiveness of the Speech Recognition subsystem, the amount of training and the size of the possible vocabulary required.

Monitoring 6LowPAN Networks using Z-Monitor

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ABSTRACT

Low-power wireless personal area networks (LoWPANs) comprise devices that are conforming to the IEEE 802.15.4 standard. Typically, a LoWPAN includes devices that work together to connect the physical environment to real-world applications, e.g. wireless sensors. In some applications of wireless sensor network which are based on LOWPANs there is an urgent need to ensure reliability of data, to make networks faster, smarter, and more reliable. In a nutshell, we want to maximize the network performance. To get all of that, we must have a monitoring tool for IEEE 802.15.4. An example of that tool is Z-monitor. Z-Monitor (ZM) is a free tool for monitoring and controlling IEEE 802.15.4 Wireless Personal Area Networks (WPANs). It is compatible with the open source official TinyOS which is the implementation of the IEEE 802.15.4 recently released by the TinyOS 15.4 WG. It has also been tested and validated with the open-ZB implementation. Currently, Z-Monitor is available only for TelosB motes platform. The motivation behind Z-Monitor is the fact that commercial products for monitoring and testing IEEE 802.15.4 compliant LOWPANs are too expensive and typically require special sniffing hardware. In addition, other generic purpose sniffers such as WireShark and Ethereal are not specifically designed for IEEE 802.15.4 compliant networks and to provide a convenient solution for researchers and students for developing, debugging and deploying wireless sensor network applications based on 6LowPAN which is standard that integrates IPv6 into low power wireless devices such as wireless sensor nodes. This work makes part of the Z-Monitor project funded by the Deanship of Research at Al-Imam Mohamed bin Saud University, and directed by Dr. Anis Koubaa. It is continuation of two previous graduation projects developed by Ahmed Al-Dakhil and Mossab Al-Sania and other partners from different countries, mainly CES Research Lab in Tunisia and CISTER Research Unit in Portugal. They create the previous versions of Z-Monitor 1.0 and 2.0 which are include a GUI of Z-Monitor and offer some features such as sniffing the packets, display it in the GUI, draw the topology of the WSN (only Star topology), provide a timeline for the sniffed packets, provide protocol analyzer and packet statistics and decode 6LowPAN packets based on BLIP which is the implementation of 6LowPAN in TinyOS as you see in figure 1. The objective of our project is to extend Z-Monitor software to monitor 6LowPAN traffic. For that purpose, we reorganize the current code of Z-Monitor to have better modularity and extensibility. In particular, we separate the monitoring and packet decoding operation from the Graphical User Interface (GUI), add some advanced packet filtering options for traffic analysis, traffic dump into XML format and WireShark format and support multi-hop topologies. We believe that Z-Monitor will be of a great interest for the TinyOS research community. So, for the future, Z-Monitor can be extend to support other protocols such as ZigBee network layer and adding advanced filtering options.

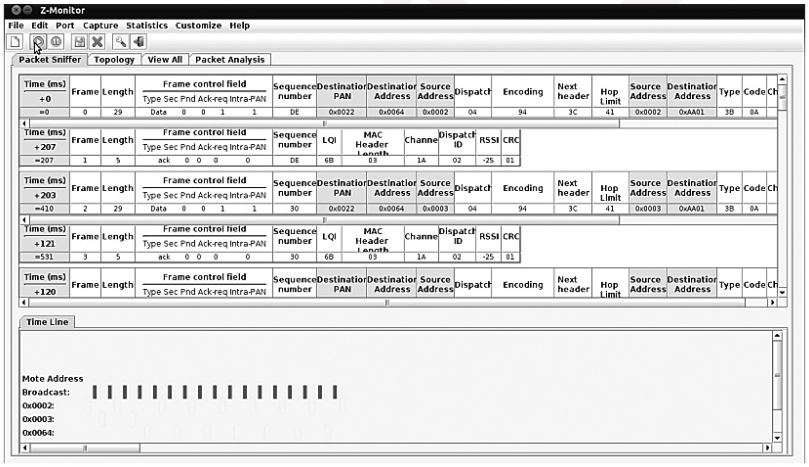

Figure 1: Z-Monitor 2.0 GUI.

I-Architect: A Virtual Reality CAD System

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ABSTRACT

Current architecture projects are characterized by interim partnerships between multi-punitive teams with varying levels of information handling capability and progression maturity. This involves a planning phase, design phase and a phase of formation of structures of all types. The final product development process in architecture is normally structured as a chronological chain of activities in which each action is separated in space and time and where the target design information is communicated via traditional files – like 2D drawings which is error prone and slow and reflects the functional perspective of the carried project by architects, who used to draw many rough drafts of any certain model in the past before implementing it in reality, and after a long fine-tuning process of drafts going through approvals of many designers and the owner, the final design is decided.

In operations involved in architecture and construction it is not often easy at all to achieve the described target situation. In practice due to difficulty or otherwise too much time-consuming communication people tend to minimize all required communication with other participants in the process. This situation is a big challenge for the development community. An obvious solution is to provide an easy-to-use communication for all stakeholders in constructing models for architects. The desirable overall target system is one where all those involved from clients to designers would have a good understanding of the model object at any time, and without trouble. Virtual Reality (VR) technology is suited for this purpose that will enhance the learning process, reduce lead times and increase efficiency of architectural students through our prototype system that can be used to aid architectural students to form scenes from scratch, import scenes from a 3D software like AutoCAD for editing and better manipulation, or both, with the advantage of a better experience, and a more flexible interaction with any scene. The idea is illustrated in figure 1.

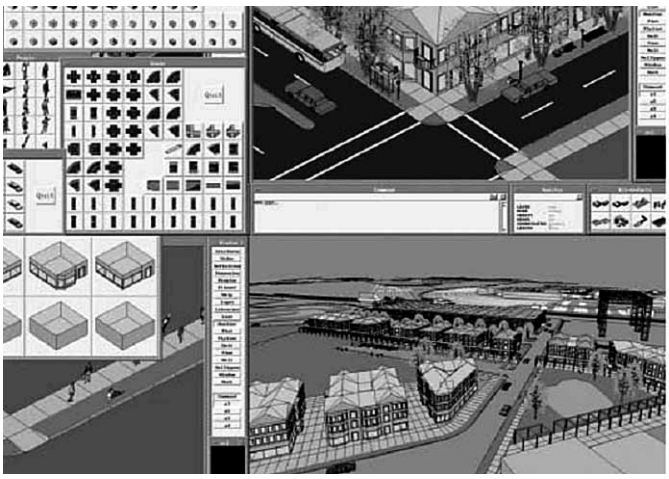

Figure 1: Kit-of-parts used on a sample constructed site

This project presents a part of an ongoing research, with two modules, that intends to improve architects' construction education through the use of virtual reality for Computer Aided Design (CAD) modeling (a 3D design of such environments plus time) of construction processes. This funded project intends to implement CAD modeling into undergraduate Architectural Engineering Curriculum that will provide an interactive learning environment for simulation, visualization and modeling of constructed sites. The proposed system intends to be a base for experimenting with the use of immersive virtual reality through which our created tool allows construction engineering students to interactively generate sequence of modules for a project in an immersive environment. This tool will provide a Java-based environment for sporadically creating and renovating newly created or imported models from a dxf-formatted CAD file. The system will serve as a flexible toolkit that will have most of the CAD operations and utilities in addition to have students able to manipulate designs in an immersive environment. A second group will handle the module creation of a Knowledge-Based System for verification of operations, guided tours with different levels of information.

Diagnosing ADHD with Eye Tracking Technologies

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ABSTRACT

This poster describes the design and development of a screening system for Attention Deficit and Hyperactivity Disorders (ADHD). Diagnosing ADHD is a complex process that requires a team of specialists and considerable effort that often involves monitoring people for one week or more in order to diagnose them. Professionals in the field often complain from the lack of devoted technical tools or programs that can accurately measure behaviors of individuals to help them in this process. In our local context, ADHD specialists suffer from the absence of Arabic interface programs that support them in diagnosis and screening of ADHD. Developing a system that attracts but doesn't distract ADHD people, and combining that with a friendly interface that helps specialists regardless of their proficiency in computers is a challenge. This project aims to address these issues by developing a screening program that provides objective measures of visual attention for individuals with ADHD. Based on the measures known to be provided by eye tracking methods, we developed an ADHD diagnostic tool that connects to Tobii Eye tracker devices. This eye tracker is a device that can measure the eyes' positions and permits comprehensive measurement of the eyes movement paths, and estimates the direction of gaze of a person- relative to a monitor. By using this technology, the system enables specialists to conduct rapid and accurate screening of people suspected as having ADHD. This software component allows the specialists to run three major tests for subjects, these tests measure the following: Test1: visual attention when the system displays a grid of static images, Test2: visual attention when the system displays a grid of static and dynamic images, and Test3: smooth pursuit test when the subject views an animated object.

Before starting the session, to the system begins with calibration in which subjects follow moving circles on the screen with their eyes. The calibration process enables the Eyetracker to capture the subject's eyes characteristic, and validate the subject's position. Specialists can determine test durations from 1 second up to 5 minutes. In the first two visual attention tests, specialists can use the default image or upload new ones. Specialists guide subjects to focus on a selected object in the grid. During the test, the eye tracker captures the subject's gaze data, which is recorded in a text file. The processing of the test results depends on x and y-coordinates and time stamps of the subject's gaze. According to this data , fixation will be identified in corresponding location on the grid. After that, for every object in the grid, we can calculate the number and the percentage of fixations, duration of fixations, and the mean of fixation durations. Attention duration on objects of interest can help specialists determine the likelihood of subjects with ADHD. In addition to these results, the system generates visualizations representing the results in graphical forms, which are heat maps and gaze plots. Gaze plots will display fixations in the order of subject's gaze movements. The third test measures smooth pursuit, which is the duration of subject's eyes following an animated ball, the smooth pursuit is the continuous movement that slowly rotates the eyes to compensate for motion of the visual object. The system allows specialists to customize the color, radius, and speed of the animated object. The system does not diagnose ADHD people but it helps specialists to obtain objective measures of visual attention.

Figure 1 Test 1 or Test 2 Result.

Design and Development of a Zakat Expert System

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ABSTRACT

In today's business world making decisions has a major impact on the future of organizations. Some decisions turn out beneficial, while others turn out unfavorable. As a result supporting those people who have to make decisions through systems is of paramount of importance. These systems are usually referred to as Experts Systems (ESs) and aim at mimicking experts' reasoning process by providing responses to users' questions. ESs are used in different domains such as medicine, engineering, geology, computer science, business, law, and education. An ES is defined as a software system that consists of two main components: knowledge base and inference engine. The knowledge base uses facts to represent knowledge, and the inference engine executes rules upon these facts to provide responses. A user interface is usually developed to ensure the interactions between users and the ES. A rule is considered as a conditional statement that links given conditions to actions or results. Like other information systems, designers of expert systems are assisted with design methods such as KADS (Knowledge Acquisition and Documentation Structuring) and development tools such as Jess (Java expert system shells). KADS is a modeling framework that covers all aspects of knowledge-based applications. KADS supports most features of a knowledge-based systems development project, including: project management, knowledge analysis and modeling, knowledge system design, organizational analysis, knowledge acquisition, analysis of system integration issues, and capture of user requirements. The KADS methodology is a result-oriented rather than process-oriented. It describes the expert systems development from two perspectives; result and project management. The former is a set of models of different aspects of the KBS and its environment, which are continuously improved during a project life cycle. Jess program is completely written in Java. Jess is an interpreter for the Jess language, a rule-based expert systems that can be strongly coupled to code written in the powerful, portable Java language. Jess, The Java Expert System Shell. Livermore, CA: Sandia National Laboratories). In our capstone project we aim at developing an ES for the domain of Zakat (obligatory charity). Zakat is one of the Islam's five pillars and is "a way of purification for the souls and properties of the wealthy man and the poor man at one and the same time, and it is success for the one who pays it". Different things are eligible for Zakat such as money savings, gold, silver, animals, and plants. Each type is subject to different conditions and rules. Muslims need to know these rules so that they can calculate their payment of Zakat correctly. ESs will be very helpful in calculating Zakat. By asking the user some questions about his wealth the system calculates the amount of Zakat that she should pay.

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Case Study on Dubai E-Government (A Force to Change)

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ABSTRACT

The use of web services has increased dramatically in the last couple of years. People tend to use the World Wide Web to do their shopping, paying bills and money transactions. To cope with this new communication style, governments have to adopt the World Wide Web to have a direct and an easier connection with their citizens. Specialized web departments were created to develop web applications to provide services such as money transaction and billing systems. Those services are to provide efficiency and to save both the client's and the department's time. Those kinds of governments who upgrade their services and convert to an electronic are called e-Governments as what Dubai Government. So in order to be successful, e-government people have to get over these barriers by involving the end-users in the very first building, prototyping and implementing process. In this research the Dubai E-government directions will be discussed in terms of the services that are provided to the three categories: Business, citizen, individuals. In addition to the challenges that faced the implementation and how did Dubai e-government overcome them, the legal barriers, examples of e-services and ways of improving them throughout the years of experience, how was the main goal met throughout the last 10 years and finally advices and lessons learned from the beginning till these days.

As a first step, a survey was held at Zayed University to illustrate the effect of shifting to an e-government, the most used e-services, in addition to the privacy trust issue and the satisfaction regarding the services from the users' side. Our target was the whole university community, from different nationalities and ages, students to workers and instructors, in order to cover a diverse range. The results of the survey and a link to the survey are provided in Table 1.

Table 1. E-Government usage survey results

Question	Percentage of each answer	Total answers
1. On scale of (very satisfying 1→5 very unsatisfying), how would you rate Dubai E-government services ?	- 1 →76% - 2 →14 % - 3 →6% - 4 →3% - 5 →1%	250
2. About the privacy of the information you provide while using e-government services, you:	- Trust that your information is protected → 92% - Worry about your information privacy → 8%	
3. How did the shift from traditional government to e-government affect you? And how?	- Positively → 78% - Neutral → 20% - Negatively → 2%	
4. Among the following governmental websites which provides several e-services, which one do you use most:	- Roads and Transport Authority →34% - Dubai Health Authority → 4% - Dubai Municipality → 9% - Dubai Courts → 2% - Dubai Electricity and Water Authority →14% - Dubai Police → 37%	

The result of the first question indicates the satisfactory level of the e-services regarding the users. The highest percentage of answer was very satisfying but it still needs more improvement and continuous maintenance to reach a higher user satisfaction level. In the second question most of the users answered that they trust the privacy of their information which is an indicator that they are comfortable with the use of e-services. Thirdly, regarding the effect of the shift from a traditional government to an e-government, the replies were between the mostly positive. And the final question showed that the most used e-services are Dubai police and Roads and Transport Authority services. That demonstrates the high effectiveness of these two services and that the users are very satisfied while using them as they resolved an issue.

"eHelp": A Finger Tracking and Gesture Interface for the Disabled

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ABSTRACT

In this digital era, the gap between human and computer interaction is narrowing with emerging technologies being developed and experimented through diverse methods. One of these technologies includes the Nintendo Wii Remote, which has brought a revolution in gaming technology. In the gaming arena, the Wii Remote emits signals that are sensed by the infrared sensors in the Wii console. The Wii console deciphers these produced signals into game movements. The Wii Remote has recently gained attention for its application on the computer. By connecting it through Bluetooth, it can be turned into a receiver for infrared signals to enable "finger-tracking". This project has been inspired by the growing opportunities that this technology presents. With the use of Wii remote and a few other tools, a simple interface can be provided between the user and the computer. One example of this interface is the control of the mouse cursor through the motion of the fingers. This overrides the single cursor by making it a multi-touch technology. The purpose of this project is to provide an easy interface for the disabled to communicate with their caretakers' through simple finger motion and gestures. These gestures help them to communicate their needs or requirements. The Nintendo Wii controller uses accelerometer technology to detect gestures. The data is retrieved as timed triplet (ax, ay, az) representing X, Y and Z-axes. The Wii remote acts as an infrared camera. The user will wear reflective tapes on their fingertips and should be approximately 3-5 feet away from the Wii remote. The console should be placed at around 45-degree angle. The infrared signal detected by the console will be analyzed and filtered using an API. Gestures that need to be tracked are pre-defined. Thus, everytime a finger gesture from the user is made; it is compared with the previously collected data. The application consists of two modes: training and recognition mode. The training mode consists of performing the to-be-recognized gesture repeatedly. This procedure trains the system to correctly identify pre-defined gestures – thus triggering the transition to the recognition mode. Once the gestures have been recorded in the training mode, the recognition mode matches the gestures made with the recorded data through the calculated probabilities. The application recognizes the gesture made by the disabled person and sends the corresponding meaning of the gesture to their caretaker, who maybe at a different location. The respective message will be displayed on the caretaker's monitoring screen informing them about the needs of the disabled and thus enabling the caretakers to provide help.

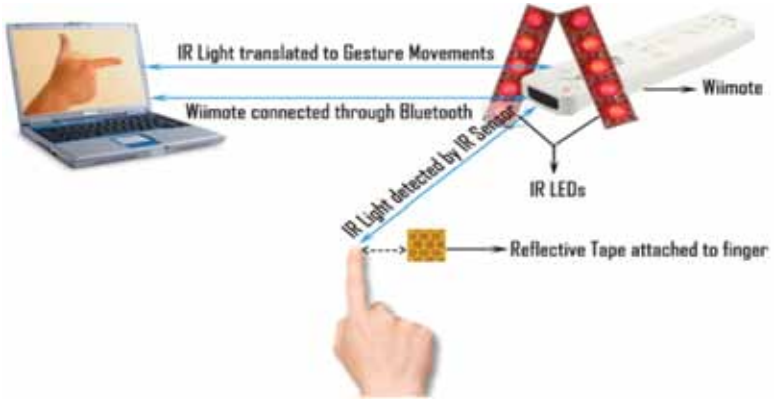

Fig 1.Working of the e-Help Gesture Interface

An Effective User Interface Design for an Interactive Virtual Museum: Case Study of Dubai Interactive Digital Museum

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ABSTRACT

Interactive digital or virtual museums are becoming more popular, accessible and usable by many groups of people nowadays. This kind of museum is exists only online and accessible through the web. It is also known as an online museum, electronic museum or Web museum. Digital Museums allow user to take a virtual tour of the museum contents and display it in an interactive fashion. Users will be able to view and rotate objects in different contexts and positions. Visitors can browse through the Dubai museum collections using the chronological approach, based on region, historical period, and area of interest.

This paper presents a new user interface design for an interactive virtual museum: special case Dubai Museum. A survey of several world digital museums have been examined and studied such as European virtual museum, Iraq virtual museum, Japan virtual museum, and virtual Egyptian museum to help researchers understand the existing features of an existing and common user interface design. A partially functional prototype of the newly proposed interface for an interactive virtual museum will be developed to be used for user studies and usability testing purposes. A full usability and accessibility study will be planned, designed, and conducted using Eye Tracking methodology. As part of research methodology will use both quantitative and qualitative approach. Data and feedback on well-defined user performance and preference pertaining the new system functionality and features and interface will be collected and analyzed from the study to measure the usefulness, effectiveness, efficiency of the new interface design. Based on the findings of the study, a set of final recommendations well be developed in this regard. An additional benefits of developing new Dubai interactive museum is to help international visitors by providing them with virtual and easy access to the valuable UAE museum collections. It will also help in promoting knowledge, heritage and cultural information sharing cross people around the globe.

An Experience to Develop an Environmental Web Portal for Qatar

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ABSTRACT

A web portal plays currently an important role to give detailed information about a specific domain. Many modern countries have developed their portals which offer many useful information and electronic services to their inhabitants and visitors. A web portal contributes largely to build a knowledge based society. The state of Qatar is moving from an oil and gas industry to a knowledge provider industry. In addition to that, Qatar aims to be an attractive country for thousands of workers and tourists. Protecting the environment is one of the main aim of Qatar 2030 vision. Many environmental protection projects have been initiated in different sectors of the country. The oil and gas companies have set important plans to reduce the pollution (water, air, co2 reduction, etc). Schools, universities and social entities have launched new projects to plant trees, flowers and herbs in different areas of the countries. The local municipal council ALBALADI launched also many contests for the best home gardens. Other private and public organizations (banks, ministries, cars inspection company, etc) have also their own projects. It is then very important to group all the information about these projects in one site and to be the main point of access to information. Our work consists of developing a web portal about the environmental projects in Qatar. We will show our experience in: (1) data collection; (2) site development; (3) interfacing; (4) calendar of events etc.

Image Classification and Clustering Using Various Algorithms

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KEYWORDS: Classification; Clustering; Image Data; Feature Extraction; Bayesian Theory; Decision Trees; SVM; K-Means

ABSTRACT

With the growth of modern societies, a huge amount of data is collected everyday and needs to be analyzed and interpreted using powerful means in order to help in decision making. Data mining deals with (hidden) knowledge discovery in a set of data related to a specific domain. Data mining is the ultimate and the most important phase in the knowledge discovery process. Data Mining is part of knowledge discovery process. Data mining is seen as a step in an iterative knowledge discovery process with the following main steps: Data Cleaning, Data Integration, Data Selection, Data Transformation, Data Mining, Pattern Evaluation and Knowledge Representation & deployment. Data Mining and knowledge discovery have been applied in various domains including Business transactions, Medical and Personal Data, Games, Digital Media, CAD and Software Engineering Data, Virtual World, Text reports and Memos (E-mail messages), Etc. recently there have been increasing interest to apply data mining on image and multimedia data [1, 2].

Data mining functions are diversified. The most common ones are Classification, Clustering, Characterization, Association Analysis, Forecasting, etc. In this paper, we are interested in particular in classification applied to a set of textured images. Texture, as it plays a very important role in visual perception, has been extensively studied and used in the image and multimedia community to carry various research tasks including classification, clustering, retrieval, etc. [1, 2, 3].

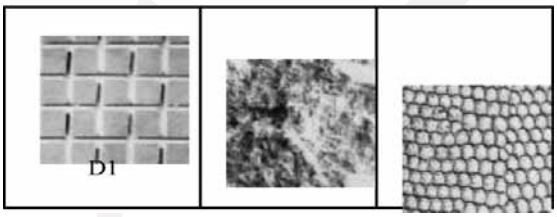

Figure 1. Sample of images from Brodatz database.

We are interested in classifying and clustering a set of textures into various classes and clusters. Classification is a supervised data mining function that groups data into pre-defined classes as opposed to clustering which is a non-supervised data mining function that groups data into non-predefined clusters. First, we apply three (3) models to these images in order to extract useful features that represent the textural content of these images [6, 7]. Then we apply classification techniques namely Bayesian classification, decision trees, and support vector machines as well as the K-means clustering algorithm to classify and cluster images. Experimentations, done using Oracle Data Miner (ODM) [4] show interesting results.

Sample of images used in the project from Brodatz database [5] are given in Figure 1 and sample of classification results obtained using Bayesian classification, decision trees (DT), and support vector machines (SVM) are given in Table 1. The results obtained suggest that, for classification, although all three (3) classification techniques have an acceptable performance, Support Vector Machines (SVM) provide the best performance while for clustering, the results obtained suggest that the K-means algorithm performs well except in cases where data is not homogeneous.

IMAGE_ID	BAYES	Decision Trees	SVM
D1-1	D1	D1	D1
D1-8	D1	D1	D1
D28-8	D28	D10	D28
D28-1	D112	D10	D28
D105-1	D106	D76	D105
D105-8	D105	D10	D105

Table 1. Sample of classification results.

ACKNOWLEDGMENT

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Facial Surface Alignment and Recognition based on Structured Patterns

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ABSTRACT

The context of this project is face recognition. Face recognition is the process of identifying a person using his image as biometric data. 3D image-based face recognition is expected to overcome many problems facing the traditional 2D face recognition, such as the lack of explicit shape information, and pose and lighting variation. However, as a relatively new technology, a number of challenges still exist that limit the performance of the current 3D facial image-based recognition system. Among these challenges how to represent the facial shape to ensure effective and efficient matching but face instances. A standard paradigm of face matching is aligning their corresponding surfaces and evaluating to what extent they do overlap. This procedure requires computing the geometric transformation, composed of a rotation and translation that brings the two facial surfaces into a same coordinate system. This method raises the fundamental correspondence problem, that is finding points in one face that anatomically correspond to other points in the other face. To address this problem we propose a method that exploits the ordered structure of some facial patterns in order to establish large number of valid correspondences. We design and implemented the extraction process of these facial patterns, we employed them successfully for aligning facial surfaces (See figure below), and currently we are investigating the final stage, which is their application for face recognition. We are using a public database that includes the scans of 100 faces.

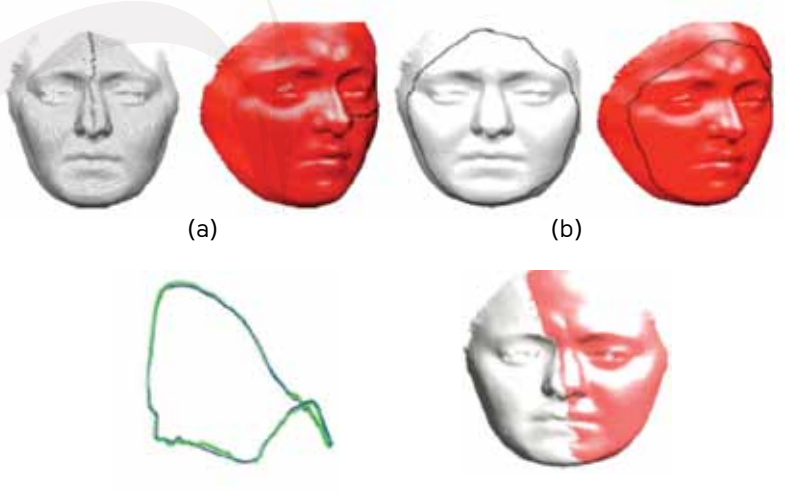

Figure: a: extraction of the structured pattern in two faces at different views. (b) selection of the largest pattern in each face. (c) computation of the transformation that aligns these two largest patters. (d) repeating the task (c) for all the patterns and using the resulting transformation to align the two surfaces.

The process starts by extracting concentric rings around the nose tip. From them we derive discrete contours composed of the triangle facets' centers in each ring. Theses contours exhibit some irregularities inherited from the raw triangular mesh. To address this problem, we apply a basic spatial smoothing followed by an arc-length parameterization. Next, we parameterize the contours using the inverse map, with a natural cubic spline interpolation. Finally we extract from the spline curves a uniformly sampled discrete contours. The circular arrangement of the points within these contours is used to establish valid correspondences between two facial instances. These correspondences are then used to align them.

Cloud Computing in Healthcare

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ABSTRACT

In the past few years, the usage of the technology cloud computing has been amazingly increasing among verity of areas, such as e-business, social networks, educations ...etc. That propagation is mainly due to valuable and outstanding features that this technology offers. We can define Cloud Computing as providing resources as services over the internet so instead of the users having to keep them in a local serves which require significant amount of storage and usually are expensive, they can rent a space from a cloud computing providers .Also in this case, the user will only be concerned about the services needed and the implementation details are kept abstracted.

The healthcare industry is continuously developing and the amount of health data that need to be stored and professionally managed is massively increasing. Therefore, the need for more storage to keep the data, smart techniques to handle them is very important. Also with all the technology and increasing awareness among patient the ability to remotely access to them is becoming more and more sufficient. Cloud computing give the best answers for these demands with it web-based resources. As mentioned before, with cloud computer web-based feature, a huge amount of the expenses that was required for the actual physical infrastructure and for storing the data will be cut. Also cloud computing provide more reliability and failure recovery than regular systems. Another future that satisfies client needs is providing easy to user interfaces for verity of users and giving them the ability to access their records remotely.

With all these promising features, healthcare organizations are still hesitating toward adapting the cloud. The reasons behind that are mainly privacy, security and reliability concerns. For privacy, health organizations must follow certain strict regulation to protect patient record. Also patient are yet concerned about who is going to access their records and how are they used. For security they are worried of malicious hacks and security breaches. And finally the fact that it relies on connection arias concerns about what if the connection are lost. Yet Cloud computing has found solution for many of these concerns whether by adding more feature to increase security and privacy such as increasing the level of encryption, authentication and authorization, or by providing a backup connection in case of a failure.

Google Health and Microsoft Health Vault are prominent systems that are example for cloud computing which are used for healthcare purposes. Google Health with its easy-to-use interface and cohesive left hand navigation, tabs, and profile, smooth the data entry and increase the usability of the system. In the other hand Microsoft had some trouble some with the navigation where all terms in medical jargon and the irregularity among data entry elements. But provided a desirable feature where more details can be easily added. For security aspect both systems proved their capability of providing highly security and privacy tools.

Finally, cloud computing technology provide an almost excellence solution to improve the healthcare industries by decreasing the cost and increasing the usability and reliability. Also, it is the one of the latest inventions in the healthcare IT which introduces great services to all health system members and helps them to develop the health environment over the world. In this paper we discuss how cloud computing is used in healthcare.

IT Standards in the UAE

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ABSTRACT

IT Standards in the UAE is a research project that conducted for a year under the supervision of Dr. Manar Abu Talib and Dr. May El Barachi from Zayed University and Dr. Adel Khelifi, the Canadian ISO member from Al Hosn University. The goal of the project is to help the organizations in the UAE to harmonize their IT standards. Standards play an important role in our lives as they ensure a high level of quality, safety, reliability, and efficiency to the products and the services.

We were able to:

- Survey more than 95 organizations in the UAE
- Develop the "Guide to Success" booklet which includes real case studies of how to get certified.
- Conduct interviews with ESMA, GASCO, ADSIC and Injazat in order to have a complete study on the innovative use of IT standards in the UAE.

Moreover, we wanted to raise the awareness about using IT standards through the development of IT Standards Application about the main IT standards for the main standard organizations such as ISO, IEC, IEEE and ITU. Finally,we developed a complete web application about the IT standards since ESMA seeks to focus its resources on IT field.

The survey measures and evaluates the use of standards in the UAE. It contains 13 questions if the organization is using the IT standards and 6 questions if the organizations are not using them. The survey has been distributed among 95 organizations within the UAE. These organizations are from seven different sectors which are; Oil Sector, Health Sector, Banks, Ministers & Government, Heavy Industries, IT Organizations, and Travel agencies.

The **"Guide To Success" booklet** has been prepared to highlight the best practices of organizations that implemented ISO standards such as (i.e. ISO 27001 and ISO 20000). It contains five case studies about organizations located in the UAE, which are: ESMA, ADSIC, Injazat Data Systems, GASCO and Nbiz Infosol. The guide is designed as a source of information that helps the organizations to understand how they can apply standards (i.e. ISO standards). It simplifies the standards' implementation procedures, works the way that the organizations want, and makes the ISO certification possible. It could encourage different the organizations to implement the IT standards processes to improve the performance of their information system which, in turn, will help in gaining the customer satisfactions. This booklet shows that the IT standards will hold a very important role in enhancing different information systems and business practices in the UAE organizations within the next couple of years.

IT Standard Application is the first step to raise user's awareness about the main IT standards. IT becomes one of the important aspects in education, health care, marketing, banks, trading and almost everywhere. Therefore, the user need an application to get detailed information about the needed IT standards of different categories. IT Standards Application presents a total of 260 IT standards of four main standard organizations: ISO, IEC, IEEE and ITU. The strong link between the IT and the other fields in human life makes this application useful and required currently and in the future. Also, IT Standards application will raise the user's awareness about the main IT standards and how they have been used in the reality. This subject is still new in the UAE and there are many people, who have a narrow idea about the IT and the international standards. The application will save time and effort by providing an easy and a quick search of the specified standards. It acts as a effective resource for further researches and practices. In addition, the application contains functional features and options such as printing, changing the application theme, transferring the information to Excel file and searching for a particular standard of a particular IT category. We believe that the use of IT Standards Application will be more in the future as the UAE focus to reach to the globalization and enhances its new resources and industries.

IT Standards Web Application is to be added to ESMA's official website. These web pages were designed using Microsoft Visual Web developer 2005. Several categories of the IT standards have been added such as: Networking standards, Software Quality standards and Security standards . Also, the user can view a detailed description of each standard in the list. In authorized users can view a list that contains the names of all organizations who participated in the survey. These organizations are listed depending on different sectors like: Oil sector, Health sector, Banks, Heavy Industries, Travel Agencies, IT Companies and Government and Ministries. The web application is easy to use and friendly designed.

Autism Screening With Eye Tracking (ASET)

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ABSTRACT

Diagnosing autism is a challenge to professionals in medical, psychological, and rehabilitation domains. In contrast to physical disabilities that are visible and measurable, autism remains a mystery to many professions. One of the most challenging aspects of autism for doctors and parents is the lack of a definitive tool for diagnosing the Autism Spectrum Disorder (ASD) in children. Autism cannot be diagnosed exclusively with medical tests; screening and diagnosis involves clinical examinations, observation and evaluations. If autism is diagnosed late in an individual's life, intervention is often less effective than with early diagnosis. Social and emotional deficits are the features that appear to be unique in ASD, whereas communication defects and repetitive behavior patterns also occur in other disorders (Schultz, 2005). Distinct patterns of visual attention in examining faces reveal the key problems that children with ASD experience in visual communication. When a child is not tracking the most informative parts of the face (eyes, nose and mouth), very little can be gathered with respect to other people's emotions. We developed the ASET program to examine the viewing patterns exhibited by children with ASD and measures the eye gaze intensity and patterns for each individual.

We have developed software that collaborates with an eye tracker and uses it in the screening of children as shown in Figure1. Eye tracking is a new technology that is used for measuring the point of gaze ("where we are looking at on the screen"). It uses a combination of an eye- tracker device and gaze analysis software.

Figure 1 : A child during a screening session

Initially the software gathers the child's demographic data that include indices which are commonly used by specialists' for screening, such as Social Impairment (SI), Communication Impairment (CI), Restricted and Repetitive Behavior and Interests (RRBI), and Development Age. Then, a specialist designs a session by selecting the number of stimuli and their duration to be presented to the child. These stimuli include both frontal faces and social scenes. The eye tracker then returns the gaze data to be filtered and analyzed depending on the number and duration of each stimuli's exposure. Finally, ASET presents the results of each stimuli in the form of visual maps of subjects' visual attention (e.g. heat maps that show the aggregation of attention distribution, gaze plots that demonstrate the gaze path, and statistical charts which present the number and duration of fixations and mean fixation duration). These visual maps show the distribution of attention on key areas in the stimuli such as eyes and mouth. Screening is based on whether the amount of attention allocated to these areas is below normal thresholds.

ASET uses facial processing prior to running the screening sessions in order to determine the areas of interest (AOIs) in the face for each session stimuli (i.e. eyes , mouth). Facial processing in ASET includes three steps. First, images are uploaded from a file or a database. Second, images are scanned to extract the face in the image and exclude any non-related areas such as image background. Finally, once the face is extracted the system will localize the features (eyes and mouth). Stimuli in sessions also include images of social scenes where the area of interests- the side view of each face and the path gaze between the two subjects- are predefined and do not require any pre-processing.

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Monitoring Memory Streams: Assistive Technology for Alzheimer's Patients

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ABSTRACT

Alzheimer's Disease (AD) is the most common type of dementia [1]. It is one of the many diseases that are getting the world's attention nowadays because it has affected increasingly large numbers of people in the last few years, It has been estimated to affect approximately 50,000 people in Saudi Arabia [2], it's also considered to be the sixth main cause of death in the United States [3], AD is very hard to detect in its early stages, although there have been a lot of studies to try and create a tool to diagnose it. But so far, AD remains an incurable disease. Usually people who suffer from Alzheimer's are elderly people; they could be our parents, grandparents or someone we love, having the disease would have a great impact on their life leading them to feel hopeless, dependent and unable to cope due to the continuous confusion and memory loss.

The Monitoring Memory Streams system is an application addressed to help Alzheimer's individuals' caregivers in measuring the memory decline. Monitoring Memory Streams will provide tests that accurately measure the memory progressive decline for AD individuals, by implementing a photo database of the AD individual's relatives, friends, familiar places and surrounding objects, and an audio database to store the voices of the people who are close and familiar to them. We also used the user centered design approach in the requirements elicitation and specification since our intended users are people with disabilities to help us understand the appropriate requirements for those targeted users. Also Monitoring Memory Streams will include an Arabic user interface that will be used with native Arab users, who have design considerations specific to their culture and unique language. Figure1 depicts how the system works.

In addition to measuring the memory decline the application will also help in slowing down the memory decline by keeping the brain active as a part of memory therapy. Moreover it will generate reports of Alzheimer's individual's performance to enable the specialists to follow up with their memory decline or stability. And to add some entertainment to the application the AD individual or caregiver can browse either the photo/audio without feeling the pressure that comes while running the test. Furthermore, Monitoring Memory Streams is not only limited for people with Alzheimer but it will also help people with memory loss in general.

By this process we will reduce the burden and effort to be made by the caregivers -also known as the second or hidden victim of AD- in taking care of their beloved ones, while at the same time keeping an accurate track throughout a long period of time. The photos and audio clips used in the tests are to be uploaded by the user. Monitoring Memory Streams is expected to be used at home or clinic by the AD individuals with the help of their caregivers or specialists. To make Monitoring Memory Streams more attractive, appealing, and easy to be used by our targeted users, it will be developed for multi-touch tablet-computer, which is mainly known as a platform for audio and visual media.

Monitoring Memory Streams is currently under development, and it is expected to be available and tested by June, 2011.

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Data Security in Cloud Computing

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ABSTRACT

This research discusses data security in cloud computing. Our goal was to help companies looking to move their data to the cloud to have a clear understanding of the risks associated with cloud computing and the benefits of cloud computing and look at one of the vendor's security measures.

Cloud computing is one of the new trends that a lot of companies are shifting towards. According to Gartner researches, cloud computing is one of four trends that will transform information technology and the way business is conducted. One of the reasons that limit the expansion of cloud computing to all business functions is the data security concern.

The concerns of data security are increasing due to the ongoing development of the Internet and the ease of data sharing and communication. Data security is critical in all aspects of our lives; banking information, personal files and businesses almost all of those are processed using technologies and through network communication.

In this research, we first introduce data security and cloud computing by defining the terms and introducing their importance in addition to discussing the data lifecycle and the level of risks associated with each stage. We discuss the services offered by major cloud computing service providers, such as, Amazon, Google, and Microsoft. We then move to discuss data security technologies and techniques, which are authentication, access control, and audit. After that we start discussing data security in cloud computing by addressing most of the threats or concerns that may occur when using could computing which are Unknown risk profile, Malicious insiders, Shared technology issues, Data loss and leakage, Insecure interfaces and APIs, Account or service hijacking, and Abuse use of cloud computing. Each of these threats is clarified, with a definition of it, which type of the cloud platforms do they affect and how can cloud computing customers minimize the level of the threat. After discussing all major issues we will talk about some possible technical solutions such as encryption and private clouds. Then we introduce one of the clouds computing service provider (Amazon Web Services) and we discuss in details their security measures. The last part in the research is about the security benefits of cloud computing. We conclude that security cloud computing needs a few more years to be solid. A lot of researches have been conducted to introduce new ways of securing the clouds and the data.

Mufasseh: A Modern Arabic Dictionary

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ABSTRACT

Our research involved the investigation of issues associated with young learner dictionaries and the development of such a dictionary. Gaining competence in the Arabic language is a challenge even for native speakers, due the complexity of the language and its morphology. In addition, current Arabic dictionaries in printed and electronic forms are not user- friendly. The goal of this project was to develop an interactive linguistic skills–acquisition environment for children in order to make them learn more vocabulary in an enjoyable way. Visualizing ideas is an effective learning technique that enhances learning, since dynamic pictorial presentations have a lasting impact on children's memory.

The basic premise of our project is to focus on the child's view of the universe to enable him/her to navigate in a virtual world where he/she can explore the places and their objects. Immersing the children in an animated universe and gradually challenging them will attract them and encourage them to search and learn.

Our approach consisted of several stages: (1) assessment of the state of the art; (2) paper prototype development; (3) requirements engineering; (4) object-oriented design; and (5) system implementation and testing. In the assessment stage, we identified a set of attractive dictionary features of various languages and we elaborated a comparison based on these features. Major features of foreign electronic dictionaries we considered are interactivity, search by image, search by category, search by themes, word search, and thesaurus search. Electronic Arabic dictionaries were also included. This investigation allowed us to select major features that enhance the ease of building one's vocabulary. As an exercise to explore various scenarios and to elicit requirements, we developed a paper prototype that explores the child's universe in a lively fashion. Subsequently, we laid the foundations by capturing the requirements, developing the use-cases, and describing the structure and behavior of the system using object-oriented concepts. A working prototyping that simulates exploration was built. This prototype illustrates the navigation process from a big picture (the universe) to close-ups (objects of interest). Once the user focuses on an object, then several game-like functions become available, e.g., matching, spelling, and animating the corresponding picture/word/sound. Currently we are developing the full-fledged system using the Flash Builder technology.

The contributions of our research address a much needed learning tool, i.e., an electronic Arabic dictionary that is not only easy and intuitive to use, but provides a game-like environment to encourage children to explore on their own. Such a tool makes children become independent self-learners, thus enriching their linguistic skills. Its online availability will benefit Arabic as well as non-Arabic speakers.

Figure 1 navigation scenario: village display

Development of Target-Interception Autonomous Robot System

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ABSTRACT

Our research addresses issues associated with the design, formal specification and implementation of an autonomous robot system that is capable of chasing a maneuvering target while avoiding obstacles. Thus, we describe our approach to developing such a system and summarize our major contributions to the development of hybrid systems.

Just like other mobile communication and computing devices, autonomous robots are becoming an essential part of our everyday lives. These robots are built to perform tasks that can imitate human activities as well as handle some boring and dangerous tasks. Examples range from vacuum cleaners, to dangerous landscape explorers, to museum tour guides, etc. Designing this kind of autonomous robot-based systems requires methodologies that provide a high level of formality to ensure safety and reliability.

Autonomous robots are critical hybrid systems that require a high degree of safety and reliability. We formally addressed these issues by: (1) decomposing the system into manageable units; (2) elaborating a structural and behavioral design of each unit; (3) developing specifications; and (4) implementing and testing a prototype. To effectively manage the complexity of the problem, we decomposed the robot system into several subsystems: the perceptual subsystem, the planning subsystem: the acting subsystem and the monitor. The behavior of the robot perceptual system is defined as the result of communication between the processes emitter, receiver, timer, and map-builder. Our robot system has three main subsystems: the perceptual system, the planning system and the acting system. The perceptual system uses sonar sensor technology to scan the area, define its features, and generate a map. This map shows the robot's position, the target's position and the environment's features. The planning system uses the information from the perceptual system to find the most suitable path to reach the target. While tracking the target, the robot engages into four different modes: move-to-goal mode, move-to-intermediate-goal mode, obstacle-avoidance mode and path-smoothing mode. The planning system sets the robot's mode according to the map. The acting system controls the movement of the robot and moves according to the planning system's directives. There is also a coordinator system that manages the communication between the three main subsystems. Based on a set of requirements for each of these subsystems, we developed a design and a specification. The design consists of use-case diagrams, UML class diagrams, state charts and sequence diagrams. We used the Z specification language to formally express the structure and behavior formal specification. Finally, we implement a software simulation of the system to demonstrate the feasibility of our approach.

The major contributions of our research are the design and specification of the structure and the behavior of an autonomous target tracking and interception system using UML and Z. Our formal approach provides a way to demonstrate that our product exhibits critical properties such as safety and reliability. A 3D simulation software of the autonomous robot system is currently under development.

Undoing Sending an E-mail

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ABSTRACT

1. Introduction and motivation

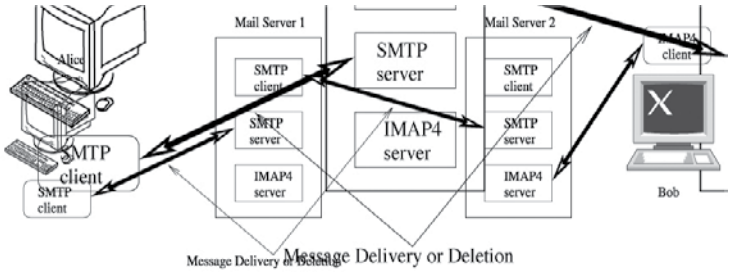
Undoubtedly, almost everyone who ever used the e-mail system has wished that the e-mail client has a button labeled with "Undo Sending" that would revoke the last (or a previous) e-mail message that was already sent. There are several reasons to wish for such a capability. These include, but are not limited to, sending an e-mail with no subject when the e-mail system does not warn on this event, accidentally pressing the "Send" button instead of the "Spell check" one, erroneously sending a sensitive e-mail to a friend instead of a family member, and last but not least forgetting attaching a necessary file.

2. Implementation details

We have modified the Simple Mail Transfer Protocol (SMTP) by adding a new "DELETE" command that is sent from the SMTP client to the SMTP sever. Upon receiving the command, The SMTP server deletes the respective e-mail only when the recipient has not already read the e-mail. Therefore, this undo functionality is opportunistic and is deployed as "Undo if Possible." However, in most cases, this is a very useful feature, which prevents many embarrassment situations. The two specific situations where this indispensable functionality can be unsuccessful is when the recipient reads any newly arriving e-mail instantly or when he or she is setting up a mail client (e.g., Outlook Express and Thunderbird) to pull down e-mails via the POP3 protocol. However, a small percentage of contemporary enterprises are still using POP3 to retrieve e-mails. POP3 has mostly been replaced with the more powerful alternative IMAP4 or recently with the Web-based mail. Additionally, we believe that the probability a user reads every new e-mail instantaneously as it arrives is small.

The working of the original mail system and the modified system is best described by the following most general scenario; see the Figure below. Alice uses her mail client, e.g., Thunderbird, to send an e-mail to Bob. Bob's mail server is different from that of Alice. Alice's mail client uses the SMTP client that communicates with the SMTP server of her mail server. Then, Alice's mail server invokes the SMTP client that communicates with the SMTP server of Bob's mail server to deliver the e-mail to Bob's mailbox. Bob uses his client to retrieve emails. In this example, Bob's mail client uses the IMAP4 client that communicates with the IMAP4 server of his mail server. Now, suppose Alice wants to revoke the e-mail she just sent to Bob. Her modified mail client sends a DELETE command with sufficient information to identify a specific message to be deleted (e.g., subject, date, and/or full message text). Recognizing that the e-mail to be deleted is on another mail server, Alice's mail server relays the DELETE command to the Bob's mail server. Since Bob's mail server keeps track of read and unread messages, it deletes the specified e-mail if Bob has not yet read it. Finally, Alice would receive a notification of whether the deletion was unsuccessful in the same manner one would receive a notification when an e-mail cannot be delivered to a recipient for whatever reasons.

We have chosen the hmailserver to test, validate, and evaluate the proposed modification because hmailserver is open source; it supports all mail protocols, i.e., SMTP, POP3, IMAP4, and Web mail.



3. Related work

Currently, there exist two ad-hoc mechanisms to provide this necessary feature. First, in the Gmail mail service and in the Outlook mail client, each e-mail message is held in an output queue for a given amount of delay time. The maximum amount of the configurable delay is 20 seconds. Therefore, if the sender does not act before the 20 seconds, the message is sent to its destination and cannot be undone. Note that such delaying feature can still be used along side with our proposed solution, which can still work beyond the 20 second limit as long as the recipient does not read the specific e-mail. The second mechanism is similar in spirit to our proposed solution and is employed by Microsoft's Exchange mail system. However, it has several disadvantages, such as, it necessitates both the sender's and the recipient's mail servers to be both Microsoft Exchange, it is implemented using proprietary protocol that might not comply with the corresponding RFCs of the mail protocols, and it has strict constraints on which folder a message ends up in.

MAC - Layer Protocols for WiMAX-Sensor and CCTV Network

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ABSTRACT

WiMAX (Worldwide Interoperability for Microwave Access) is expected to arise as the main Broadband Wireless Access (BWA) technology providing voice, data and video services with different type of QoS (Quality of Service). Although different type of QoS classes had been defined by the IEEE 802.16 standard, the scheduling architecture is left to be vendor specific. Designing an efficient scheduling algorithm provide high throughput and minimum delay is challenging for system developers. In this research, we describe the WiMAX technological features like how it's physical and MAC layer was designed and frame structure to be add new non WiMAX user (sensor, CCTV or both) to WiMAX network. And give non WiMAX user high priority to send data (no big reserve in bandwidth because only alarm data). And the result is enhancement when we apply variable slot more than fixed slot.

Our experiment is using 10 WiMAX users and two non WiMAX users with two ways for fixed and variable slot. For fixed slot each user has slot size whatever has data or not. The frame size slot is divided by the number of user and the slot size is still fixed until one or more user is removing out from the range of WiMAX. But for variable slot, the frame size slot is divided by the number of user which he has data and the process is check after any slot if the number of user which have data increase or decrease and modify the slot size. The highest priority is for non WiMAX users with variable slot. When all non WiMAX users is finishing his data, the WiMAX user start sending data with variable slot and for any slot the process check if any non WiMAX user have data the process give him priority for sending data. We separate non WiMAX user from WiMAX user and we explain the difference between two algorithms for scheduling, Strict-Priority and Round-Robin algorithm with variable slot size. The RR algorithm is better than SP algorithm; because all non WiMAX users start sending in RR algorithm, but in SP algorithm only one non WiMAX user start sending until finish his data, then the second is start to send (sensor or CCTV is very important information like alarm and must be sending his data immediately). We implemented our experiment with Matlab program. Figure 1 illustrates the difference between fixed slot and variable slot for 12 users. We see the enhancement is increase up to 50% percentage like user number 4.

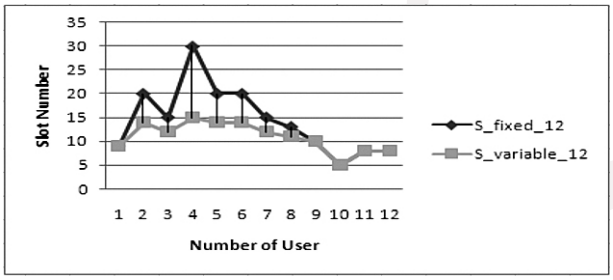

Figure 1 Last slot number for sending data, 12 users

For future work, we are going to expand this research to by Increase non WiMAX user and increase throughput by modifying the slot size instantaneous for the last slot when the last slot is less then slot size

Prevention IP Address Spoofing Using ACLs and uRPF in Watch Mode

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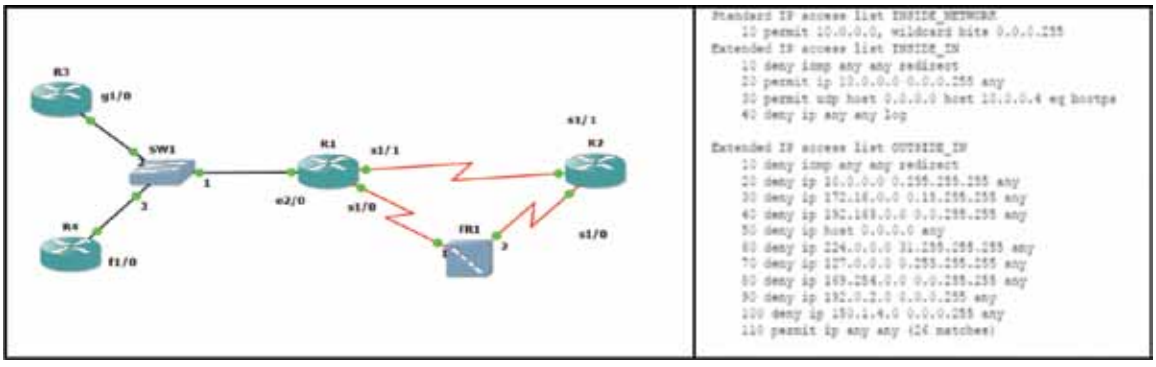
ABSTRACT

Computer security is the process of preventing and detecting unauthorized use of your computer. Prevention measures help you to stop unauthorized users from accessing any part of your computer system. In this project aimed to study and experiment the issue IP address spoofing prevention using ACLs and URPF and experiment. Access Control Lists (ACLs) Configuring IP ACLs to prevent IP address spoofing using CLI. (ACLs) prevent spoofed packets passing through the router. In unicast Reverse path forwarding (uRPF) is a technique used in modern routers for the purposes of ensuring loop-free forwarding of multicast packets in multicast routing and to help prevent IP address spoofing in uincast routing.

The exhibit shown below is the directions of configuration in which routers are directed as per the NAT scenario, the task is to enable uRPF checks and IP address filtering on outside to filter out using ACL and the networks are RFC 1918 and RFC 3330. Yet exempt some networks from verification. Additionally, all spoofing attempts should be logged Create additional interfaces Loopback1 and Loopback2 on R2 with specific IP addresses. It do not advertise the new Loopbacks into any routing protocol and disable BGP on R1 to stop receiving default route. Create access-list 100 on R1 and permit network which is not targeted to attack. Deny and log everything else is configured. Similarly the network is configured uRPF on R1, using Serial and FR interfaces. Apply access-list 100 as uRPF ACL.

At the same time the recommendations of RFC2627, ingress filtering should be performed, to deny “illegal” IP addresses.

That is, only our network is permitted from inside, and “our” networks are denied as sources on outside also, it’s a good idea to filter out ICMP redirect messages and disable IP source routing. The experiment pay special attention not to block source address 0.0.0.0 on inside interface, since DHCP usually uses it to send requests. As per RFC 2627 deny packets sourced from specific network. Create extended access-lists to filter out ICMP redirects and permit UDP packets from 0.0.0.0/32 to R1’s address port BOOTPs implemented via Ethernet interface and FR interfaces.



This is a great benefit to the internet backbone as blocking packets from obviously bogus source addresses helps to cut down on IP address spoofing which is commonly used in DoS, DDoS and network scanning to obfuscate the source of the scan. The procedure we used to experiment using we will use Graphical Network Simulator (GNS3) that allows emulation of complex network. The system has the capability to determine if the packets are coming from within the system or from an outside source. This method can be enhanced by disconnecting the source routing on the network to prevent hackers from exploiting some of the spoofing capabilities. The result of these experiment observed using different troubleshooting method. The study of this network paves to optimize the network from attack.

An Arabic Sign Language Computer Interface Using the Xbox Kinect

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ABSTRACT

The Xbox Kinect sensor kit hit the U.S. market on November of 2010 as a hands-free, Controller-free gaming console sensor extension, which provides full-body playing capabilities. The Kinect sensor lays down a strong foundation for the development of applications that goes much farther than computer gaming. It provides full-body 3D motion capture, facial recognition, and voice recognition capabilities, along with open source libraries that allow access to the data gathered and processed by the Kinect and its sophisticated software. In this project, we are developing a computer interface that captures commands in Arabic sign language, analyzes those commands, and performs the computer functions intended by those sign language commands.

With the proliferation and pervasiveness of speech-based systems (e.g., car GPS navigation devices, it is becoming clear that speech-challenged individuals are being left out of this technology trend. Our system aims at closing this technology gap, and provide equal share of the technology benefits to all individuals regardless of their needs. The system will be applied to the Jordanian sign language (JSL), which is a variant of the Arabic sign language.

JSL is the primary language used by most deaf people in the Jordan. It consists of two distinct forms of communication. In the first form, called signing, gestures are used to communicate the approximately over 1000 most common words. In the second form, called finger spelling, the fingers on a single hand are used to spell out more obscure words and proper nouns. In addition, there are two constructs used to add depth to communication in ASL. Facial expressions can be employed to distinguish between statements, questions, and directives. In this project, a complete system will be constructed to recognize the hand movement and facial expressions. The hand movement along with the facial expressions will be tracked using the Kinect sensor.

The recorded data, from both the facial expression data, and hand and fingers data will be further analyzed to recognize the signing and the finger spelling. The analysis part will consist of 4 major sections, pre-processing of the collected Kinect data, segmentation to extract the time event, features extraction, and classification.

- Pre-processing: Normally raw data suffers from noise and inferences. In this step we will try to eliminate this.
- Segmentation: In this part, the onset and the offset time will be determined to extract the time event from and sequence of events.
- Features extraction: The recorded data for both facial expression and hand movement will be in a form of a time series. It is not efficient to use the entire time series for pattern recognition; instead features or parameters will be extracted from the raw data and uses them for classification and pattern recognition.
- Classification: This is the last part of the implementation and it employs a kind of artificial intelligent methods for classifications. Other methods are also available and will be explored to find the optimum and accurate method.

Figure 1 shows the successful detection of the “hello” gesture by our system. In order to enable the detection of more gestures, words, and signals, it is imperative that we identify and distinguish the various fingers in the hand, as shown in Figure 2.

Figure 1 Last slot number for sending data, 12 users

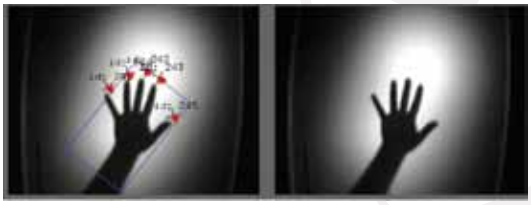

Figure 2. Detection of fingers

Virtual Mouse - Human Eye Controlled Assistive Mouse Movements

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ABSTRACT

Human eye controlled computer interaction systems are particularly well known for providing an efficient medium for communication from humans to computer in a way that closely replicates natural human communication. A few of such systems have been proposed in the literature for the purposes of assistive technologies such as mouse control, keyboard and voice input. However, they are limited by their incapacity to handle microsaccades (small movements of the pupil), changes in the target's position and

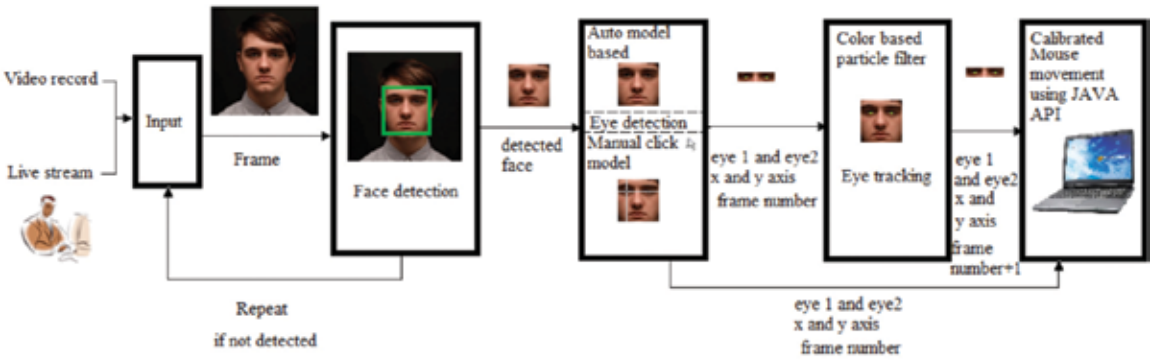

Figure 1 System Block Diagram

the need for special hardware interface. Therefore the deployment of such systems has often been inaccurate, unreliable and rather expensive. In this paper, we propose a convenient mechanism of controlling mouse movements to assist people who have physical disabilities to use the computer. Our proposed virtual mouse system incorporates several functionalities such as acquisition, face detection, eye detection, calibration, mouse pointer localization and mouse movements. We present a new eye detection method (model based detection framework), based on combined local and global shape models for deformable object matching. We engage this system, closely integrated with face detection, to simultaneously detect both the eyes using a point distribution model. The main advantage of detecting both eyes is to help increase the system robustness and reliability. In addition, it also helps determining the distance of the target from the screen thereby allowing compensation for slight changes in the targets position. Finally, we also use the localization of one eye to correct the tracked location for the other. We employ a color based particle filtering mechanism to track the eye ball across the different frames of the video and the predicted/tracked eye location is further calibrated and input into the mouse movement control application program interface. Our system will run in real time with the ability to provide functionalities such as mouse movement, and mouse click. The system will provide the user with a friendly interface to control the system parameters and fine tuning. The proposed virtual mouse system will overcome a number of limitations that other systems have, such as high cost, efficiency, reliability, health risks and other inconvenience. In Figure 2, we demonstrate some preliminary results of our system. The plot shows the location of the mouse pointer as computed by our system compared to its original expected location. Here, we also show the results of comparing our model based on the output from one eye against the outputs from both the eyes (where the location of one eye corrects the other). We anticipate that the project will play an important role in progressing the research within eye detection, tracking and gaze detection and at the same time provide a natural means for physically disabled users to interact with the computer. We also trust that the project will play a critical role in industries as it will provide computers that support eye tracking features to give customers with physical disability the opportunity to use them. Furthermore, the proposed software can also be used by regular users to augment and speedup human-computer interaction.

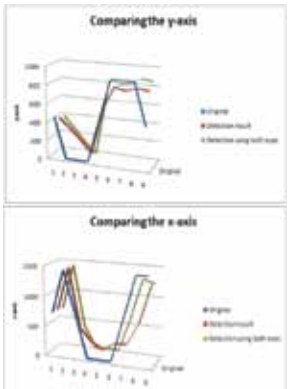

Figure 2 Results

Efficient Artificial Neural Network Design for Recognizing Iris Data Based on Intensity Reflected and Saved in the Eye Print Image

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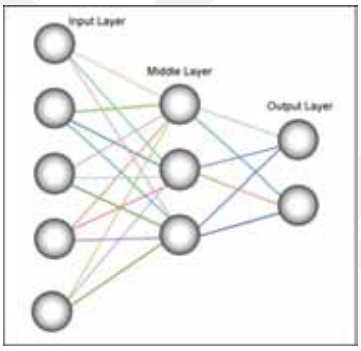
ABSTRACT

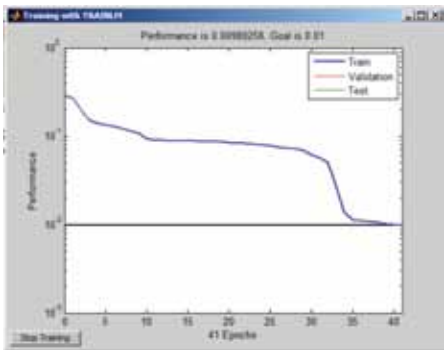
Nowadays in different areas of Biometrics, iris recognition has been taken into consideration by researchers as one of the common methods of identification like passwords, credit cards or keys. Although the human iris is small, it has enormous pattern variability. Iris pattern recognition as a novel biometric technology has great advantages such as variability, stability and security which can be used for differentiating the individuals and groups. Features extracted from the human iris can be used in iris based recognition system that can be of great importance for the real-time applications. Iris scans have been used in several international airports for the rapid processing of passengers through immigration which have pre-registered their iris images.

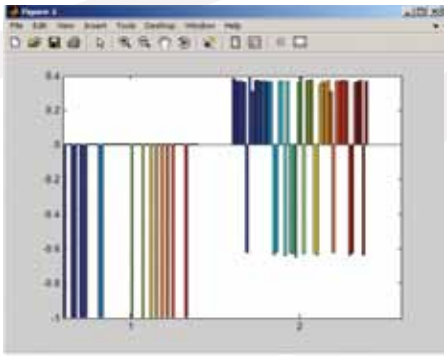
Artificial neural networks are mathematical models inspired by the functioning of biological neurons. There are numerous variations in how the neuron is modeled. In some cases, these models correspond closely to biological neurons for the purpose of recognizing patterns. The network consists of an input layer, an output layer, and one or more hidden layer, Figure 1. Each layer consists of multiple artificial neurons; these artificial neurons are connected to other neurons in adjacent layers. Since these networks contain many interacting non-linear neurons in multiple layers, the networks can capture relatively complex phenomenon. Learning occurs through the adjustment of the path weights and node biases. The most common method used for the adjustment is back-propagation. In this method, the weights are adjusted to minimize the squared difference between the model output and the desired output for an observation in the data set. The squared error is then propagated backward though the network and used to adjust the weights and biases.



Our model implies recognizing eye print patterns for three different ethnic backgrounds based on the intensity saved for 150 samples of eye prints. The novelty of our model in classifying and recognizing patterns is based on extracting the intensity features from the eye print images and accordingly passing these features for all samples through our designed neural network. The examination results have demonstrated high performance in terms of a recognition error = 0.01.

To begin estimating the network, the weights and biases are usually initialized with random values. The observations are then input to the network and parameters are adjusted using the following methods. First, an observation is presented to the input layer and an output generated. The difference between the network's output and the desired output provides the error that is back-propagated to adjust the weights. Then, the next observation of the data is presented and more adjustments made. This method is used to start the gradient descent process (since it leads to a fast descent of the error surface) . Running the simulation of the neural network, the results are plotted below with MSE= 0.0098 compared to the target error .01, Figure 2.





Face Recognition on Surveillance Images

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ABSTRACT

The main purpose of this research paper was to obtain a solution to identify an individual from a network of Surveillance cameras in an Airport or public place. When the face recognition software finds our subject of interest; it will output the location of the subject's location or a list of most likely locations where the candidate may be present (depending on the likelihood probability). In general, the face recognition process consists of four stages; Acquisition of the Database, Face Detection or Segmentation, Feature Extraction and Classification.

In the initial job was to analyze different methods that were researched for each of these categories and benchmark their works. In the Acquisition of the database, the nature of their existence in terms of face recognition was examined. In the beginning, the ORL Database (AT&T faces) database helped in determining, which feature extraction method and classifier to be used for obtaining the best average recognition rate. Later on, the SCFace database was acquired during Feb 2010, which fulfilled our purpose of a much richer surveillance database. It had a database of clear mug shots including some rotations and database of 8 different surveillance cameras to test the algorithm. It would also provide us feedback to our algorithm because of the availability on other researchers for this topic.

For the Face detection or segmentation, a manual face-cropping algorithm was devised as a result of our focus on the identification algorithm during the feature extraction and classification stages. This method was employed to remove totally all the redundant information such as the hair, the clothes and the background to minimize error in the identification process. Next, these manually cropped faces were normalized to a median size of all the cropped faces.

The next step followed the Feature Extraction method by a simple Discrete Cosine Transform (DCT) method and was prepared for the classification stage. By this stage the features of the images have been extracted into a 'Training Matrix', which were used in classification. In addition, Classification stage includes a broad range of decision-theoretic approaches to the identification of images. For the surveillance system, the classifiers used were based on statistical inferences for identification of a person in a surveillance image with respect to the person's feature extracted full frontal mug shot. The kNN (k Nearest Neighbor) Classifier was used, using the Euclidian Distance and Cosine Distance, as well as Linear Discriminant Analysis (LDA) classifier was used, which created subclasses for classification. The preliminary investigations were done on the ORL Database and results showed that optimum average recognition rates - In comparison to the tests inferred on the ORL (AT&T faces) databases, the results obtained were high – 90% and 95%, for DCT (Discrete Cosine Transform) and PCA (Principal Component Analysis) respectively. However this algorithm performed poorly with the SCFace database for different distances, thus the kNN using cosine distance and Linear Discriminant analysis was used to refine the recognition rate. The initial benchmark recognition rate on the SCface Database was 8% using PCA; however, we managed to improve the recognition rate up to nearly 60% by using all the previous mentioned algorithms as well as introducing Cosine Distance Classifier which in turn improved the overall average recognition rate by 15% in comparison to Euclidian Distance Classifier.

Improving Holy Quran Recitation Using Speech Recognition Technology

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ABSTRACT

All Muslims long to recite the Holy Quran (HQ) in the appropriate way by applying Tajweed rules, this requires continuous practice, and amendment of trainers. As attending lessons frequently poses time, cost, and transportation problems to the learner, it would be of great beneficial to have a ubiquitous HQ trainer.

As a step to fulfill the aforementioned need, Automatic Speech Recognition (ASR) technology has been used in our research project to develop a system for recognizing the special sounds of the HQ recitation. Our aims include recognizing the pronunciation of phonemes of Arabic letters, in addition to the corresponding geminates for each Arabic constant and vowel, and exploring the performance of the same developed system in the recognition of more sophisticated Quranic sounds of Arabic letters, called allophones, which represent occurrences of Tajweed rules.

It is common in ASR research projects to use Hidden Markov Model Toolkit (HTK), and apply the Mel-frequency Ceptral Coefficient (MFCC) in extracting features of each sound unit from sound files, and use the Hidden Markov Model (HMM) to build the mathematical model that is used in the recognition process. In our research, we have applied these techniques and tools in the special area of HQ recitation. To address the specifics of this area, we used a new labeling speech scheme developed by Dr. Yahya Elhadj that is specifically developed to represent Arabic sounds instead of using a universal scheme. In addition, the prototype of the HMM was defined using Gaussian Mixture Model (GMM). Another special aspect of our research is experimenting with sounds at the allophone level.

Our sample data that is used to train the system and test it was taken from the Quranic speech database that was built by Dr. Elhadj. We focused on 137 verses of 6 suras selected from the thirtieth chapter and recited by a single male recitor, as we are developing a speaker-dependent ASR system.

The phonemes experiments were designed to recognize the pronunciation of phonemes, whereas the allophones experiments addressed the recognition of the pronunciation of allophones. Preparing the HMM for training included specifying it with a 3-state topology, in addition to specifying the number of GMM to be used –ranging from 1 to 10. In each experiment, half of the HMMs were trained using bootstrap procedure, and the other half using flat start procedure.

The best results of the phonemes experiments showed that the recognizer is able to recognize approximately 90% of the phonemes, with accuracy of 62%. The best results in the allophones experiments showed that the recognizer is able to recognize approximately 86% of the allophone, with accuracy of 58%. The results also showed - in both sets of experiments- that training the HMMs using bootstrap procedure produced higher system performance than using flat start procedure especially when increasing the number of GMM.

Finally, as a subsidiary aim of this research, a user-friendly interface that is integrated with the HTK was developed, to facilitate testing the recitation by recording the recitation and then display the statistical results that represent the recognizer's performance.

e-pharm Assist

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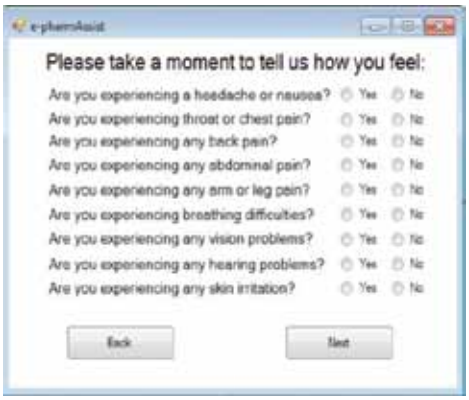
ABSTRACT

For decades, man has toiled away in laboratories in desperate search for a cure to life claiming viruses that lurk among us undetected. Several procedures, inventions, miraculous chemicals and vaccinations have been developed over the years in order to defend ourselves in the never ending battle between virus and antibody. And with the advancement of technology we have been able to achieve unbelievable feats such us robot surgery, laser eye surgery, organ transplant, artificial organ implants and so much more. Miraculous drugs have come round into production to provide immunity and relief from the deadliest of viruses. Many times, elderly citizens residing on their own do not have the means to reach a pharmacy in time in the event of a health crisis. Inaccessibility of proper medication in due time has led to situations go from bad to worse within seconds. Even so, with modern technology, there are many flaws in the current distribution system of pharmaceuticals. Therefore, our aim is to eradicate even the slightest chance of medication not being within reach, should the need arise. Every household these days has a subscription to Internet services and our aim is to provide access to pharmacies and medicine at any given time through our software which is connected via the web to pharmacies nearby. Human life is priceless, and our focus is to eliminate the slightest possibility of it being lost due to inadequacy of any form of medical accessibility or availability. The software is designed to be quick and easy to use without any complicated menu navigation. It will feature an easy to use interface. It will contain information of and access to all pharmacies within a 50 km radius and also provide access to available doctors, dependent on the severity of the patient's case. The user will have the option to input the name of the drug he requires and also a prescription id which will be cross verified with the doctor's database in order to assure that the correct strength and dosage of the drug is delivered. If the patient is not sure which drug to take, then he/she will be provided with a simple form to enter the symptoms and any medical conditions that need mentioning. An in-house doctor will diagnose the mentioned details and will personally visit the sick person along with the appropriate medication and take further measures if necessary, such as calling for an ambulance. Delivery of medicine will be free to elderly citizens above the age of 60, which will be clarified in the initial steps of the software. Approximate time of delivery based on distance from home will be displayed along with a quickly generated transaction receipt for the customer's record. There will be a prompt to enter a medical insurance company name and number so that people who are covered will not be charged, after being cross verified with the company database. After all, what good is any miraculous drug if it doesn't reach you on time?



Data Mining and Information Security

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ABSTRACT

According to MTI Technology review magazine, data mining is going to be one of the most 10 sectors that is going to change the world in the future. Many giant companies entered this sector recently like Oracle and IBM by supplying software or models used to serve data mining. Also there are many companies interested with the security of data mining like Cisco Company. But, what makes all these companies interesting in data mining? What is behind the big profit gained from data mining companies?.Many standards and rules was added recently to help improving the information security .These standards are figured and controlled by strong organizations and sometimes governments like International Organization for Standardization (ISO) .Lets take the ISO27001 for managing the information security as an example .We are going to talk about a new powerful technology that helps firms and companies focus on the important information in their warehouses. This technology is data mining, which is extracting information from large data sets. The future of data mining is bright and portentous ¡and growing very fast to reach web and text mining .Many researches are done recently to serve the future knowledge of the data mining. Data mining allows businesses to make positive knowledge decisions by its tools which predict future trends and behaviors. Data mining tools help finding predictive information that experts may miss because it lies outside their expectation.

We will try to link between two important and new aspects for data which are the security of these data and the extracting of it or what is known as data mining. The technique of data mining comes with the huge size of databases used now. This will increase the risk of losing or damaging these data warehouses .Then it comes the need of more security management to guarantee your data reliability, privacy, integrity, etc. Information security was known as an old definition used in the Second World War, but it becomes a large sector because of the revolution of technologies. The security of information avoids risks not only for individuals also for organizations, business companies and the most important governments.

Lots of institutions are spending more resources on developing their data mining skills and by doing and looking for new research on data mining. Privacy Preserving Data Mining (PPDM) is the most popular example of these researches. Our research focuses on the security side of the data mining, shows the solutions for controlling access to private data and control actions on accessible private data. There are some cases we discussed in this research regarding to the security of information within data mining. Can we have information with a totally secure side or the security process will not stop? In short words, we will start by explaining data mining mentioning the most common techniques. Then, we will move to talk about data warehouse. After that, we will go deeply into the data security sector. And finally, we will move to the relation between data mining and information security, and ideas used for more security information on data mining.

Next Generation e-Wallet – A Conceptual Outline

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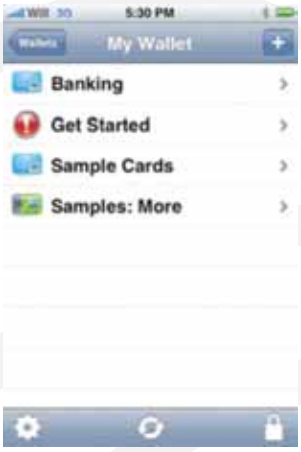
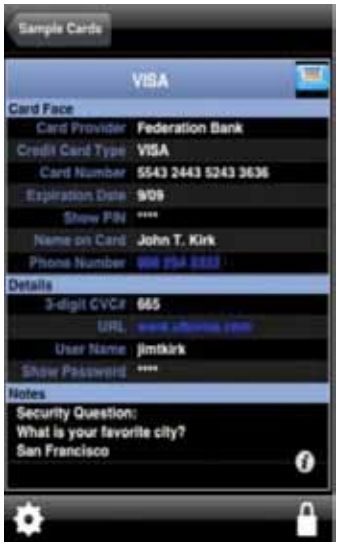
ABSTRACT

In the past years there has been a significant convergence of multiple advanced technologies. The Internet has created a new economic ecosystem, the e-Commerce marketplace making it virtual economic Main Street of the world. Electronic commerce or in short e-commerce, refers to business activities like selling and purchasing of products and services carried out over electronic systems like the Internet and computer networks. The greatest and the most important advantage of e-commerce, is that it enables a business entity or an individual to reach the global market at their convenience. This has extended its potential to the banking and financial sector via the Internet, Smartphones and networking devices providing user friendly interfaces & applications. iPhone is a Smartphone which has popularized the use of touch screen as a primary interface for mobile phones. Apart from providing basic facilities like internet connectivity, messaging it provides a wide variety of features which have been broadly classified into categories like hardware, media and applications. Technically, the iPhone works as a media player and a web browser providing applications which are easily available and downloadable. The e-Wallet is one such application provided by the iPhone. This is an emerging concept which allows the user to store personal banking information securely, giving them access to their accounts anywhere and anytime. This acts as a "mobile pocket bank" serving as an electronic wallet that holds passwords, PINs, user names in a secured password protected and encrypted environment on the mobile device. This application maintains multiple account types [both debit & credit] enabling people across the globe access their account details securely through smartphones. The e-Wallet provides a physical independent, virtual environment to its users making banking an effective and efficient online process. The objective of our research is to study the functionality of e-Wallet, its benefits and contributions to the finance and telecommunication industry through a framework. Our study intendeds to analyze the security issues, drawbacks of this system, and recommends policies for a better enhanced system in order to provide a safe and secure environment to its users. This will be the next generation - "Anytime, anywhere banking indeed".





Real-time Detection, Tracking and Reaction to Moving Objects at High Speeds

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ABSTRACT

In this research, we design, implement and test a real-time detection and tracking system of fast moving objects based on a video stream, and a laser pointing system to react/defend against the threat. Applications of this research are widespread, and range from military applications such as anti-rocket system, to airport security such as tracking a specific person in a crowd, and even entertainment lighting system where the lights follow the objects on the stage.

Figure 1 shows the diagram of our experiment. The detection part of the system is based on image processing of a video stream from a fast camera. To detect movements, subsequent frames from the video are subtracted from each other. The subtracted images will indicate whether any motion exists or not. A moving object appears as white pixels while the non-moving parts of the image remain as black. A non-linear filter is then applied to the subtracted image to remove the noise. Then using a fast algorithm, the center of mass of the moving object is found by summing the number of one's in the binary matrix representing the moving object. From the changes in the center of mass, the position, speed and direction of the moving object is estimated. This information is then sent to a microcontroller at a different location which controls a reaction system—in our case a laser pointing system. The laser pointing device is mounted on a pan/tilt module which is controlled by two stepper motors, and the laser pointer will track the moving object as long as it is within the view of the camera. The microcontroller predicts the future position of the object and calculates the angles of the laser pointing system. These angles are then converted to the appropriate number of steps needed for two stepper motors. The microcontroller connects to the motors through a high-speed RS-485 connection. One critical challenge is the calibration between the angles defined by the microcontroller and the angles of the stepper motors. This calibration will be performed through mathematical calculations and experimental testing. The camera in our system can operate at 120 fps which enables us to detect moving objects as fast as 100s of km/s. Our reaction system is based on fast and accurate stepper motors which can react within milliseconds time. The detection and prediction algorithms are developed by keeping efficiency and calculation speed in mind. Overall, this research demonstrates undergraduate students' ability to design, implement and test sophisticated applied projects at universities in U.A.E.

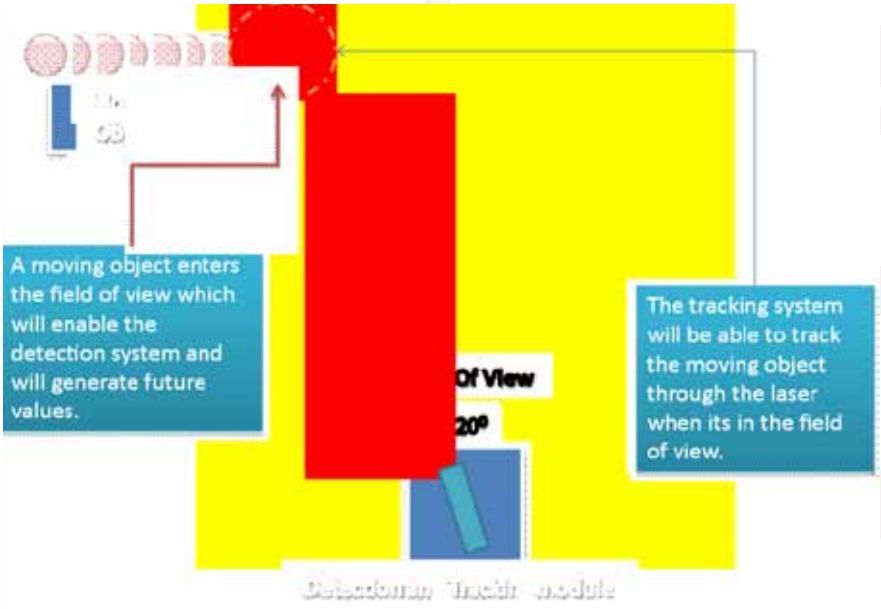

Figure 1: The diagram of Moving Object Detection System

Prospective Application of Artificial Intelligence in Mobile Based Services

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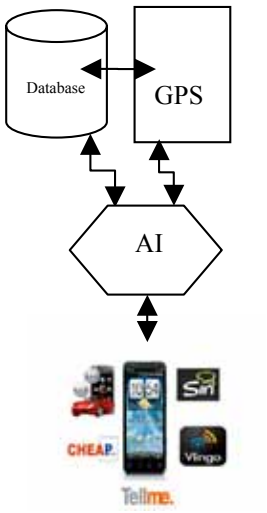
ABSTRACT

Artificial Intelligence is defined as the study and design of intelligent agents that perceives system's environment and takes actions that maximize its chances of success. The telecommunications industry has been a fertile field of application for AI. Some of the world's first practical expert systems in AI were employed to improve operations and maintenance of telecommunications networks and services. Future telecommunication services are very complex, and if they are to be promulgated to a wide audience they will require a much easier user interface. AI holds the promise of overcoming these difficulties and playing a major role in the widespread promulgation of new services. Currently, AI is being used in mobiles as an automatic telephone interpretation system that transforms a spoken dialogue from the speaker's language to the listener's automatically and simultaneously. But, the main question that arises is how to construct new environments that are suitable. The main aim of this research is to construct new environments and to able to give mobile phones a new meaning, which could be done by developing a software that turns a phone into a thoughtful personal assistant that understands peoples interests and helps find fun things to do. For this purpose the first and foremost step would be to identify the likes and dislikes of the user which could be done through feeds that allow transference of text between applications on the Internet or by searching SMS's received or sent word by word and identifying certain predefined keywords and maintaining a frequency of those words. After having identified these likes they firstly need to be stored on a database after which certain coordinates need to be set on the GPS system to identify locations of the person's interests in the locality and showing or notifying when the interest places are available in the area the person is in also as soon as the person opens the GPS system they should be able to locate places based on the area they want to search. This would help the people to be well aware of locations, since as per the general report 70% of UAE population is unaware of routes. This will also be a major success in the youth as it will show them every spot in the area where they can find some place of their interest. This will even help the visitors in the country roam freely as they will be have the area described in their hand. It also is very useful to locate any public transport locations such as bus stops, metro stations or abra (ferry) stations and also shows you hospitals, medical centers, police stations, ministry of foreign affairs, ministry of interiors, or embassies.



Adding "Agility" to Open Source Software Development: An Exploratory Study

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ABSTRACT

Agile Software Development (ASD) is a group of software development methodologies based on iterative and incremental approach to software development. The requirements as well as solutions evolve through collaboration between self-organizing and cross-functional teams in a cost effective way. Open Source Software Development (OOSD) develops software through efforts of large, globally distributed communities of developers collaborating primarily through the internet. These developers tend to work parallel, with different individuals/groups working on different aspects of the software simultaneously. Open Source Software Development communities often exploit the power of peer review to facilitate the debugging process, better articulate system requirements, and speed up the process of feature enhancement. In theory, agility and open source are very different concepts, the latter being just a licensing paradigm with implications for code reuse and redistribution, whereas the former emphasizes rapid delivery of operational software. Any software development process can incorporate agility if it adheres most of the principles. The manifesto of Agile Software Development and its principles were thoroughly reviewed and a comparative analysis of Open Source Software Development processes was conducted. It was found that there are many drivers which enable the leverage of agility in Open Source Software Development. At the same time, some barriers, which make certain agile principles difficult to be incorporated in Open Source Software Development, were identified. This research paper presents the findings of the exploratory study to introduce a level of agility to Open Source Software Development.

Does The Excessive Use of Computer Affect The Human Health Disorder: An Empirical

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ABSTRACT

The increased use of computers in both workplace and personal lives has brought about a rise in the number of health concerns. Many individuals working on a computer, report a high level of health related complaints. Considerable and growing concern exists in both the medical and scientific communities that the extended or improper use of computers may place users at increased risk of upper extremity musculoskeletal symptoms (MSS), musculoskeletal disorders (MSD), repetitive strain injuries (RSI), carpal tunnel syndrome, eye strains, computer vision syndrome (CVS), internet addiction, stress, depression and radiation related health problems. Repetitive strain injuries (RSI) and musculoskeletal complaints occur frequently in adults and children, with many people reporting strains of the hands, wrists, arms, shoulders or neck. RSI includes many disorders, the most common being Carpal Tunnel Syndrome, caused due to extensive use of a mouse and wrong wrist postures. Visual discomfort and related symptoms like eye strain, tired eyes, irritation, redness etc. occurring in computer users are growing health problems and can be scientifically termed as Computer Vision Syndrome. Computer users are more stressed and depressed than any other occupational group. Also various radiation related problems like skin rashes, abnormal reproductive outcomes, skin aging and cancer are common. The unsatisfactory Occupational Safety and Health (OSH) record of the corporate sector has always been highlighted. Call center and desk job involving computers report increased rates of musculoskeletal disorders. Therefore safety is considered as an important issue, but many employers do not feel that it is vital to the success of the companies. However, based on current evidence it is unlikely that the computer usage causes permanent changes or damages to the visual and musculoskeletal system. This research is divided into two phases; Phase 1 reviews the factors relating to various health disorders caused due to computer work and providing recommendations for preventing or reducing their development. The purpose of this phase is to examine the correlation between these types of disorders and computer work, by considering the physical workplace and psychological factors from medical practitioner's perspective. In the Phase 2, software will be developed to guide the users for proper ergonomic use of computers. This software will help users to take sufficient precautions to be used while working on computers. Bending your wrist and back, keeping the computer at a proper distance from the eyes, not stretching yourself when moving the computer away etc. are few measures that can help when dealing with a computer which is both a necessity and a machine at the end. The inputs for this program will be taken from the data collected from Phase 1. This research work is limited to the findings of Phase 1 of the project.

Impact of Shoes and Surfaces on the Human Foot

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ABSTRACT

Several injuries have been attributed to the wrong use of shoes – along with wearing the wrong shoes. Lower back pain, shin splints (which if not taken care of, can result in stress fractures), knee injuries and Achilles tendon have been correlated with the previously mentioned. This is due to the distribution of forces on the foot – this is where shoes differ due to size and shape. Poorly designed shoes have long been a source of pain for users due to the increased force on sensitive regions in the foot which may affect other parts of the body (such as the spinal cord). Even the greatest of shoes may cause injuries and pain due to their improper use. A casual sneaker should not be used for everyday exercise, no matter how comfortable they may be. Several companies have tackled on this issue and released shoes which they advertise as being the greatest of their kind.

Knowing the force on the foot will help us analyze the shoe and the surface; and according to what we have regarding force distributions on feet (and their ensuing injuries); we can safely analyze and rate different shoes and surfaces. Moreover, we will be able to add to that which shoe works best for which surface. The results of this study can have a major significance in the field of medical and sports science. The results of the experiment can help guide aspiring young athletes, runners and even common people who want to exercise by telling them what kinds of shoes to wear, and what kind of surface to run on. It can also have an impact by making realize if market-available silicon insoles help reduce stress on feet and also ankles and knees. Lastly, it can help guide females about how different heel length effects stress on their bodies, and compare them with flat sole shoes as well.

We will be creating two insoles, based on the foot specifications of male and female test subjects. Building the insole is basically taking an available insole and placing sensors at the right spots i.e. the ball and the heel of the foot. The time consuming part of the project will be building the insole and designing its circuit. Multiple sets of experiments will be conducted under different test conditions.

The results of this experiment are valuable in the field of medical and sports science. It can provide young athletes, runners and even common people who want to exercise information on the kind of shoes to wear and what kind of surface to run on. It can also have an impact by making realize if market-available silicon insoles help reduce stress on feet and also ankles and knees. Lastly, it can help guide females about how different heel length effects stress on their bodies, and compare them with flat sole shoes as well.

The Modeling and Simulation of Crowds in Al Masjid Al Nabawi in Medina

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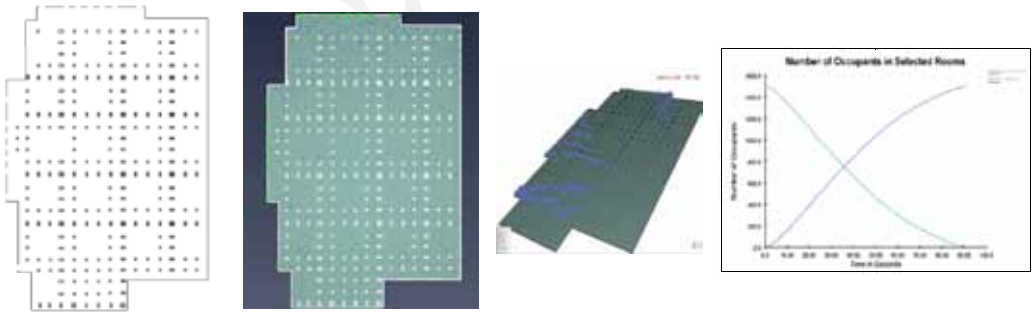
ABSTRACT

Crowd phenomenon is important in the design of public places. Every year, a growing number of Muslims visit the Holy Mosques in Mecca and Medina. Such number presents a challenge to local officials to provide safety and security while maintaining comfort to worshippers. Previous research shows an increasing interest in assessing major religious events such as the Hajj. Unfortunately, very limited effort has been focused on evaluating the crowd phenomenon in the Prophet's Mosque's (Al Masjid Al Nabawi).

The proposed study focuses on a safety assessment of a section of the Prophet's Mosque (Al Masjid Al Nabawi). The purpose of the study is to implement modeling and simulation of the crowd phenomenon to come up with the best recommendations, strategies, and solutions for the evacuation process in case of an emergency. The reason we chose this topic is because such study has never been conducted before. One of the major difficulties is that we won't be able to evaluate the real evacuation process of such section. Therefore, we implemented a simulation modeling technique to mimic the process based on real data from the Holy Mosque of Medina. The simulation solution is a representation of a section that is mainly occupied by ladies and children (since it is the most vulnerable group to face challenges in a crowd). The dimensions of the studied place are 142m in length and 95m in width. It accommodates around 13500 people. The part of the Mosque has 15 doors (8 on the length and 7 on the width) with 2.5m wide each (Figure 1a).



(a) (b) (c) (d)

Figure 1: The sequence of research methodology and results

The study simulates people movement based on the description of other assumptions (speed, weight, direction, effect of obstacles such as poles and cross trafficking) to determine the total evacuation time, find better place arrangement, and evaluate expected crowd behavior in normal and panic situations. The study started with a layout drawing of Al Masjid Al Nabawi imported to an evacuation simulation model called Pathfinder (Figure 1b). The number of occupants in normal conditions is about 1500 worshippers, distributed randomly inside the designated area. The speed and size of each worshipper are normally distributed. We ran the model with no delay time and with normally distributed delay time (pre-evacuation time).The simulation model (Figure 1c) presents several results such as occupants flow rate through exit doors, number of occupants exiting as a function of time (Figure 1d). Total evacuation time to evacuate 1500 worshippers is 91.8 seconds. The results presented here are preliminary for future attempts to simulate and model at a full capacity of 13500 worshippers. The study can be applied to propose a set of evacuation plans and procedures to be implemented in an emergent situation. The study also has the potential to be applied to a larger scale of Al Masjid Al Nabawi and across other public places in which the crowd phenomenon presents a challenge to safety and security officials.

Online Text-Independent Arabic Writer Recognition

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ABSTRACT

Biometrics involves methods for uniquely recognizing a person depending on intrinsic physical or behavioral traits. Physiological traits include fingerprint, face recognition, DNA, palm print and iris recognition. On the other hand, behavioral biometric techniques relate to the behavior of a person and includes traits such as voice and handwriting. A text independent writer recognition system aims to identify or verify a person from his/her handwriting.

While identification of a person deals with recognizing a person from a database of writers, verification is more concerned with confirming the identity of a claimant. Writer identification techniques can be divided into online and offline. Offline systems take input data that is pre-written and holds no temporal information. Online systems use data that is acquired by a device in real-time and thus contains temporal information. Therefore, for security applications, online systems are chosen as these systems make use of dynamic features, such as the speed of writing or the tilt of the pen while writing, as well as static features such as the curvature of the letters. The applications of such an automated system are plentiful and include security, as in banks, airports and large institutions. The main focus in this project is on such applications and the system is being developed accordingly.

This project develops an Arabic language recognition system since the existing Arabic language algorithms have not been fully developed yet and research in this area has not produced satisfactory results. As security applications are the main purpose of such an algorithm, the algorithm being developed takes input data that is text independent and online. For this application, a text independent system is superior to a text-dependent one as it prevents the writer from forging his/her identity by excessive practice of a specific sentence; a text-independent system prompts the writer to write a different sentence each time he/she uses the system. A Wacom Intuos4 tablet, shown in Figure 1, is used to collect the writer's dynamic data.

In our research, the acquired data is first pre-processed to segment the words and remove any dots. A segment is defined as the set of points from the pen-down to pen-up motion. Once the pen is in contact with the pad again, a new segment is initialized. After pre-processing, statistical features are extracted from the raw data to form feature vectors. Using these feature vectors, a model is created for each user during the enrollment phase, shown in Figure 2 (a). The testing, or recognition phase, involves acquiring an unknown writing sample and identifying the writer (Figure 2 (b)). Currently, the developed system is being implemented using two functional classifiers: K-Nearest Neighbor and Neural Networks. Our main focus for the remaining period of this research is to implement more classification methods such as GMMs and to extract more useful feature vectors. The best result achieved thus far is an identification rate of 98% for 10 users using K-NN classifier.

Figure 2: (a) Enrollment Phase, (b) Recognition Phase

Difficulties arise from the fact that the system is text-independent, meaning it has to be able to distinguish within-writer variations (several writing samples from the same person) from between-writer variations (different writing samples from different people). Achieving high recognition results is a source of complexity that is currently being addressed. For the verification of a writer, the algorithm must not allow a forger to be incorrectly verified; a zero percent tolerance will most probably present a difficulty to be achieved. Also, some existing systems nowadays achieve quite high results at the cost of processing time; in this system, our aim is to overcome this issue by attaining high results with the lowest processing time possible to mimic real-time systems.

An Overview of the Electrical Power Network in the Sultanate of Oman

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ABSTRACT

Keywords: Electrical Power Network, Sultanate of Oman, Muscat, Machine Ratings.

Generation, transmission, and distribution of electrical power networks always remain one of the most challenging fields of electrical power engineering. The astonishing technological developments nowadays are highly dependent on safe, reliable and economical supply of electrical power. This project is crucial to increase the awareness of electrical engineering students of the electricity sector and the power network in the Sultanate of Oman.

In this project, students should provide a descriptive overview of the electrical power network configuration in the Sultanate of Oman including generation, transmission and distribution. Specifications, ratings of machines, devices, equipments as well as voltage levels should be included. Special interests will be given to the power network of one of the big cities in the Sultanate which is Muscat. It is well known that there is no much research in this area that has been made available in literature before now. This research work involves:

- Data collection and literature survey.
- Describing the main systems that form a power network; generation, transmission and distribution as well as machines, equipments and devices involved.
- Providing a descriptive layout of the electrical power network in the Sultanate.
- Mentioning the specifications and ratings of electrical machines, devices and equipments included.
- Illustrating a detailed configuration of the power network in one of the cities in the Sultanate (Muscat).
- Developing an interactive software program for a section of the power network in the Sultanate.

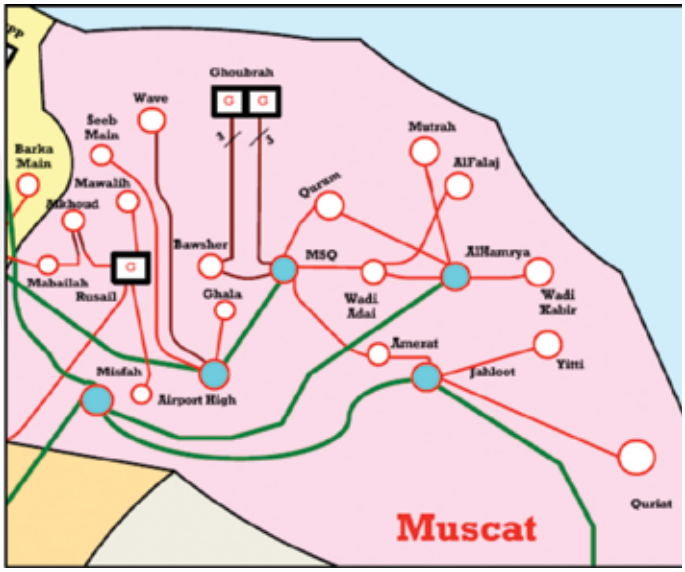

Figure 1. A Futuristic Lay-out of Muscat Transmission Network by 2014

At the current stage of the project, students were able to collect relevant information on the generation system of Muscat which is supplied by four different power stations, as shown in Table 1. An overview of the expected configuration of the transmission network of Muscat, by the year 2014, is illustrated in Figure 1.

Table 1: Power Generation in Muscat Region

Steam Turbines	Gas Turbines	Net Generation Capacity	Generation Station
4	13	468.5 MW	Ghubrah
-	9	686.9 MW	Rusail
1	2	434 MW	Barka AES
2	3	681 MW	Barka SMN

The SatisfiabilityProblem and its Applications

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ABSTRACT

The SAT problem is started by Stephen Cook-in 1971.The subject of the research reported in this thesis belongs to the area known as Propositional Satisfiability, an area located in the intersection of Theoretical Computer Science, Artificial Intelligence, and Mathematical Logic. The satisfiability problem (SAT) is fundamental in solving many problems in several real applications as data base, machine vision, robotic, computer architecture design, automated reasoning, scheduling, etc.

The significance of the SAT problem either in theory or in practice makes many researchers in the worldwide are involved in its resolution. Besides, there are many SAT competitions in the world because the importance of SAT problem. The next SAT 2011 competition will held in USA in period June 19th - June 22nd 2011.

SAT problem can be briefly defined as a conjunction of clauses, where each clause is a disjunction of literals. A literal is a Boolean variable or its negation. Satisfiability is the problem of determining whether it exists a total assignment (assignment of each variable to TRUE or FALSE) satisfying all clauses of the problem. If there exists such assignment the problem is said SATISFABLE (sat), otherwise it is said UNSATISFIABLE (unsat). So, A SAT problem is a simple model, defined by a set L of literals (logical variables) and a set C of clauses. The objective is to find a solution satisfying all clauses of the problem.

The main real applications of SAT are knowledge representation and Reasoning, timetabling, map coloring, electronic circuit design, planning, etc.

SAT solvers are based on two type of searching: local search (NP-completed search) and systematic search (complete search).When faced with a difficult search problem, there are two approaches that can be used. In a "systematic" approach, all possible solutions are either eliminated inferentially or examined explicitly. In a nonsystematic or "local" approach, a variety of solutions are examined but there is no guarantee that every possibility will eventually be considered. Both methods have advantages and disadvantages. Local search is often faster when it manages to find an answer, but it doesn't always do so. Systematic methods are guaranteed to find solutions when they exist, and can also report conclusively that no solution is possible.

The objective of this project is to study, to design and evaluate solving strategies for SAT based on the Davis-Putnam scheme. First, we have shown through two examples, how to model reasoning and scheduling as a SAT problem. Then, we studied the implementation of some variants of the Davis-Putnam algorithm. Finally, an experimental evaluation of implemented algorithms will be performed on benchmarks of the SAT competitions.

The Davis-Putnam (DP) procedure is a tree-search technique which explores the whole search space of the SAT problem. Either a solution is found (sat) or it is proved that the problem has no solution (unsat). The DP procedure embeds unit clause rule to reduce the size of the problem at each node of the search and intelligent heuristics to guide the search towards promising regions (regions with solutions). Our investigations are focused on an optimal implementation of the unit clause rule using an adequate data structure facilitating its process (at each node of the tree search we have to identify unit clauses and to assign to their literals a truth value satisfying all unit clauses and to perform propagations of these assignments over all other non-unit clauses). It is well known that good intelligent heuristics of selecting a non-assigned variable and truth value at each node can significantly reduce the size of the search tree. We also intend to design intelligent heuristics exploiting the structure of the problem to guide the search towards promising regions.

Result until this day, we approximation to end of a software implementing stage. During this month, we will test program with some type of benchmarks and measure the effectiveness in terms of speed to find solution, number of clauses during period of time, Memory consumed ...etc.

A Ubiquitous Heritage Preservation Center

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ABSTRACT

RFID (Radio Frequency Identification) technology is well known in tracking and indentifying areas. Many companies are using this technology to gain the advantages of its value. We develop a cyber-physical model to integrate physical objects into the digital Web using RFID-tagged things. The proposed integration is applied in the context of “Juma Al Majid Cultural & Heritage Centre" in Dubai, where RFID tags are associated to relevant heritage resources to preserve and promote physical ancient items and extend the scope of information driven by these resources.

We build a mobile application to enable visitors of Juma Al Majid Cultural & Heritage Center to enrich the exhibits’ value of resources available in the Center.

Physical heritage resources include authentic manuscripts and valuable artworks. Given the important value of these resources, their inspection by prospective visitors could be both protected and enriched using our proposed solution. Indeed, manual inspection may damage their preservation and their real historical value cannot be judged or appreciated by the actual resource only, but more importantly by its historical dimension. RFID technology can protect and enrich the displayed exhibits by minimizing the need for physical inspection and linking the identified resources to some related digital media. Awareness about these resources is important for their preservation but because they made it a long way across time and possibly required expensive preservation costs, the need for their protection is paramount to expand their future lifetime for future generations.

In addition, different visitors can have different preferences when browsing resources of the Center. Given RFID technology capability to identify resources, a visit to the Center could be further personalized and contents’ navigation could be further customized to meet individuals’ profiles. Besides, the proliferation of mobile devices such as handheld RFID readers and RFID-enabled smart phones could lead to a novel digitally enriched viewing facility. Thus, we also aim at mapping user’s profiles to preferred exhibits and manuscripts that are later recorded for future references by the user in a post-visit step. The latter action could lead to wider awareness of the Center’s heritage preservation efforts through sharing post-visit experiences via the Web, to the users’ social connections (such as social networks).

The main outcomes of this project are (1) to enrich a visitor experience to a heritage center like Juma Al Madjid Center and (2) personalize in-situ visits through interactions with exhibits using handheld devices and share post-visit experience through social networks. Our contributions to these outcomes consist in building a mobile application to display enriched-media for REFID-tagged resources. We have completed the design part and built some of the prototype modules of this targeted application.

The main feature that distinguishes our project from other RFID-based museum guides projects is the use of (Android-based) personal mobile phone as a device to display, store and share the tagged information from the historical resources instead of acquiring a certain device from the museum each time a visit is planned to the museum (such as The Tech Museum of Innovation in San Francisco, USA). Moreover, the visitor can enjoy different multimedia types of information (text, images and videos) displayed on the mobile device as soon as the desired tag is detected. And finally, awareness about heritage preservation expands beyond the Center walls through the association of our application with social networks.

Evaluation and Optimization of Window Functions to Reduce FFT Leakage

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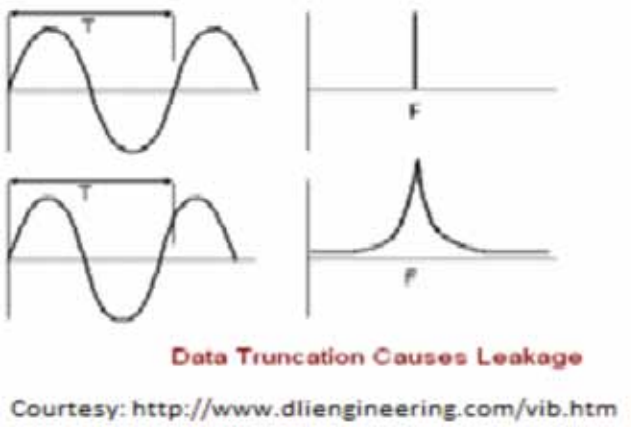
ABSTRACT

Digital signal processing is an area of science and engineering that has developed rapidly over the past 30 years. DSP is concerned with spectral analysis, modify or extract information from signals. It has vast areas of applications involved in it like spectral analysis, audio processing and medical imaging etc. However, two fundamental tasks are involved when designing DSP system, (i) analysis of input signal and (ii) design of a processing system in order to give a desire output. The Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT) are very important mathematical tools for carrying out these tasks. The FFT algorithms enable to analysis the spectral properties of a signal and eliminate the redundant calculation. Moreover, FFT allows time domain signal processing operation to be performed equivalently in the frequency domain. In both domains, FFT has considerable reduction computation time. In fact, FFT are mainly useful in computing the DFT and IDFT and also find applications in correlation analysis, digital spectral analysis and linear filtering.



Moreover, The FFT algorithm is used to obtain the Fourier spectrum of a periodic signal. The transaction required to obtain a finite length sample data generates the spectral leakage. Multiplying the sampled signal by a weighting window is the usual procedure to reduce leakage. A number of windows are defined and their properties are intensively studied in the literature. Moreover, it has been noted that the most researchers could not solve the problem between frequency resolution and the spectral leakage. In other words, the spectral resolution and the spectral leakage cannot be control independently using the conventional windows. The conventional windows are generally able to control the spectral leakage and the frequency resolution by one parameter. In addition, the spectral leakage is reducing when the frequency resolution is reduced and vice versa.

An earlier research which was done by Yoon and Joo (2010) could overcome the problem by using a novel window (Butterworth window) with two parameters: cutoff frequency and order of the filter. The researchers have tried with first order filter up to the 4th order with changing the cutoff frequency. They conclude that by reducing the cutoff frequency and increasing the order of the filter, the spectral leakage is reduces without the loss of resolution experienced by the conventional window function.

In this research the Yoon and Joo conclusion is to be proved. Since, the earlier researchers have done their study with up to the 4th order, this research is going to be done with up to 10th order even though the complexity is going to be increased. In other words, up to the 10th order of the Butterworth filter is going to clearly analyzed and compared with the conventional window. Moreover, hardware implementation is going to be done using the TMS320C6701 DSP Microprocessor and PC with compatible data acquisition board DAQ.

However, any specialized spectral scheme that requires the imaginary part of a window function's spectrum to be all zero will not work with the Butterworth window because as it is well known that Butterworth windows are not symmetrical. In fact, this leads to further research on solving the tradeoff problem between the spectral leakage and frequency resolution for symmetrical applications.

Development of the Neighborhood Al-Doherah the Old City of Riyadh

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ABSTRACT

Urban development and the preservation of heritage buildings and rehabilitation this project will provide the new central urban area and multi-function through the re-design (RD) and re-zone (RZ) and Habilitating Five residential buildings ancient heritage. And find new public space will help to expand and strengthen its role as a center of urban life.

The study site is:

- District Al-Doherah: (Study area is located in the southern part of the city of Riyadh, specifically Region Al-Doherah).
- Urban fabric: (Off the physical fabric of the old city of Riyadh, which formed the current region, which exist outside the walls is an area of the Suwailem door and Al-Doherah door. The effect of radiation through the fabric of the main roads and the presence of many of the features of the old city at the site and why the presence of heritage buildings dating back to the community of the fourteenth century).

Studies related to research are Field studies. (Issued from the Municipality the city of Riyadh), Historical books. (Books on the history of the Riyadh city), and Access to books specialism. (Book Building Rasim Badran - related research studies, heritage).

Many steps to develop the site:

- Optical scanning of the entire site and took the most important parameters affecting the Site.
- Conduct a survey of studies and took a census and usages of the buildings.
- Decision-making design on the site and determining the uses and identify the decisions of the demolition and maintenance of the buildings.
- begin to identify spaces for rehabilitation, and design.

The Site before start design neighboring buildings in good condition needs some repairs, dilapidated buildings and dilapidated, Narrow corridors are organic, some finished and some of them continuously as figure 1. And we Removal of dilapidated buildings and to provide an intermediate in the project, Reuse of adjacent buildings and use of heritage restaurant offers cuisine of Najd, - Exploitation of some dilapidated buildings rehabilitated and make it clear example explains the details of Najdi architecture (Arch)and terraces adjacent to the visitors and meditators in this architectural monuments resulting we have the possibility to set up events in the vacuum resulting from the rehabilitation and The use of architectural elements Najd and Todifaa in the arena and buildings as figure 2 .

Results:

- Continuity local architecture in the best form and show a bright renewed.
- Maintaining the basics of green architecture techniques and the elimination of polluting the environment.
- Diversification in the uses of the place creates a natural atmosphere for the entire region definitions and characteristics

Figure 1: the site before study

Figure 2: the site after study

e-Fashion: A new Approach to Online Apparel Shopping

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ABSTRACT

Electronic Commerce (eCommerce) has grown in size and acceptance worldwide. It no longer remains as an exclusive privilege of few western countries but rather has found its way to be accepted by many eastern countries and less developed economies in both hemispheres. Business – to – Consumer (B2C) eCommerce has entered many business segments including retail sectors such as book sellers, toy sellers, consumer and corporate electronic retailers and so on. Latest rage in eCommerce is the apparel selling i.e. online apparel shopping. Online apparel shopping is the process whereby consumers directly buy garments or apparels from a vendor in real-time environment over the Internet. This is done using electronic commerce and evokes the physical analogy of buying garments at a bricks-and-mortar retailer or in a shopping mall. Online shoppers can purchase garments or apparel s and the same are delivered right to their door step with the best handling and shipping services. Moreover, online garment stores provide shoppers with ability for price comparisons, color choice, customization, etc. As the concept became more and more popular, the online apparel vendors started using latest technological innovations to gain competitive advantage. Virtual Dressing rooms are one such technological innovative solution which has been used by online garment vendors. Virtual dressing room allows the at home shopper to virtually try on garments. Some of Virtual Dressing rooms include Video Virtual Dressing Rooms, Motion Detector Virtual Dressing Rooms and Webcam Virtual Dressing Rooms. Video technology is one of the first advances in virtual dressing rooms. By employing video technology, the at home shopper can get a realistic and lively view of the apparel they like. An innovative method in virtual dressing room is of utilizing motion detectors to create a touch free screen. Using this technology, it is possible to create a virtual dressing room with touch free screen. An online web cam virtual dressing room allows consumers, sitting at home, to virtually try on clothes on their own by using a web cam. Authors have studied these current techniques and identified important future prospects in them which can be collectively used to design innovative solutions. This paper presents the proposed solution. The purpose of this paper is to identify the research of the various technologies and propose a 3D solution in the online apparel shopping websites for the betterment of the customers and providing a better picture about the apparel by developing Three Dimensional (3D) models as per customer's size inputs for better fitting decisions. The robotic 3D prototype is formed based on various measurements in order to accurately present the shopper with a 3D model body style match. The requested garments and motion data are downloaded and are then loaded into the scene using the Virtual Reality Modeling Language (VRML) loader. After the user enters their measurements, the body and garments are resized accordingly. Once the match is made, the consumer can virtually try on different sizes of clothes to determine the best fit. The design of the prototype is discussed in this paper.

Keywords:
Online Apparel Shopping
E-Commerce
Business-to-Consumer (B2C)

Image-based System for Real time Smoke Detection

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ABSTRACT

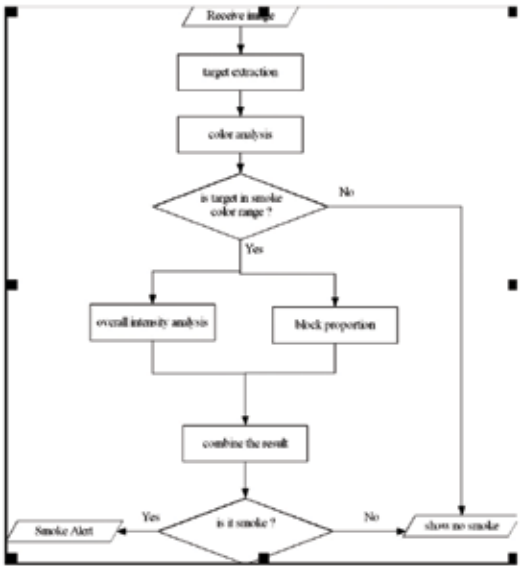
Fire accident usually causes economical and ecological damage as well as endangering people's lives. To avoid the fire's disasters, many early fire-detection techniques have been explored. Most of the existing techniques are based on particle sampling, temperature sampling, relative humidity sampling, air transparency testing and ultraviolet and infrared fire detectors. However, smoke is one of the important signs to detect the fire immediately; and it is the first warning indicator of fires.

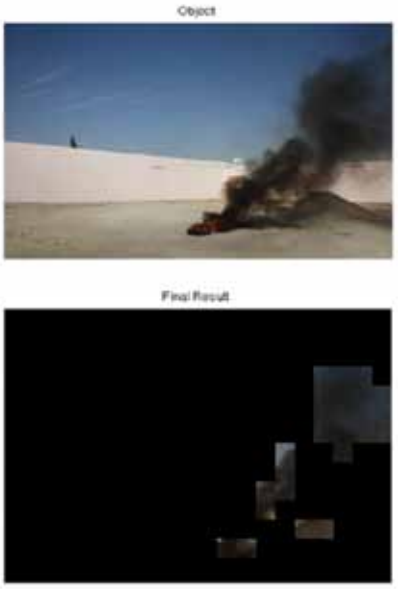
By analyzing an image, which contains millions pixels, we can detect a fire. Image-based smoke detection methods often use color and motion information to detect smoke from digital images. The smoke color will range from white-bluish to white when the temperature of the smoke is low. On the other hand, the smoke color will range from black grayish to black when the temperature rises until it catches fire.

Image processing techniques for smoke detection have become a hot topic in computer vision during the last decade. Several detection algorithms have been proposed in literature and they lead to a large amount of techniques that can be used to detect the presence of fire at an early stage. The current smoke sensors suffer from the transport delay of the smoke from the fire to the sensor. In addition, sensor cannot distinguish between fire and cigarette smoke.

In this project, we evaluated existing techniques and proposed an improved smoke detection algorithm. We aimed to design a fast detection technique for detecting the fire at the early stage. In our method we used target extraction, color analysis and block subtraction algorithms. Experiments on a set of images showed that our method is fast and accurate in detecting smoke.

The algorithm works as the follows: First, extract the target by subtracting the current and base images, and then analyze the image based on the colors of the target. If the colors in the range of smoke's color, the system will perform two parallel processes, the block proportion (which counts the percentage of the changed pixels) and the overall intensity analysis (which works by performing the curve fitting process to calculate the area of the curve. The detection is based on the differences in the area of the curve between the base image and current image.





Online Shopping Security and Customer Satisfaction – An Exploratory Study

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ABSTRACT

The World Wide Web (WWW) has become the new platform for commerce and has given new definition to online marketing. In the current scenario many people are buying and selling their product through this medium. Online shopping has opened new avenues for people who are living in remote areas and find it difficult to shop in traditional markets. Electronic commerce, commonly known as e-Commerce, consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks. When people buy products through e-Commerce website, the process is called Online Shopping. Shopping convenience, product availability, search tools, comparative analysis of products, reduced price, loyalty points, convenient shopping hours and after sales services are the main factors which prompt the customers to buy online. It has been seen that both type of shopping viz. traditional shopping and online shopping have advantages and disadvantages. In traditional shopping, non-availability of required product and searching are the main concerns but we can search the products easily and check their availability through e-Commerce. The best advantage with traditional shopping is ability to feel /touch / taste /smell the product but Online Shopping has no such facility. Many studies on e-Commerce and Online Shopping have discussed the customer concerns over the security of such transactions. Merchandisers have to be very careful when it comes to either personal data security or card data security. Online Shopping vendors use sophisticated security techniques such as Secure Socket Layer (SSL) and Secure Electronic Transaction (SET) to ensure the safety of e-Commerce transactions. Authors have conducted rigorous literature review of research papers on the topics of e-Commerce and Online Shopping and extracted factors related to same. On the basis of this literature survey, authors have also identified the drivers and the barriers of Online Shopping. These factors were used to construct the questionnaire survey tool to collect the data from UAE residents. Data collected were statistically analyzed to see that how merchandisers addressing the security, website, convenience, and trust related issues and providing confidence to customers to shop online without fear. This research will not only play a significant role in designing the strategies for making e-shopping better but provide enough customer concern related data to merchandisers to make sure that the e-shopping is attractive and safe in future.

iPhone Forensics vs. other Smart phones Forensics Techniques and Crime Investigations

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ABSTRACT

The smart phones are used worldwide due to its enhanced features. Features like computing capabilities, increased storage capacity, attractive touch interface, as well as the ability to use the Wi-Fi signals anywhere, which give the user the ability to download and upload video, pictures and programs. The uploaded features add in to the mobile phone enjoyable features by sharing video, pictures and other data via social network websites such as Facebook, Twitter, and other social websites. These characteristics made them very popular devices and increased their usage. Due to the highly number of people using smart phones, it gives new meaning of digital and electronic crimes. Therefore, investigator found that smart phones become a potential source of digital evidence in criminal investigations. Recently, some of the crimes were detected by retrieving the data store in these smart phones. Since iPhone is one of the most popular smart phones, researcher needs to investigate its capabilities and file structures. In addition, iPhone forensics turned into an essential practice for forensics and security practitioners.

Investigating different types of smart phones logical backup and encryption techniques that can be used as digital evidence in forensics investigations is a goal of this research. Different smart phones are examined; examples of these are iPhone 3Gs, BlackBerry Bold, and Samsung Omnia II I8000. The execution is on several steps. First step is to investigate and examine the logical backup acquisition of the iPhone 3G generation mobile device using the Apple iTunes backup utility, BlackBerry using BlackBerry desktop manager and Mobiledite, then the Samsung Omnia II I8000 using Mobiledite tool through an ActiveSync connections. The backup utilities will backup data from the smart phones into a PC work station for further forensics investigations. Second, an investigation to the storage location of social network application data will be indentified and allocated. Finally, the encryption techniques of the allocated data will further be investigated to address the level of the security of these handheld devices and how the user privacy will be affected. The last part is to compare storage capabilities of the new generation of Apple handheld devices such as iPad and iPhone 4G generation.

iTunes was used to backup the iPhone 3GS. IPhone Backup Extractor software was used to determine which file of the backup files is related to Facebook and Twitter. To extract and read some database files, the plist Editor, SQLite Database Browser, and Hex Editor Neo were used. After the first test our findings indicate that the Twitter backup files were not encrypted. In addition to that, the tweet received from one of the follower of the user is not encrypted, too. “@AlyaYousif I miiisseddd u toooo 3alayaaa I swear walla nsait ench on #twitter hahahahahahahah” tweet was not encrypted; it was easily spotted using the Hex editor (Figure1).

Within the Facebook there are five backup files categories; `com.facebook.Facebook.plist`, ‘Cookies.plist’, ‘friends.db’, ‘iTunesArtwork’, and ‘iTunesMetadata.plist’. When investigated, the ‘com.facebook.Facebook.plist’ file is encrypted. Figure 2 is a sample of lines in “com.facebook.Facebook.plist’, ‘friends.db’ files. Two tables were allocated which are the “friend” and “meta” database files. The friend table had several attributes such as letter, uid (userID), first_name, last_name, name, pic_square, phone, cell and email. All the fields are in CHAR (character) format expect “uid” which was BIGNT. Our findings show that only three fields were encrypted; phone, cell, and email. The other fields were not encrypted (Figure3).

Figure 1: “@AlyaYousif I miiisseddd u toooo 3alayaaa I swear walla nsait ench on #twitter hahahahahahahah” tweet.

pic_square	phone	cell	email
http://profile.ak.fb...			5056bf2874f06639...
http://profile.ak.fb...			
http://profile.ak.fb...			07c1791400da67d...
http://profile.ak.fb...		e5cf925cfb13c5b6...	f61cc1c2501f8ac5...
http://profile.ak.fb...			8eb8fcb8b0d3b1fe...
http://profile.ak.fb...	f4004f95d7e32323...	049242aa76869c1...	8204273aeee83af2...

Figure 3: the encrypted fields of ‘friend.db’ file.

Figure 2: lines in com.facebook.Facebook.plist’.

Trapped in Cyber World

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ABSTRACT

Today the internet is being regarded as a severe addiction; not due to the large amount of time spent aimlessly surfing, but due to the negative toll it takes on an individual, the family and his or her social life. In general there is no specific cause that causes internet addiction, however one may begin to use the internet legitimately for important reasons, and begin to stray into the boundaries of addiction. Physical socialization amongst peers can be overburdening at times; such as peer pressure, therefore using the internet for socializing is more open or more restricting depending on the person. Demographics of internet addicts can be ignorantly stated as young, and male, however with increased ease of using technology and surfing the web, addicts include a much larger range of the population. Lack of research results in a lack of identified causes which ultimately results in less treatment or no treatment at all. Therefore the only treatment available to internet addicts in this time and age is the similar treatment used for food addicts. The treatment is as follows: Identify that there is a problem, accept that there is a problem, moderately enjoin in using the internet, which inevitably requires large amounts of self control. In addition, engaging in outdoor activities and outdoor hobbies will help with ones will power and self control.

Using Information Systems on the Courier Service

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ABSTRACT

Understanding best practice within a particular business sector is often a challenge that requires careful examination of inputs, process and outputs. Due to the huge growth in technologies in recent time it is important to research and understand different business sectors and the effect information systems has on their growth and performance.

This poster presentation will show how modern information systems are used in the courier services business sector. Most courier enterprises nowadays uses advanced technology to handle their businesses for all the organizations functions and processes. Information systems are the core business of courier services; they are used in every function and every process. Examples of businesses and organizations that are part of this sector are illustrated specifically with the results of research into how Information Management Systems help them to achieve their goals. Since information needs are unique for different business sectors, and are even unique for individual companies in a business sector, this paper discusses three different types of information systems and how these systems help achieve strategic business goals.

In this poster, the technologies and systems used for carrying the services are illustrated, with different types of Information Systems and the way they help the organization:

Transaction Processing Systems (TPS) produce daily routine transactions which deal with huge amount of data. Warehouse Management System is TPS and allows complex storage and distributions systems to be easily managed and optimized as part of critical business processes for the courier business sector.

Management Information Systems (MIS) provide routine reports and information on firms' performance of transaction-level data, middle and operational level managers. FedEx uses an Enterprise Service Quality Index (ESQI); a system that generates reports and analysis based on FedEx Enterprise Data Warehouse. This system is analyzed in term of its ability to ensure customer satisfaction by conducting a survey and comparing the results between branches.

Decision Support Systems (DSS) are more analytical models. They support organizational unstructured and semistructured decisions. In the past, DSS's were Model-driven DSS answering "what-if" questions. Whereas now they are more Data-driven using Online Analytical Processing (OLAP)and data mining to analyze large group of data.

A good example that includes multiple information systems is the one DHL uses. The "Enterprise Resource Planning" includes several systems that manages all areas in the company. The system combines several information systems like transaction processing system(TPS) and decision support system(DSS).

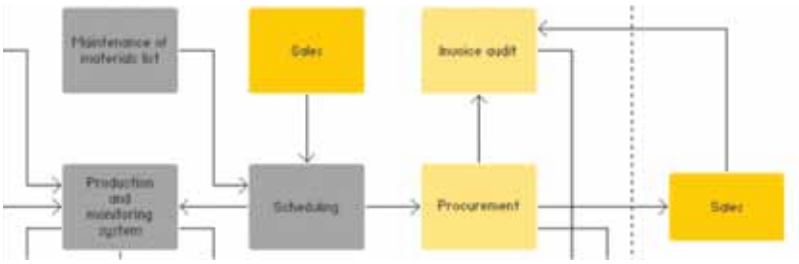

Figure 1: sample of the ERP system and how the information flows from one function to another

Warehouse Management System is one component of the ERP. With its help WMS can be conducted effortlessly and the supply chain can be improved. It is a Transactional Processing System(TPS) that develops a multifaceted strategies which optimize the systems used for indicators which allows complex storage and distributions systems to be easily managed and optimized. It also does basic processes such as shipping, picking and forms management.

Each system is analyzed in terms of its ability to achieve operational excellence, customer and supplier intimacy, effective organizational communications and better decision making.

Implementation of Network Traffic Access Control using Dynamic ACL (Lock & Key) and NBAR

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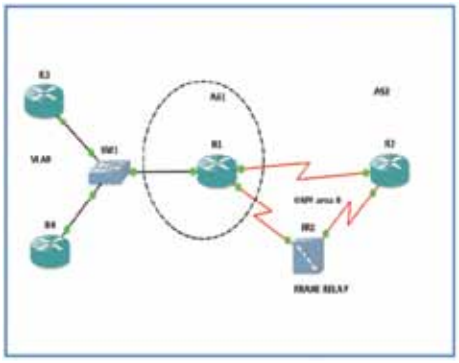
ABSTRACT

In a communication network the security is the process of preventing and detecting unauthorized use of network devices. Prevention measures help you to stop unauthorized users from accessing any part of your computer system. This project aimed to experiment Access Control with Dynamic ACL(Lock & Key) and Using NBAR to filter network traffic issues. In Lock and Key (Dynamic ACLs) Lock and key is traffic filtering security feature that dynamically filters IP protocol traffic. (Dynamic ACLs) was introduced in Cisco IOS Software Release 11.1. This feature is dependent on Telnet, authentication (local or remote), and extended ACLs. Lock and key configuration starts with the application of an extended ACL to block traffic through the router. Users that want to traverse the router are blocked by the extended ACL until them Telnet to the router and are authenticated. In NBAR(Network-Based Application Recognition), it is truly an amazing feature in Cisco routers. Most routers just look at traffic at Layer 3; with NBAR, routers can also look at Layers 4 through 7. This means that a router can recognize applications. And once it can recognize the applications, it can then take some action to ensure that the application gets higher priority, drop packets from that application, or take some other action. NBAR currently works with Quality-of-Service (QoS) features to help ensure that the network bandwidth is best used to fulfill your business objectives.

The scenario shown below are the instructions and topology configuration in which routers are directed as per the NAT scenario, the task is to enable dynamic ACL(Lock and Key) and NBAR. It sets the absolute and inactive timeouts for the remote users and to authenticate incoming telnet session, therefore setting inactivity timeout to desired range. NBAR uses CEF globally in the R1. It Creates a map-class IMAGES on R4 on match any of HTTP URLs that are retrieving an image file (.gif, .jpeg, .jpg) and Creates policy-map DROP_IMAGES and configure it to drop any traffic in class IMAGES. Finally the policy map can be applied via WAN interfaces. The table describes the time out situation for various types of traffic discussed later in this paper.



Type of Traffic	Day and Duration	Configure this:
Telnet	Monday through Friday, 8:00 am to 6:00 pm only	periodic weekday 8:00 to 18:00
FTP	Every day of the week, from 8:00 am to 6:00 pm only	periodic daily 8:00 to 18:00
HTTP	Every minute from Monday 8:00 am to Friday 8:00 pm	periodic monday 8:00 to friday 20:00
HTTP	All weekend, from Saturday morning through Sunday night	periodic weekend 00:00 to 23:59
SMTP	Saturdays and Sundays, from noon to midnight.	periodic weekend 12:00 to 23:59

Today's applications require high performance to help ensure competitiveness in an increasingly fast-paced business environment. The Dynamic ACL over come leave permanent openings that hackers might find and exploit are difficult to manage in a large network can require the router to do excessive processing, depending on what's in the list do not offer a mechanism to authenticate individual users. The NBAR help ensure performance for Mission-Critical Applications, Improve Multiservice Performance and Reduce WAN expenses. The result of this experiment observed using various troubleshooting method. The study of this network experiment paves to prevent the network from attack in various network layers and unauthorized resource usage.

CineApp: A BlackBerry Application for Finding Movies in UAE Cinemas

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ABSTRACT

CineApp is a BlackBerry application created for providing access to Cinemas and movie timings in the United Arab Emirates, specifically Abu Dhabi and Dubai. This application allows users to access showings of different cinemas, new upcoming movies, a list of the movies that are available and in which cinemas they're currently being viewed. CineApp is designed to help people save time and have easy, quick access to all their favorite cinemas, wherever they are, whenever they feel like it. This application is very useful because most of the cinema websites can't be accessed via BlackBerry smartphones.

CineApp will be built for all the different versions of the BlackBerry smartphone and will also have a feature that allows the user to share the application via E-Mail, Facebook, Twitter or simply by copying the link. An additional feature is that the users can search the application for movies and rate the movies to help other users decide which movies to watch. CineApp will get its resources from the websites of the Cinemas in Abu Dhabi and Dubai, which means it will be automatically updated as the cinemas update their websites.

This application will be useful for people who are used to going to the cinemas frequently and they can check the movies that are available easily. Teenagers, youths and adults who like to go to the cinema will use this application. Moreover, the application supports English and Arabic.

The application has an entertainment goal. By using this application, users will be able to check new movies in the cinema around the United Arab Emirates and which movies are available in specific cinema. Users will also be able to book for any movie that they would like to watch. Moreover, users can save time while they check the movies from CineApp application, especially when they spontaneously decide to go for a movie during an outing, which is common between young generations. The following screenshots depicts the application interface.

Information Management System in Manufacturing Sector

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ABSTRACT

How do we know what information system to use in a specific business? How do we know if it is the optimal environment tool to use for achieving the business goals and objectives? This paper discusses how modern information systems are used in a one specific business manufacturing sector. The purpose of this research is to discuss Information Systems and how they work with business process to achieve goals and competitive advantage and make appropriate decisions.

The following systems are discussed for the manufacturing business sector, with a study of the inputs, processes and outputs being necessary alongside an understanding of traditional models of Information Systems. Producing complex products and generating items that are suitable for human usage without difficulties, require effectives Information Systems to handle manufacturing process issues.

Firstly, Transaction Process Systems (TPS) carry out, step by step, the activities of daily routine processes. For example, in factories the flow of materials can be tracked easily via TPS. It organizes and speeds up internal operations and allows managers to monitor the updating through the system's reports, so imagine how business practices on a daily basis can be performed effectively without the use of this system. For instance, TPS enables a manufacturing company to build up an online ordering system that depends on daily transactions between the company and the customers. This interaction between both parties has an advantage on supply chain management in a way that reduces the participants like distributors and retailers. As a result, the cost of merchandise will be much lower and the opportunity for all customers to purchase in any time with the delivery option make this operation more valuable as well, so this system allows the production companies to be in touch with their clients more than regular stores.

Secondly, Management Information System (MIS) support the managing and administering of a companies' performance to ensure that everything is on the right track. MIS's evaluate and compare transactions and then make appropriate decisions. For instance, MIS is able to summarize for a production company the annual sales for a particular product. This helps to identify the growth or reduction of some products and lets the administrative level react immediately if the possibility of loss occurs. An example of MIS that is used in manufacturing is called inventory control program that depends on the production schedule. It predicts the potential production, verifies manufacturing costs and improves resources allocation scheme. The important goal to be highlighted for these systems is the efficiency of resource management and low expenditures.

Thirdly, Decision Support System (DIS) assist managers with non-routine decisions that usually affect the whole companies' performance. For manufacturing companies, DSS gives a clear analysis about the negative or positive effects on production schedules if sales increased and the impact on return on investment if the factory schedule is delayed. The managers have to know the revenue and profit of a particular product in order to realize whether an increase or a decrease occurred. This facility helps them to handle the problems punctually regarding the production practices and to be in charge of controlling overproduction and underproduction issues.

The manufacturing sector is huge and an essential one. The enormous demand from the public to achieve self-sufficiency of consumer products is a real challenge. The speed, accuracy and efficiency are some factors that lead to accomplish communities' needs without difficulties. I think that the information systems that were created for the manufacturing sector have a great ability to accomplish these factors successfully.

Smart Closet

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Supervised by
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ABSTRACT

As technology advances, life becomes easier, and as developers we aim to achieve this goal by providing easy and useful applications that simplify people daily tasks.

Often, our closets are full of every kind and every color of clothes but when we want to go out, we just don't know what to wear ! . We may don't have time to look for a blouse with a matching color for a specific skirt, or we may have some clothes that we bought and we totally forgot about them. Not just that, sometimes we buy a new piece of clothes and we don't know what to wear it with.

From all above , we find that we lost our time in trying to find matches , we may lose our money when we go to shop for a specific piece of clothe forgetting that we have a similar one at home . So our smart closet will help users to seek in their closets and have the right matches , perfect styles and many interesting features.

Our virtual closet aims to arrange your closet , suggests many forms of matches that it is not only from your own closet but also from a group of big designers and specialists of the fashion in the world . Those fashion designers can have the benefit of advertising their collections.

An important point is that this software can be improved in the future to be in real closets.

So , Smart Closet is website where you can register and have your own virtual closet , add items to it ,search it , have matches for items and much more.

Shop owners also can add their shops items to be suggested to the users.

The smart Closet will help people in:

1- Save their time by facilitating matching and searching.
2- Save their money by helping them not to buy unnecessary items.
3- Suggesting those styles from their own closet or from other registered shops' items.
4- Mix and match their clothes to come up with outfits.
5- Making them wear clothes of season colors and styles to follow latest fashion trends.

The smart Closet will help shop owners in:

1- Having a virtual shop that people can visit and view its' items.
2- Advertising their shop items by suggesting them to user "when appropriate".

For now the website is total free but it can be commercial website charging the registered shops to advertise their items.

Finally ,our vision of the future is to see the smart closet included in every closet , with advanced technologies that can facilitate the closet work , for example the add process could be done by simply waving to the item using special device that saves the picture of the item and analyzes it to come up with its specifications .

Implementations of Application Port-Mapping using CBAC and Smurf Attack Mitigation Using CAR

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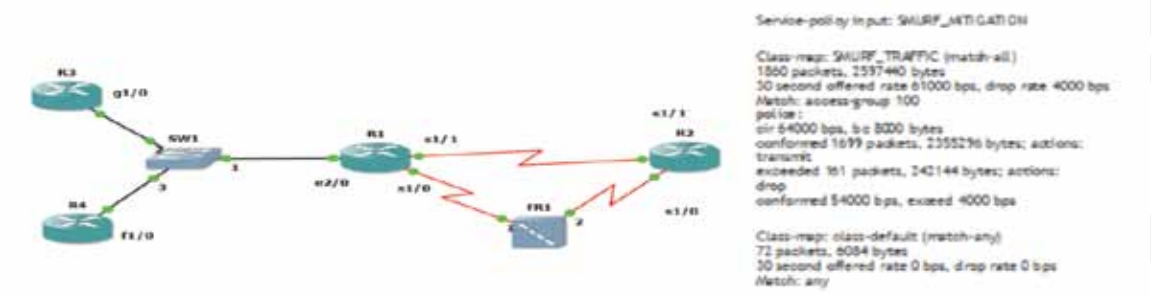
ABSTRACT

Computer security is the process of preventing and detecting unauthorized use of your computer. Prevention measures stop unauthorized users from accessing any part of your computer system. This project intended to study and experiment security issues which are configuration of Application Port-Mapping with CBAC and Smurf Attack Mitigation using CAR. In the CBAC using PAM to determine the type of inspection should be performed on a connection. PAM enables CBAC-supported applications to be run on nonstandard ports. Using PAM, network administrators can customize access control for specific applications and services to meet the distinct needs of their networks. The Smurf attack is a way of generating a lot of computer network traffic to a victim host. It is a type of denial-of-service attack. Specifically, it floods a target system via spoofed broadcast ping messages. CAR(Committed Access Rate)is a technology developed by Cisco that allows you to specify the maximum amount of bandwidth that can be used by any particular packet type. By using CAR you can precisely specify the maximum amount of bandwidth that can be used by echo reply packets.

The screenshots shown below are the implementation of Port-Map and Smurf Attack mitigation. The CBAC and CAR are the methods used for configuring in which routers are directed as per the NAT scenario. In this scenario router R1 is configured CBAC inspection rule named INSPECT_TELNET to inspect telnet protocol. The Map ports are configured1023 and 6023 as telnet ports for networks. It has been applied with access-list INSIDE inbound to Ethernet interface on R1. Smurf attack is performed reflecting ICMP echo packets, therefore, target network is bombed with a heavy flow of ICMP echo-reply packets. The rules are created to limit traffic matching access-lists with 64Kbps.



The PAM to apply a non-standard port numbers for a service or application. The use of PAM when a specific host or subnet uses a port number for an application that is different than the default port number established in the PAM table. Similarly PAM is used when different hosts use the same port number for different applications. When we consider the Smurf attack, there is much mitigation to reduce the risk of Smurf attack in a network, which is outlined as follows: Turn off the forwarding of directed broadcast on all router ports or take other measures to assure your network cannot be abused in this manner. The procedure we used to experiment using Graphical Network Simulator (GNS3) that allows emulation of complex networks. The result of this experiment observed using various troubleshooting method. The study of this network paves to avert the network from attack.

i-Surgeon: A Virtual-Training Environment For Innovative Medical Education

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ABSTRACT

Medical schools have a continuous commitment to produce qualified practitioners. This commitment is currently being challenged by the rapid growth in knowledge, number of medical students, the high monetary cost, high risks, and possible severe outcomes of practice errors. Traditional teaching setups, such as the mentor-apprentice, are becoming ineffective in allowing the students to acquire medical knowledge at a competent level.

In many cases, medical doctors propose surgical procedures as part of the patient treatment, but still, thousands of surgical errors and mistakes occur each day, there is no conclusive proof that any surgery has a 100% success potential, no matter how easy or common it was. Success of surgical procedures demands surgeons with high caliber in terms of knowledge, confidence, and surgical precision. Producing such proficient surgeons requires intensive training. Traditional methods for teaching surgical procedures are ineffective where the high number of students only learn by watching their mentors for long periods of time with minimal practical involvement. In contrast to traditional methods of learning and training, the i-surgeon system is proposed to overcome the above mentioned challenges, and it's designed to help trainees achieve a high level of experience using a computer program without the need of being in the operation room.

In this project we are presenting the way to simulate the appendix surgery 'Appendectomy', in a way that medical students can perform the surgery upon the virtual organs by manipulating the tools, which are integrated in the system via the virtual reality data gloves. The tools also provide force-feedback and collision detection to indicate to the user when they are pushing on or moving some organs or tissue.

The 'I surgery' is an effective assessment tool because it provides a compression between the actions that the user takes, with what really has to be done, this compression is applied by building a knowledge base (KB) contains all the exact information about the surgery, The thing that can provide an immediate judgment of the user's behavior and an appropriate correction if anything went wrong.

Building a strong (KB) is the first step in building an efficient (VR) system, achieving this starting with collecting all the information about the subject to be simulated. Our (KB) contains all the detailed information about the surgery, starting from checking the patient in the table, making sure that all the tools needed are available, starting the general anesthesia, cleaning the operation area, exploring the location of the incision ... etc, reaching to the closing of the incision. Each step should be in its simplest form because this is the right way to get our KB working properly according to the right flow of the surgery. The outcomes of the project's applications are expected to have significant impact on the quality of learning, leading to a better health care quality. In the case of the i-surgeon system, it would save disposable material, save time, eliminate the need to use cadavers or animals, enhance experience by exposing the students to rare pathological cases. Virtually trained students are expected to become more proficient and able to practice on real patients in a short period of time.

Information Management System in Banking Sector

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ABSTRACT

Matching appropriate technology with a particular business sector's goals is a key process and a challenge in modern information management. People seek successful output and revenues and as a reason for that, technology has been used more lately to be more efficient and innovative, to help managers from the operational, middle and the senior levels make effective decisions.

This poster discusses how modern information systems are used in the banking business sector. Examples of banks and organizations that are part of this sector are illustrated specifically with the results of research into how Information Management Systems help them to achieve their goals. To begin a business, different components should be considered, for example, customers, suppliers, firm's employees associated with their payments, and products as well.

Banking is an industry that has services, for example, opening different types of account can be describe as two types either current or saving, and deals with both individuals and companies. Islamic banks, which follows the principles of the Islamic laws or Shariah, use Islamic economics as a guide, where paying for bank own interest, or riba, is forbidden. It is also known as profit.

This poster session describes information systems and how Transaction Processing Systems (TPS), Management Information Systems (MIS) and Decision Support Systems (DSS) are used in the banking sector:

To begin with, a Transaction Processing System is an information system that serves operational managers and provides them with daily records and track banks daily activities, such as credit card and ATM transactions. Automated Teller Machines (ATM) are illustrated as an example of a TPS that provides banks with daily transactions processing capabilities that streamline core business operations. In these systems, the input is the data entry that goes in to a process, where it is recorded, that helps managers to observe the operations in the bank and customers receives a copy of the transaction as a message to his mobile phone or bank statement, which summarizes the TPS (illustrated in Figure 1).

Secondly, Management Information Systems serve middle management and provide them with the bank's up-to-date performance reports that are based on the Transaction Processing Systems. This type of systems is examined in terms of its ability to forecast banks' current and future performance. MIS is a helpful since it saves the firm's time because the data can be accessed easily and it helps the bank to increase the work productivity.

A third system is a Decision Support Systems. These are also analyzed in this paper in terms of their ability to support decision making at higher organizational levels. Specific examples are provided and examined. An example is core banking system where all the information from all systems, about the clients are gathered in a database which is constantly up to date.

To sum up, this poster demonstrates that three main systems are used to achieve operational excellence, customer and supplier intimacy, better organizational communications and more efficient decision making. This poster is also going to give you an idea about the original business sector and, as a final point, describe the most successful banking business sector.

Advanced Physical Activity Calorimeter

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ABSTRACT

The modern Pedometers are capable of measuring distance, time and the number of steps completed. These devices are designed specifically to aid people in tracking their daily fitness levels by displaying the number of steps on the step counter. Unfortunately, there is no device small enough to calculate the calories burned efficiently with varying velocity. To perform previously specified functions we designed and programmed an Advanced Physical Activity Calorimeter, named CALFIT hereafter. The device displays the velocity and fitness levels of the person in a user friendly way. The CALFIT aids in monitoring fitness levels as well as sets limitations on food habits based on the calories burned.

The CALFIT was designed by using a Wiimote sensor (which contains a 3 axis (X, Y, Z) accelerometer) and a Windows based PDA device. Furthermore, LabView PDA (an engineering software package) was used to program a function that calculates the velocity and the number of calories burned through acceleration. The acceleration along the X-axis was used to acquire velocity by the method of integration (this step was included in the Lab View programming). The Wiimote and the PDA are connected using a Bluetooth connection prebuilt in both devices. The PDA device sends SMS regarding health and fitness levels to doctors automatically after each exercise to update concerning doctors on how well the patient is doing. One of challenges in the design was to incorporate LabVIEW programming and the sensors into a single device. (Refer to figure 1 for further details).

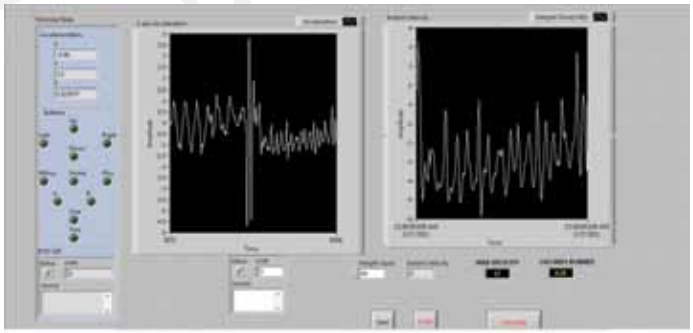

Figure 1: Represents V1 for calculating the Velocity and the number of Calories burned

The main objective is to design an efficient and compact device that is available to everyone and is lightweight. The CALFIT is a viable solution that is cost effective as well as user-friendly. It can prove to be a great asset for research in bio-medical engineering, since it demands data analysis as well as program implementation. This device provides an alternative measure that medical experts can rely on for patient updates. Moreover, this device would attract the medical field, as it could be used to monitor a patient's fitness levels and guide them to get the appropriate treatment. This machine will be very significant in the health industry.

A Social Network Search Algorithm for Team Formation

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ABSTRACT

Social networks such as Facebook, LinkedIn, MySpace, and others can be used as a source to connect people and form a team for a specific task. A social network can be visualized as a graph where the nodes represent the individuals and the existence of an edge between any two nodes represents the efficiency of communication between them. In our work we consider a social graph that consists of individuals (nodes) and relationships (edges). An edge between two nodes means that the two individuals can work with each other with the minimum communication cost. Every individual in the graph has graded skills and the task requires skilled people with certain levels of skillfulness. For an individual to be selected for the team, their skillfulness for the given skill must be equal or higher than the requirement of the task. So, choosing the individuals should not only match the required skills, but the respective skill levels as well. In this work we study the problem of forming a team with the required level of skills that can communicate effectively and efficiently to achieve a specific task. Given a social network graph G, a set of required skills; task T that contains the required skills with their levels. The output should be G' a connected sub-graph of G with nodes representing individuals having the specified skills levels in T, and the edges represent the efficiency of their collaboration.

Let us consider an example. We will assume a set of possible candidates in the network, P={A, B, C, D, E}. Given a task T = {Network Programming (expert), Network Security (expert), GUI (novice), Electronics (advanced), Networking (advanced)}, which is a subset of the superset X of all skills, $T \subseteq X$. Firstly, we compute the support candidates for each skill $S(x_j)$. We then inspect the cardinality of each set $S(x_j)$ and label the set with the least cardinality as (x_{rare}) , i.e. x_{rare} is the skill supported by the least number of people. In our example, we assume the rarest skill x_{rare} is "GUI", with a support of two nodes, E and D. From hence forth, we will refer to a candidate with the more general term Node. Node E possesses skill "GUI" with novice level, whilst node D possesses "GUI" with expert level.

To evaluate the possible fitness of the teams, two measures are considered, namely, Skillfulness of the team and the Communication cost between every two nodes p_i and p_k. The effectiveness of a team is also a relatively general term. One can argue that an effective team is a team with the least number of people, or a team with the highest level of cognitive intelligence and skill. These measures of effectiveness will require us to solve other optimization problems. We calculate the costs of each path from node p_{rare} to p_i in order to determine which choice of node will minimize the cost optimization problem. To determine the path, we traverse the network from p_{rare} to p_i moving along the edges. The weight of an edge is a pre-computed value that varies according to the ease of communication (similarity) between two nodes. The easier it is to communicate the smaller the weight of the edge. We calculate this weight using pairwise Jaccard distances, $(p_i, p_k) = 1 - \frac{skills_{p_i} \cap skills_{p_k}}{skills_{p_i} \cup skills_{p_k}}$. Unlike in T. Lappas, K. Liu, E. Terzi s' "Finding a Team of Experts in Social Networks", the diameter is not only a measure of distance, but it is a measure of skillfulness and distance. We redefine the magnitude of the diameter, i.e. the cost to include the skillfulness of the target node. With this in mind, we define the path cost as the weight of the path followed from node p_{rare} to p_i. Let us first define the components contributing to the cost. The first component is what we call the Skillfulness of a node p_i is the level of expertise in a given skill, x_j. The second component is the physical measurable distance of the path followed from node p_{rare} to $d(p_{rare}, p_i)$. These components of the cost optimization problem assess the effectiveness of the newly formed team. We will use a bias value α to control how much weight the algorithm puts on each of the skillfulness and distance components. The user is able to control the bias α depending on the requirements of the task . The function $d(p_{rare}, p_i)$ is calculated using Dijkstra's shortest path algorithm. The cost of path $d(p_{rare}, p_i)$ is:

$$cost = (1 - \alpha)\,(1 - skillfulness) + \alpha\,(distance\ along\ path),\ cost\ [0,1]$$

Thus the cost of path $P(p_{rare}, p_i)$ becomes:

$$cost = (1 - \alpha)\,(1 - skilllevel(p_i)) + \alpha\ \frac{d(p_{rare}, p_i)}{n},$$

where n = number of nodes along $P(p_{rare}, p_i)$. Since the cost is needed to be between 0 and 1, we need to normalize the value returned by the distance function by n, the number of nodes along the path $P(p_{rare}, p_i)$.

We are currently implementing a simulator to test our proposed algorithm. We are exploring the effect of the biasing factor on team formation cost. The tests use real data from the DBLP data set. In the future, we will explore other measures of communication cost such as the Minimum Spanning Tree and study their effects on the efficiency of the search with respect to the Diameter cost.

Implementation of TCP Intercept to Prevent DoS Attack and Filter Traffic using Policy based Routing in a Network Environment

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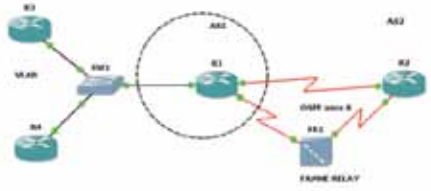
ABSTRACT

Computer security is the process of preventing and detecting unauthorized use of your computer. Prevention measures help you to stop unauthorized users from accessing any part of your computer system. This project experiments DOS Attacks Prevention with TCP Intercept, Filtering Traffic Using Policy-Based Routing. In DOS Attacks Prevention with TCP Intercept the most common attack against Service Provider IP Networks is Denial of Service (DoS). This type of attack causes your computer to crash or to become so busy processing data that you are unable to use it, so a good way to protect your environment from that attacks is to use TCP Intercept feature. It is a feature on routers used to prevent and mitigate TCP SYN-flooding attacks by monitoring the rate of SYN packets and intervening inside the TCP communication whenever necessary in order to reduce the number of incomplete TCP connections. In Policy-Based Routing to Filter Traffic the IP packet filtering the ability to define what traffic is allowed into and out of each interface based on filters defined by the values of source and destination IP addresses, TCP and UDP port numbers, ICMP types and codes, and IP protocol numbers.

The exhibit shown below is the directions of configuration in which routers are directed as per the NAT scenario. The TCP intercept feature helps prevent SYN flooding by intercepting and validating TCP connection requests as they pass through a router which forwards them. The traffic match TCP connections to network port 80, then Configure TCP intercept to use access list, and random drop mode. Start and stop clamping half-open sessions when their number reaches between 1500 and 1200. Finally set inactive connection timeout to one hour. This paper discusses the Cisco IOS software policy-based routing feature and addresses policy-based routing and its functionality. The task is to permit small ICMP echo packets with L3 length up to 300 bytes and to Create route-map ICMP_CONTROL; with section 10 permit packets matching the access-list ICMP and having length 301-1500. Route this packets to Null0 interface Finally apply the route-map to the interfaces. Additionally the table shows TCP intercept go off when the client interact more ICMP packets.



```
*Mar 19 21:29:42.391: INTERCEPT: new connection (155.1.45.5:20969 SYN ->
150.1.4.100:80)
*Mar 19 21:29:42.395: INTERCEPT(*): (155.1.45.5:20969 <- ACK+SYN
150.1.4.100:80)
*Mar 19 21:29:42.415: INTERCEPT: 1st half of connection is established
(155.1.45.5:20969 ACK -> 150.1.4.100:80)
*Mar 19 21:29:42.419: INTERCEPT(*): (155.1.45.5:20969 SYN -> 150.1.4.100:80)
*Mar 19 21:29:42.419: INTERCEPT: client packet dropped in SYNSENT
(155.1.45.5:20969 -> 150.1.4.100:80)
*Mar 19 21:29:42.423: INTERCEPT: client packet dropped in SYNSENT
(155.1.45.5:20969 -> 150.1.4.100:80)
*Mar 19 21:29:43.415: INTERCEPT(*): SYNSENT retransmit 1 (155.1.45.5:20969 SYN
-> 150.1.4.100:80)
*Mar 19 21:29:43.415: INTERCEPT: client packet dropped in SYNSENT
(155.1.45.5:20969 -> 150.1.4.100:80)
*Mar 19 21:29:45.415: INTERCEPT(*): SYNSENT retransmit 2 (155.1.45.5:20969 SYN
-> 150.1.4.100:80)
*Mar 19 21:29:45.415: INTERCEPT: client packet dropped in SYNSENT
(155.1.45.5:20969 -> 150.1.4.100:80)
```

The study analyze the advantage of policy based routing such as source-Based Transit Provider Selection, Quality of Service Load Sharing and also it is a tool for forwarding and routing data packets based on policies defined by network administrator. TCP intercept is used as a DoS prevention mechanism, or more specifically for SYN flooding. The procedure we used to experiment is Graphical Network Simulator (GNS3) that allows emulation of complex networks and runs operating systems in a virtual environment on your computer using Internetwork Operating Systems (IOS). The result of this experiment observed using various troubleshooting method. The study of this network lay concrete on to prevent the network from attack.

Programmable Water Curtain

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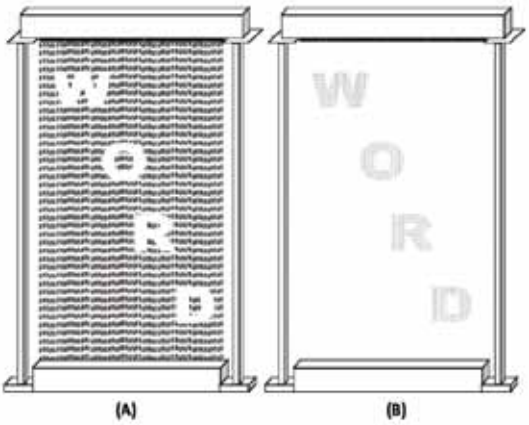
ABSTRACT

The purpose of this research is to design, implement and test a programmable water curtain that displays words and/or pictures within streams of falling water. The water curtain will be generated by creating gaps within streams of water which are adjacent to one another with a maximum distance of 2cm and are falling from a certain height—2 meters in our case. The gaps are formed by timely switching of many valves that control the flow of each stream of water, and create a readable word or display an image as shown in fig. 1. The display will not be stagnant, and will be falling down as the water stream falls down. The project encompasses several engineering disciplines including mechanical, electrical and computer engineering. The applications of the final product include the spheres of marketing, advertising, entertainment and decoration.



The Water curtain setup (A): The gaps display the word (B): The water streams display the word

The system initiates with a user inputting an image to the computer, where the image will be processed into a grayscale image. The grayscale has a fixed aspect ratio that meets the pixel requirements set by the number of valves used and the subsequent timing on those valves. These valves are industrial standard valves with extremely low response times and high accuracy. The computer sends the bitmap image to the microcontroller which synchronizes the switching on/off of the required valves using timers and a select row of pixels. Thus, the image will be seen as falling from the height of the water curtain (2m). The microcontroller is interfaced to the solenoid valves using an industrial inductive load driver which can go into its cut-off and saturation region at sufficient speeds to turn on/off the valves with negligible propagation delay. The image itself is scaled to the number of pixels horizontally to represent the number of valves and vertically to the number of time slices used to implement the image. Each vertical pixel currently represents a 25ms timer, which can be changed. To maintain a constant pressure across all the valves, a reservoir is placed above the valve mount. The reservoir is filled with 6 cm of water and kept unvarying through a closed loop system of pipes and a motor. Hence, it is a self-sustaining advertising module with water that is re-used.

The system uses computer processing to control an Electro-Mechanical set of components that have hydraulic considerations. The main challenge lies on system synchronization and management, since it encapsulates several aspects of computer, electrical, and fluid mechanical engineering. Also the quality of the final image itself comes down to fine details such as the choice of material and size of the nozzle as well as the physical composition of the valve. Accordingly, several tests on selected valves, reservoir shape and size should be conducted to produce the desired water flow patterns. Posters and billboards have long since typified mundane advertising. This product meets the need of having an innovative advertising module that is capable of captivating a large audience. Additionally, the water curtain fits various applications since it can be displayed at numerous venues such as exhibition centers, shopping malls and reception areas.

Cloud Computing: An Effective Infrastructure Solution for the New Generation IT Industries

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ABSTRACT

Cloud computing could narrowly be defined as an updated version of utility computing, fundamentally saying, virtual servers, available over the internet. Broadly defining, it's a conventional outsourcing of data centers and computational power. The concept dates back to the 60's, when John McCarthy quoted "Computing may someday be organized as a public utility". So, rather than purchase servers, software, data center or network equipment, clients instead buy those resources as a fully outsourced service. Basically, when your applications run in the cloud, you don't buy anything, it's like a monthly subscription, and they only pay for what they actually use. Maximum amount of a company's IT infrastructure budget is spent on implementation and maintenance that too often don't add substantial value to the company's benefit. There are two types of cloud computing, namely Community Cloud & Private Cloud. A community cloud may be established where several organizations have similar requirements and seek to share infrastructure so as to realize some of the benefits of cloud computing. Private cloud and internal cloud are neologisms that some vendors have recently used to describe offerings that emulate cloud computing on private networks. There are various outcomes of Cloud Computing that could affect the way businesses or firms operate. Through the use of multiple servers, data reliability and disaster recovery increases marginally. So, during any outages or server failure, users can be switched to the next available server, thus reducing the data failure and time spent on recovery. Cloud computing provides data centralization, which reduces security risks involving sensitive and vital data. Applications based on cloud computing are easier to maintain owing to its centralized aspect, which reduces individual maintenance and updating time. Since servers are centralized and Virtual, device and location independence increases, hence enabling users to access systems using a web browser, regardless of their location or what device they are using. Cloud computing comes into focus only when you think about what Information Technology (IT) always needs: A way to increase capacity or add capabilities on the go, without investing in new infrastructure, training new personnel, or licensing new software, Hence greatly reducing a company's investment on IT resources and their management. Open standards are critical to the growth of cloud computing, and open source software has provided the foundation for many cloud computing implementations standards. The relative security of cloud computing services is a contentious issue which may be delaying its adoption. Although cloud computing is often assumed to be a form of "green computing", there is as of yet no published study to substantiate this assumption. IT teams are turning to cloud computing technology to minimize the time spent on lower-value activities and allow IT to focus on strategic activities with greater impact on the business. On a final word, mobility holds the key to future of cloud computing. Cloud apps don't eat up your valuable IT resources, so the CFO's will love it. This lets firms & businesses focus on deploying more apps, new projects, and innovation. Cloud computing is a simple idea, but it can have a huge impact on business.

GoTour: A Mobile Tourist Guide for Trip Planning

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ABSTRACT

Tourists around the world may face some difficulties during their travels. An application that is installed in a smart cell phone can be helpful for tourists. In this paper, we present a novel tourist guide project (GoTour) that works on the smart phones with Android Operating System. This project is designed for Istanbul city which is one of the most popular touristic cities and Google map supports this city as well. In order to find tourist location and to show tourist on the map GoTour uses GPS and Google Map respectively. All spots in Istanbul with their attributes such as brief description, work hours, open/close area and coordinates are stored in the GoTour database. By using GoTour, tourists are able to view the all spots based on the categories (shopping, restaurants, parks, museums, antiquities, and consulate), make his/her favorite spots list, view weather condition and request a list of available spots regarding to weather condition and current time. Also tourists can see all the nearest spots on the map including museums, restaurants and other points of interest according to their current location. In addition to this, consulate information based on tourist nationality and service information such as police, ambulance…etc. are the others utility functions of GoTour.

The most significant feature that distinguishes GoTour from similar applications [1, 2] is ability to suggest a trip plan in a smart way. Because tourists usually have limited time during the trip, they prefer to choose some interest spots. This application suggests a trip plan taking into consideration selected spot categories, weather condition, current location of tourist and current time. The plan starts from tourist's location and ends at the destination spot. The plan maximizes the number of most popular spots on the plan without violating constraints (e.g., total time of the trip is not more than a specified limit). We achieve this function by developing an algorithm based on Variable Neighborhood Search which is a metaheuristic for solving combinatorial and global optimization problems. If some spots are already visited by the tourist, the tourist can edit spots. Considering this information, system can suggest a new trip plan. Figure 1 depicts the context model of the proposed solution.

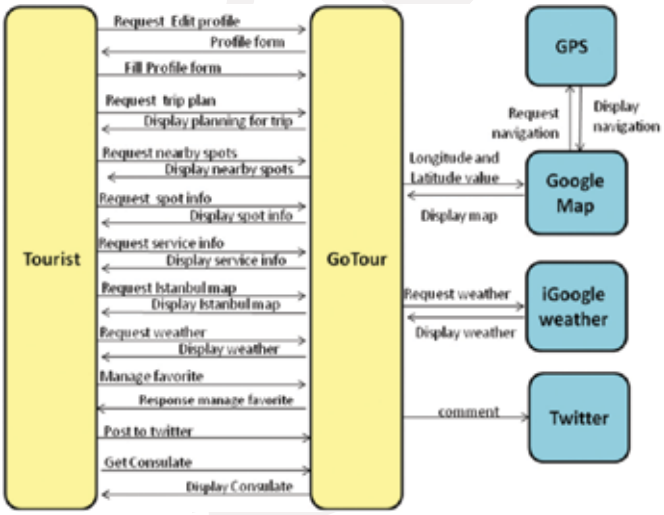

Figure 1 Context model of the proposed solution

The software technologies used to implement the proposed solution include J2ME, SQLlite, and Google Maps API. The mobile application is developed to run on the Android smart phone.GoTour both gathers the features in the various applications in a single application and adds outstanding features. Therefore, we believe that it will be one of the most preferable tourist guide application. We would like to extend this application by including the other touristic cities in the future.

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[1] "Guidepal, For the People "[Online].Available: http://guidepal.com/

[2] "About Trip Journal".[Online].Available http://www.trip-journal.com/

Building an Automatic Music Transcriber for Arabian Music

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ABSTRACT

Music transcription stands for the process of converting sound into musical score. Although this service is widely available, it only offers transcription of Western music. Unlike Western music where the tone-to-tone distance is a half tone, the distance in Arabian music is a quarter tone and the transcription process is therefore more challenging. In this work, a complete Arabian music transcriber (called Jordan University Arabian Music Transcriber, JUAMT) that offers transcription services for both Arabian and Western music is designed and implemented successfully.

The work presented in this paper involves development of a multistage transcription process which includes sound recording, sampling, noise filtering, pitch detection, building musical instrument digital interface (MIDI) matrix and score generation. The core of this process is the pitch detection stage which is based on a modified Fast Fourier Transform (FFT) algorithm. Stages of the proposed transcribing process are demonstrated in Fig. 1 with a particular reference to a traditional Arabian melody called "SobboAlgahwa". The generated score in the last stage of this process clearly illustrates the Arabian notes which cannot be detected by other equivalent existing transcribers.

Performance of the developed transcriber is assessed by comparing the score obtained by JUAMT with the score obtained by an equivalent commercially available notation application (Melody Assistant Transcriber, MAT) using the same melody reference. The superior performance of JUAMT in detecting and representing the Arabian notes over MAT is quite obvious, as illustrated in Fig. 2. In addition, the developed JUAMT offers the following novel transcribing features for Arabian music:

- E-learning platform for Arabian music learners. It offers info on basic aspects of music theory to provide learners with most needed information to start up their journey.
- Online instrumental or singing performance to assure maximum portability.
- Reading pre-recorded melodies and generating the corresponding scores efficiently.
- Auto detection of the musical scale of the generated score and the ability of transposing the score to any desired note.
- Auto saving the recorded performance in MIDI format, directly after transcribing.

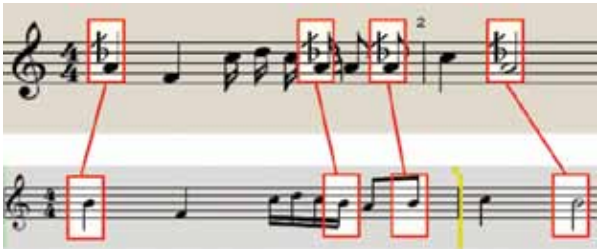
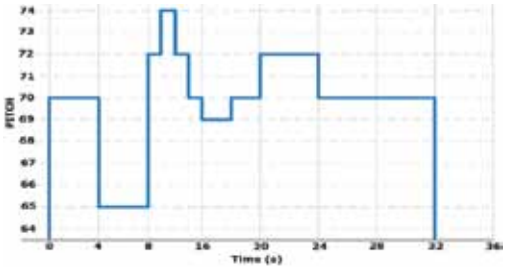
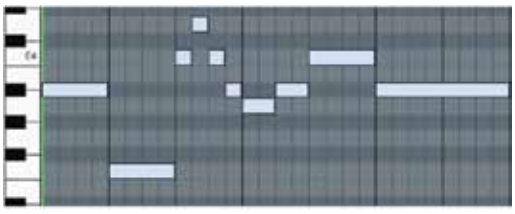


Figure 2. Comparison between JUAMT and MAT (Upper: JUAMT score, Lower: MAT score)

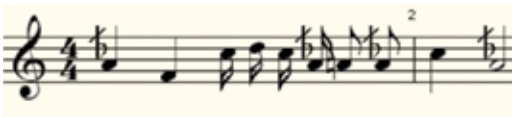
(a) Audio Signal



(b) Pitch Values



(c) MIDI Representation



(d) Score Generation

Figure 1. The JUAMT transcribing process.

Data Mining Techniques for Detecting Different Types of Fraud

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ABSTRACT

The advent of new technologies and the fast base of technological development have created new possibilities as well as imposing new challenges. Fraud, which is one of the greatest challenges for businesses and organizations, has been equipped with technologies to take new and unconventional forms that are stealthier and more difficult to recognize than the traditional forms of this crime. As a result, the techniques for detecting fraud had to develop as well to provide more efficient protection. In general, the process of detecting and preventing fraud can be very challenging due to the characteristics and nature of fraud as being stealthy, very complex and possessing some temporal characteristics and patterns. Therefore, the most efficient and effective method for fraud detection is to use data mining and analysis techniques.

This research paper explores some of the most effective data mining techniques for detecting different types of fraud. Before digging into the depths of data mining techniques, the paper touches on the general classification of data mining techniques for fraud detection according to the implemented type of machine learning into supervised and unsupervised methods. Next, some of the most widely known data mining techniques for fraud detection are summarized from a collection of research papers and presented in tabular format. A selection of those techniques is explored in the fields of mobile telecommunication fraud, credit card fraud, medical insurance fraud and computer systems intrusion detection. In addition, a real life case is presented to illustrate the application of one of the techniques in credit card fraud detection in Saudi Arabia.

In the first field, which is mobile telecommunication, the implications and challenges for fraud detection are highlighted. Then, fraud is classified into subscription and superimposed. This paper focuses on the latter as being the most common and difficult to control. Under this topic, the paper explores the signature-based methods for fraud detection, including the components of a signature and the methods for signature updating and calculating the signatures. Next, the interesting topic of cellular communication cloning is defined along with some of the post-call methods used to detect it.

The next field of this paper explores the credit card fraud detection, which is accomplished by monitoring the behaviors of the customers' transactions. This could be done either through Peer Group Analysis, which monitors the customer behavior over a long period of time or through the Break Point Analysis which distinguishes the spending behavior of the users.

After that, the paper tackles the third field in which data mining is used to detect fraud, which is the medical insurance field where data mining can employ the power to combine systematic techniques with someone's firsthand knowledge.

Last but not least, the paper explores briefly the use of data mining in the field of computer systems intrusion detection by defining intrusion detection and providing an insight on some of the intrusion detection techniques which are classified into Misuse Detection and Anomaly Detection.

Finally, the paper presents a case that demonstrates how data mining techniques helped Riyadh Bank in credit card fraud detection. In 1999, Riyadh had come to face a critical situation caused by credit card fraud. Nevertheless, with the aid of the Break-Point Analysis they were able to put a stop on this dangerous epidemic.

This research presents only a selection of the various data mining fraud detection techniques. As studies have proven, choosing the right method for a specific implementation depends on trial and error. Doing this research has brought to our attention the importance of data mining as a powerful detection tool that recognizes what is otherwise impossible for humans to detect and that has much more implications than merely recognizing common patterns.

Implementation of CBAC to Prevent DoS Attack and TCP Intercept in Watch Mode to Prevent TCP SYN Flooding Attack

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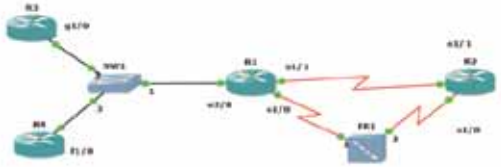
ABSTRACT

Internet security is a branch of computer security specifically related to the Internet. Its objective is to establish rules and measures to use against attacks over the Internet. The Internet represents an insecure channel for exchanging information leading to a high risk of intrusion or fraud. This project aimed to implement to prevent Dos attack and TCP SYN flooding attack security issues practically. The Dos attack prevention with CBAC (Context-based access control) and to prevent TCP SYN flooding attack by configuring TCP intercept in watch mode. In Context-based access control (CBAC) intelligently filters TCP and UDP packets based on application layer protocol session information and can be used for intranets, extranets and internets. CBAC can be configured to permit specified TCP and UDP traffic through a firewall only when the connection is initiated from within the network needing protection. In The TCP intercept feature helps prevent SYN-flooding attacks by intercepting and validating TCP connection requests. In intercept mode, the TCP intercept software intercepts TCP synchronization (SYN) packets from clients to servers that match an extended access list. The software establishes a connection with the client on behalf of the destination server, and if successful, establishes the connection with the server on behalf of the client and knits the two half-connections together transparently. Thus, connection attempts from unreachable hosts will never reach the server. The software continues to intercept and forward packets throughout the duration of the connection.

The exhibit shown below is the directions of configuration in which routers are directed as per the NAT scenario. CBAC uses timeout and threshold values to manage session state information, helping to determine when to drop sessions that do not become fully established. By configuring router R1 the inspection rule DOS_MITIGATION and inspect TCP traffic start calming half-open sessions when their number reaches 1200 and stop on 1000 sessions. And also configured CBAC to start replacing half-open sessions when their rate exceeds 300 per minute and stop when it falls below 100. CBAC to block any host for 5 minutes when it has more then 50 half open sessions.

The TCP intercept feature implements software to protect TCP servers from TCP SYN-flooding attacks, which are a type of denial-of-service attack.A SYN-flooding attack occurs when a hacker floods a server with a barrage of requests for connection. TCP intercept not to proxy the incoming connections. However, router should reset connections that linger in half-open state for more than 15 seconds. The half open sessions are resetting when their number reaches between 1200 and 1500.

```
Session audit trail is disabled
Session alert is enabled
one-minute (sampling period) thresholds are [200:300] connections
max-incomplete sessions thresholds are [1000:1200]
max-incomplete tcp connections per host is 90. Block-time 5 minutes.
tcp synwait-time is 30 sec -- tcp finwait-time is 5 sec
tcp idle-time is 3600 sec -- udp idle-time is 30 sec
dns-timeout is 5 sec
Inspection Rule Configuration
Inspection name DOS_MITIGATION
tcp alert is on audit-trail is off timeout 3600
Interface Configuration
Interface Ethernet0/0
Inbound inspection rule is not set
Outgoing inspection rule is DOS_MITIGATION
tcp alert is on audit-trail is off timeout 3600
Inbound access list is not set
Outgoing access list is not set
```



The procedure we used to experiment using Graphical Network Simulator (GNS3) that allows emulation of complex networks. It allows running operating systems in a virtual environment on your computer and allows the same type of emulation using Internetwork Operating Systems (IOS). The result of this experiment observed using various troubleshooting method. The study of this network experiment helps to thwart the network from attack.

Design of an Audio GCC Banknote-Identification System for the Blinds

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ABSTRACT

The purpose of this project is to design an ubiquitous money-recognition system that loudly reads GCC banknotes values for the blinds. The system has a push-button that changes the currency depending on each of the GCC countries. Besides, it has a switch that changes the choice of language from/to English/Arabic. When a banknote is placed in its relevant position, the system loudly reads the monetary value of the banknote and its currency. However there is an optional safe mode that generates certain beep sounds if the user prefers to keep it private.

The digital system has three main components: color sensor, microcontroller and speech chip. The color sensor reads the color of the banknote and sends it to the microcontroller. The microcontroller analyzes the readings of the sensor and sends commands to the speech chip that generates and loudly reads the monetary value of different banknotes depending on the sensor's readings. Figure 1 depicts a functional block diagram of the project.

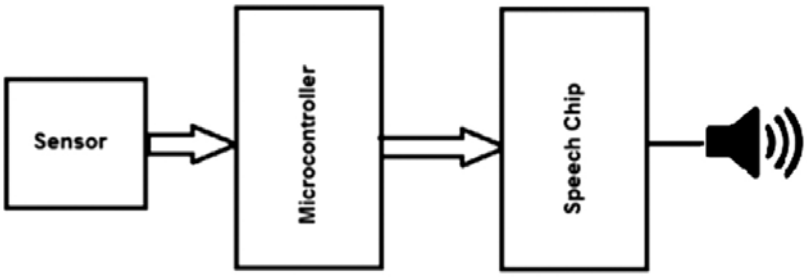

Figure 1: Functional block diagram

Many challenges have been faced while experimenting the project, paramount of these are the following:

- Banknote colors of different categories are very close and hard to differentiate.
- The sensor reading capabilities vary according to various light intensities.
- The selected sensor was not very accurate. More accurate sensors cost more, and thus, could make the project unaffordable to many blinds.

The problem of the blinds in recognizing different banknotes may be solved, in some countries, by introducing Braille lines to the banknotes. However, this solution is not very reliable since lines fade out as time passes by, and thus, making it more difficult for the blinds to recognize banknote categories. Moreover, it would take a lot of time for GCC Central Banks to introduce new banknotes that completely replace old ones. In other countries, different banknotes are of different sizes wherein each banknote category has a distinct width and length, which makes it unpractical as the blind must have all categories of money to be able to distinguish various banknotes.

The above-mentioned solutions adopted by GCC governments require a change of the banknote categories to new ones, whereas this project intends to fill this gap through recognizing banknote colors that don't fade away, like the Braille lines, and requires only updating the device to read both old and newly introduced banknotes.

The proposed system is relevant due to many reasons:

- Cost-effectiveness in development.
- High adaptability for usage in other countries with new currencies.
- Wider applicability for GCC countries.
- User-friendliness for the blinds.

Evaluation of Network Traffic using Reflexive Access Lists and CBAC Method

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ABSTRACT

Network security is a branch of computer technology known as information security as applied to networks. The network security deals protection of information from theft, corruption while allowing the information to remain accessible and productive to its intended users. This project proposed to experiment two security issues which enable the indented user accessible, which are evaluating the router-generated traffic and the outgoing traffic inspection for pinholes vulnerability. The method used for evaluating router generated traffic is reflexive access _list and to inspect the outgoing traffic inspection for pinholes using CBAC (Context-Based Access Control). For the Inspection of Router-Generated Traffic feature allows Context-Based Access Control (CBAC) to inspect traffic that is originated by or destined to the router on which CBAC is configured. CBAC is a Cisco IOS Firewall set feature that provides network protection by using the following functions: traffic filtering and traffic inspection. The Reflexive access lists are similar in many ways to other access lists. Reflexive access lists contain condition statements (entries) that define criteria for permitting IP packets. These entries are evaluated in order, and when a match occurs, no more entries are evaluated.

The exhibit shown below is the directions of configuration in which routers are directed as per the NAT scenario. The traffic filtering with Reflexive Access-Lists Create extended access-list LOCAL_TRAFFIC and match TCP/ICMP traffic from any source to any destination. The route-map LOCAL_POLICY; match access-list LOCAL_TRAFFIC and set interface Loopback0. Then it applies route-map LOCAL_POLICY as local policy. This paper describes how CBAC works to provide network protection on multiple levels using the following functions such as Traffic Filtering, Traffic Inspection, Alerts and Audit Trails. Additionally, It Creates inspection rule named INSPECT to permit TCP based protocols. CBAC permits FTP transactions to be performed through the firewall. Finally these inspection rules can be applied ingress on Serial and FR interfaces. Similarly the exhibit shows here the sample reflexive access list and the policy map in built with the type of traffic flow across the Loopback interfaces.

```
ip access-list ext OUTBOUND
 permit tcp any any eq 179 reflect MIRROR
!
ip access-list extended LOCAL_TRAFFIC
 permit tcp any any
 permit icmp any any
!
route-map LOCAL_POLICY
 match ip address LOCAL_TRAFFIC
 set interface Loopback0
!
ip local policy route-map LOCAL_POLICY
```

```
Established Sessions
 Session 650FF08C (10.0.0.6:54327)=>(150.1.5.5:23) tcp SIS_OPEN
 Session 650FFB04 (150.1.4.4:40067)=>(150.1.5.5:179) tcp SIS_OPEN
```

CBAC inspects traffic that travels through the firewall to discover and manage state information for TCP and UDP sessions. This state information is used to create temporary openings in the firewall's access lists to allow return traffic and additional data connections for permissible sessions. CBAC also provides a limited amount of intrusion detection to protect against specific SMTP attacks. In this paper experimented using Graphical Network Simulator 3(GNS3) that allows emulation of complex networks. It allows you to run operating systems in a virtual environment on your computer and allows the same type of emulation using Internetwork Operating Systems (IOS). The result of this experiment observed using various troubleshooting method. The study of this network experiment facilitate to prevent the network from attack

Comparative Study on Inspecting Network Traffic using Access Lists and Reflexive Access Lists

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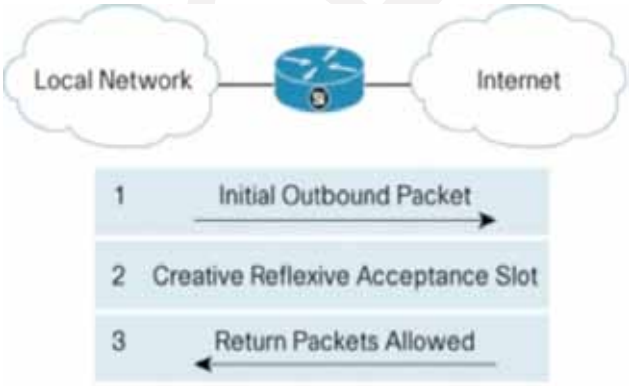
ABSTRACT

Internet security is a division of network security specifically related to the Internet. It offers the rules and measures to use against attacks over the Internet to protect the transfer of data. This project, I experiment to solve security issues such as Traffic Filtering with Access Lists and Traffic Filtering with Reflexive Access-Lists. In a Traffic Filtering with Access Lists method used to enhance network security by filtering network traffic based on many types of criteria. Access list criteria could be the source address of the traffic, the destination address of the traffic, the upper-layer protocol, or other information. Note that sophisticated users can sometimes successfully evade or fool basic access lists because no authentication is required. In a Traffic Filtering with Reflexive Access-Lists are similar in many ways to other access lists. Reflexive access lists contain condition statements (entries) that define criteria for permitting IP packets. These entries are evaluated in order, and when a match occurs, no more entries are evaluated. Reflexive access lists are an important part of securing your network against network hackers, and can be included in a firewall defense. Reflexive access lists provide a level of security against spoofing and certain denial-of-service attacks. Reflexive access lists are simple to use, and, compared to basic access lists, provide greater control over which packets enter your network.

This paper analyzes the traffic flow and the capability of both ACL and the Reflexive Access Lists. The task is to permit TCP connections to ports of FTP and HTTP services. Ping uses ICMP message types “echo” and “echo-reply” and tracroute (the UNIX variant, which IOS utilizes) uses by default UDP port range 33434 – 33464 to probe the network. At the end of access-list to log all denied packets and apply this access-list to both Serial and FR interfaces on ingress. In line with reflexive access-list MIRROR permit outbound ICMP of type echo and reflect it into access-list



The principle of a reflexive access-list is demonstrated in the figure above.A "normal" ACL has no sense of state. Packets are evaluated individually, so there is no concept of a collection of packets or sessions. In an HTTP connection, for example, packets flow both ways. The HTTP client initiates the session by sending packets to the HTTP server, and then the server sends packets to the HTTP client. With simple ACLs, the router must have an ACL to permit each flow. With a reflexive ACL, we'll see that the "return traffic" ACL can be written on-the-fly and closed after the session has concluded. The procedure we used to experiment using Graphical Network Simulator (GNS3) that allows emulation of complex networks. It lets you to run operating systems in a virtual environment on your computer using Internetwork Operating Systems (IOS).The result of this experiment observed using various troubleshooting method. The study of this network paves to prevent the network from attack.

Automatic Web Accessibility Evaluation Framework

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ABSTRACT

Web accessibility means enabling people regardless of their disabilities to access, interact and use the web without any difficulties. Many guidelines and techniques were created to ensure that the web is equally accessible to all people. Among these guidelines and techniques are those recommended by the World Wide Web Consortium (W3C), the governing body of the web and its standards, which include the Web Content Accessibility Guidelines (WCAG 2.0).

WCAG 2.0 has three levels of conformance, divided into: Single-A (minimum level of conformance with minimum level of accessibility), Double-A (intermediate level of conformance with enhanced level of accessibility) and Triple-A (high level of conformance with additional accessibility enhancements). Each level of conformance has many testable techniques that are used to evaluate web site accessibility.

While web developers find it difficult to manually evaluate their web sites using these techniques, they can use automated tools to make sure that their web sites do not contain accessibility barriers. In fact, there are different evaluation and repair tools that can be used to test the accessibility of a web site. However, the majority of these tools follow WCAG 1.0 (the previous version of the accessibility guidelines), which has outdated. On the other hand, few tools do exist for WCAG 2.0 evaluation. Yet, these tools are:

1. Few (4 to 5 tools at most).
2. Not mature enough, most of them evaluate the basic level of conformance (i.e. level A) with limited number of techniques.
3. Do not support the evaluation of Arabic web sites, or support them but with poor efficiency.

Based on these shortcomings, we propose the development of an automatic web accessibility framework that supports the evaluation of Arabic web sites and support more evaluation techniques.

The major aim of this project is to create an automatic Web Accessibility Evaluation Framework that follow WCAG 2.0 and supports the evaluation of Arabic web sites. In particular the detailed objectives of this project are as follows:

1. Develop an Accessibility Evaluation Framework that employs WCAG 2.0.
2. Develop an accessibility framework that handles Arabic web sites.
3. Automate the process of accessibility evaluation.
4. Help web designers and people who are interested in web accessibility, to understand accessibility barriers.
5. Facilitates the evaluation process with little experience in accessibility guideline.

The framework we will create to support evaluating the accessibility of Arabic web sites will support the following:

- Evaluate a page or a set of pages in a web site.
- View the problems and the warnings.
- Produce two reports as a result of evaluation.

Although accessibility tools are widely available on the Internet, those tools are lacking when comes to Arabic website evaluation. In addition, the Arabic user does not appear to be a priority in the minds of Arabic web developers, especially those with disabilities.

Thus, the need for an Arabic evaluation tool was found. And from there our idea was born, which will fill the gap and make the Arabic accessibility easier.

Finally, we hope that this project will help determine if an Arabic web site meets the latest content accessibility guidelines WCAG 2.0 by means of automating the evaluation process. Therefore, using our proposed framework web developers as well as designers can automatically test and find problems in their web sites, which will significantly reduce the time and effort required to evaluate the accessibility of a Web site.

Distributed e-Health System Architecture for Telecare Patient Management of Chronic Diseases

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ABSTRACT

Recent studies have shown that remote data monitoring of patients with chronic diseases leads to better disease management and reduces cost. The paper presents distributed e-health system architecture for telecare patient management of chronic diseases using wireless technologies for remote data acquisition and monitoring. The adopted wireless technologies include ZigBee, Bluetooth, and Wireless Application Protocol (WAP) for small mobile devices and cell phones. On the move, the medical measurement devices are linked with the patients' mobile phones while these devices are linked to the patients' PCs when at home. The patients' PCs and mobile phones, which acquire the patients' data from the corresponding measuring devices (e.g. weight scale, pulse/blood pressure, glucometer, pulse oximeter, etc.) via Zigbee or Bluetooth, send the readings to a remote health-service centre. In this application prototype a single patient's device, the glucometer, is used to demonstrate the short-range wireless communication interfaces. The developed interface can be used with other medical devices which are equipped with a serial port.

The proposed e-health system is of a distributed multitier architecture which consists of a presentation tier, logic tier and a data tier as shown in Figure 1. The presentation tier offers user interfaces for both healthcare providers and patients via browser-based access to PCs and smart cell phones. This layer also manages the acquisition process of patients' data via short range wireless communication using ZigBee or Bluetooth technologies. The logic-tier consists of several software modules, namely: communication module for inter-process communications, decision support module for clinical support services depending upon the patient's health status and the newly acquired information, QoS and security module to ensure data integrity and system security, notification module to generate necessary notifications and alarms, reporting module to provide various types of textual and graphical reports on patients' health management and the activities performed by all system users, and the database interface module to handle connections between the logic-tier modules and the database server. The data-tier which contains database records of all system stakeholders produces or stores the various types of system data. It should be mentioned here that system users have no direct access to this tier and separating it from the logic tier improves security, scalability and performance of the entire system.

The developed e-health system is capable of receiving patients' data (via Internet or cell phones) and responding to the queries on patients data from the corresponding healthcare providers (clinicians and nurses). In emergency cases, when the received patient's data reflect a critical case, the software algorithms empowered in the health centre will forward the case directly to the corresponding healthcare providers as SMS messages via their mobile phones as well as email messages. The distributed architecture of the proposed e-health system along with the adopted wireless technologies is expected to offer better management of chronic diseases by offering several important services, of these:

- Improving communications between patients and their caretakers.
- Avoiding unnecessary trips to the emergency departments/ hospitals and related costs.
- Helping patients learn about their diseases and manage their ongoing care.
- Offering an important source of information for researchers to study disease development and related social aspects.

Fig. 1. The proposed e-health system architecture.

Instrumentation of a Motorized Wheel Chair Simulator Platform

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ABSTRACT

Motorized wheel chairs are becoming more common place among people with special needs in their everyday life experience. Training sessions are conducted to familiarize them about how to use the chairs safely and become familiar with the controls. However, this is often not a safe way to train as people with special needs, especially children, can make accidents during those sessions which lead to injuries and damages. To provide real means for training users of motorized wheel chairs, a simulator platform was developed with the aim to imitate real life experience that has both visual and sound effects with a safe operation. The Motorized Wheel Chair Simulator Platform developed was initiated on behalf of Shafallah Center for Children with Special Needs in Doha Qatar. The children will be able to learn how to use their own motorized wheel chair using simulator. It will help them in safely controlling the chair and familiarizing themselves with the sounds (beeps, horns and motors) of their chairs. The training is a safe methodology of learning how to operate a motorized wheel chair. Plus, it allows the therapist to provide instruction to the user without needing to chase the chair around the hallway.

A platform that the motorized wheel chair sits on top of was designed to be light weight and easy to transport and store. The platform is configured such that the motion of the drive tires of the motorized wheel chair is used to move within a virtual environment that is either 2-D or 3-D. A roller system is driven by the drive tires along with a model 260 rotary encoder. A National Instrument input module (NI 9215) was used in a wireless DAQ system (NI WLS-9163) to interface the encoder with the CPU. The signal from the encoder is calibrated within the NI system by comparing the transformed data to the actual chair motion and the data from DAQ was interfaced with the virtual environment.

The wheel chair was placed on the platform and the drive wheels were rest on the rollers so they can spin the encoders attached to the rollers. Each encoder generates two signals (A and B) 90 degrees out of phase; these signals were used to find the position and thus the distance and velocity of the wheel chair. NI Analog Input module was plugged inside the wireless data acquisition device to acquire these signals from the encoders and transfer them wirelessly to the host PC.

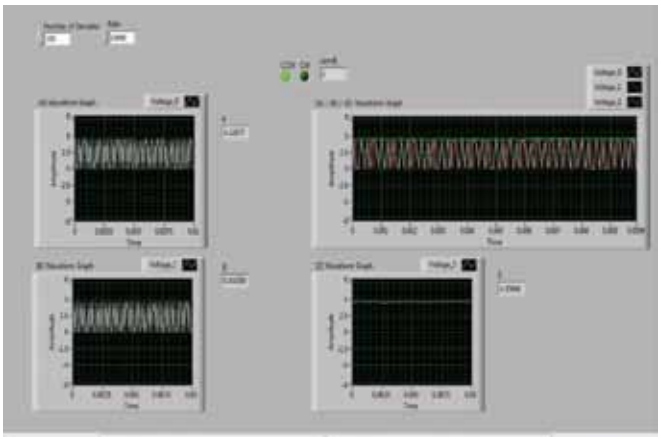

Figure 1: VI Front Panel

The expected test results are the transformed motion information from the actual wheel motion. Figure 1 represents the VI front panel which shows the direction of movement. This information can be interfaced from DAQ with virtual environment where children with special needs will learn how to operate their motorized wheel chairs safely.

A BlackBerry Application for a Tour Operator

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ABSTRACT

Tour Operator is a mobile application developed for the BlackBerry. It will guide people for the best places in Abu Dhabi. The application contains two categories: Tour Guide and Tour Trip. Tour Guide contains the top five popular places in Abu Dhabi including Malls, Hotels and tourism places. Tour trip allows the user can choose from three trips that the application provide it for them and our operator will arrange the trip for them by completing the form. The form contains the name, number of people and date of the trip. The form has a calendar for each trip, which will make easier for users to choose the suitable day and time for them. The application supports Arabic and English.

This application will help tourists to learn more about Abu Dhabi culture and tradition because it has a heritage trip planner allowing tourists to heritage places in Abu Dhabi. The application is designed for people who don't have time to search and find the places that they want to visit in Abu Dhabi, they will find the whole information without wasting their time. The interface of this application is very simple and easy to use. Once the application runs, the first page that will appear is the language page since the application is in both Arabic and English where the user can choose the language to use. Then, the user will see a page that has two main categories that are Tour trip and Tour Guide. The Tour Guide has 3 popular places Malls, Hotels and Tourism places in Abu Dhabi. Each one has the top and best five. If the user find one hotel he will see the location of this place plus the official site of the hotel were he could fine the rest information that he needs. On the other hand, the Tour Trip has three different trips and each one including three places to visit. The screenshots below depicts the interface to the application.

E-learning and its New Approaches

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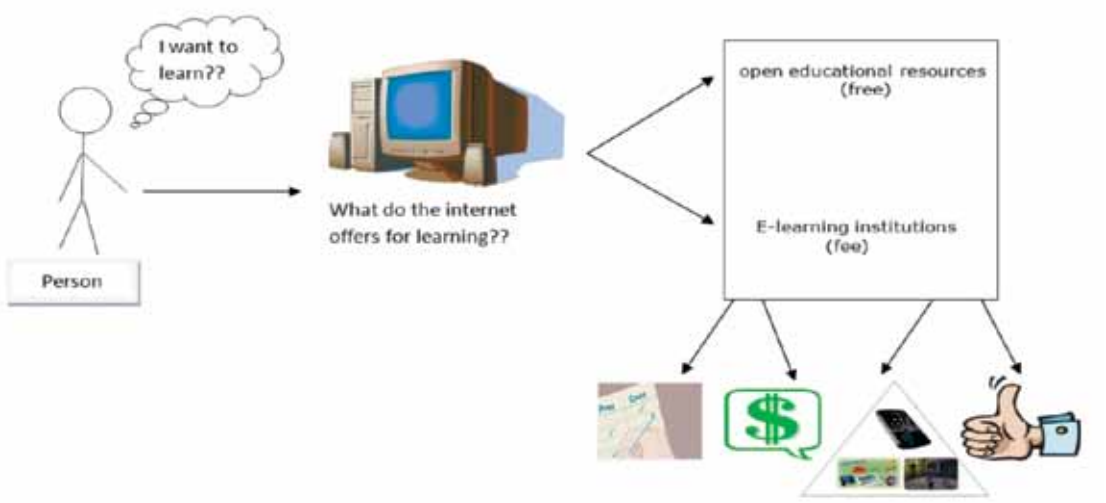
ABSTRACT

Traditional way of education is being challenged by the internet. Websites, forums, wiki, blogs, and social networks are allowing the learners to teach and the teachers to learn . Nowaday nearly all the people can gain an enormous amount of information through the web without the need of an instructor or supervisor, As we all know communication skills are the most important skill needed in the future, along with knowledge and critical thinking, this paper shows that E-learning institutions and open educational resources do support the building of these skills in some way.

E-learning is the comprehensive electronic way to support education and teaching methods through the web. This research paper is to show the potential student for a high education degree the various choices and opportunity provided through the web to learn, especially for those who cannot afford to study abroad. The main objective of this paper is to demonstrate the E-learning implementation, cost, effectiveness, impact, pros and cons, and the new approaches that are available.



This paper will concentrates on three new approaches; first is the educational video this approach made it easier to learn and to perceive information specially for kids between (5-16) years old, at the present time many devices that support interaction with videos are available such as Ipod, Ipad, samsoung galaxy, etc. The study of educational video is to shows their effectiveness and impact on e-learning. On the other hand, games dedicated to learning are also an important field that the Arab world should give attention to. In fact, the paper discusses the characteristic needed to be considered to create & play a game plus what kind of skills do the games build. M-learning is the newest technology to support the continuity of e-learning a lot of people still doesn't know what m-learning is, for that a brief research have been done to illustrate the definition, advantages, and disadvantages of the mobile learning,

This paper also had to point out a number of ethical issues that the e-learning is facing to aware the e-learners and let them try to solve the issues out; some solutions were provided that could solve & fix the issues. All in all, this paper is dedicated for helping the e-learners to choose the best & most convenient way to learn through the internet.

The Design and Development of an Arabic Multimedia Dictionary Tool for Individuals with Learning Difficulties

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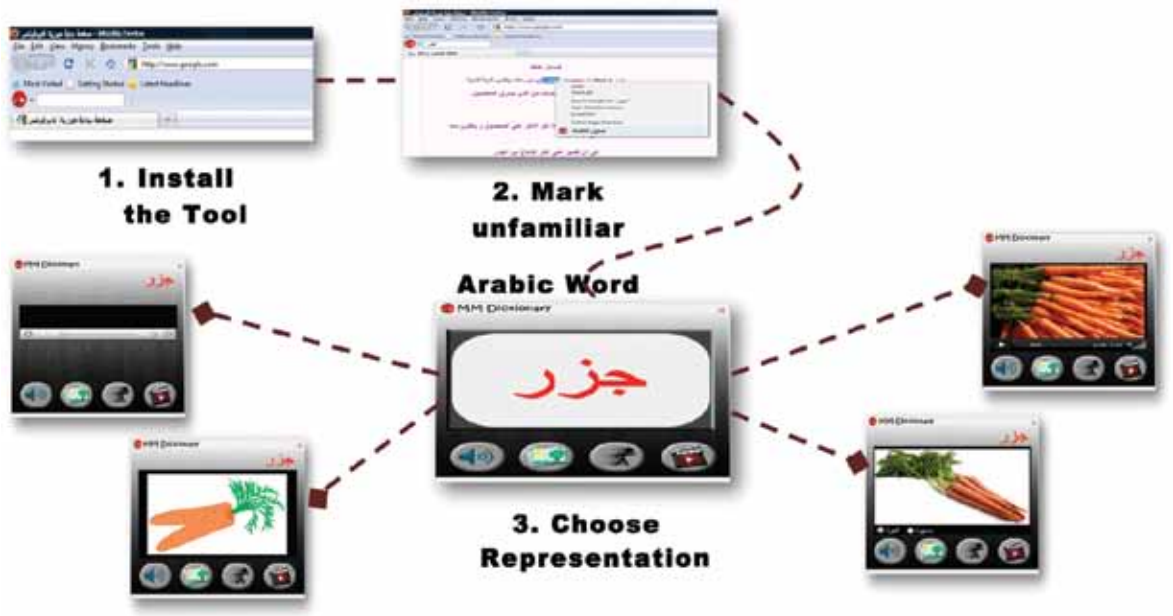
ABSTRACT

In this poster, we describe a novel system for improving web accessibility and supporting individuals with reading impairments in their use of the web. This project involves developing a web-based multimedia dictionary designed to support individuals with learning difficulties such as Dyslexia. Dyslexia is a learning disability which leads to problems in the ability to read and spell independent of socio-economic factors and despite having normal or above average intellectual abilities. According to recent research, dyslexia is one of the most common learning difficulties that affect approximately 10% of the population and it is a persistent condition, as it stays with individuals their whole life. Evidence suggests that people who have dyslexia experience problems with reading due to the fact that their brain cannot translate information properly. It is thus an information processing disability, and technology solutions have the potential to support individuals in this user population in order to overcome their difficulties.

Dyslexia can either be visual or auditory, visual dyslexia is usually seen in people who were unable to know understand the meaning of the picture or the meaning of the written word. People who have auditory dyslexia may have trouble remembering and understanding what they hear. In our system, we utilize multimodal presentations to stimulate an individual's cognitive abilities to overcome these two kinds of dyslexia and to learn to read properly. The aim of this multimedia dictionary project was to design and implement a web-based picture dictionary tool for language assistance for people with reading disabilities, embedded within web browsers, to assist them in accessing web content and to make written words more comprehensible to them. The system offers users four different representations for Arabic word descriptions including audio, image, animations, and video. Clicking on an unfamiliar Arabic word enables users to obtain interpretation of the word into the chosen multimedia representation according to the system configuration. This project demonstrates a novel web-based approach and an effective technology tool for supporting learners with disabilities.



Qatar Context-aware Tourist Mobile Application

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ABSTRACT

Advancements in mobile computing have raised a new type of mobile applications and services that are aware of the application's context and adapt their behaviors based on that context. Context includes any information that characterized the situation of the user, his place, and the application itself. The objective of Adapting system to its user's usage context and personalization is to increase its usability and enhance its functionalities. One of the best application sector suited for providing information based on current user context is the tourism domain. Tourists always need a guidance leading them whenever they want based on current locations, time, and their preferences. This project aims to build context-aware mobile application, to help tourists during their stay in Qatar by providing them with information and recommendations based on current user context, which includes location, user's preferences, time and weather.

The economic growth of Qatar is among the highest rates in the world which creates huge job market that annually attracts thousands of people to work and settle with their families in Qatar. According to Qatar Statistics Authority publications, the population of Qatar has jumped from 744 thousands in 2004 to more than 1.6 million by the end of 2009.Certinally, these new comers at their early period need to know about specific locations, schools, shopping centers, hospitals, etc. and directions to reach such places. Furthermore, numerous people visit Qatar every year for tourism , attending international events, looking for business opportunities, or visiting their resident relatives. The number of visitors also increases each year, it increased by 113% between 2004 and 2006. Around 1.1 million who visited Qatar in 2008 and this number is increased to reach 1.5 million visitors by 2010. The application provides users with general information about Qatar which includes: history and governmental information, hotels, restaurants, entertainments, and main tourist sights. At the beginning, user is requested to specify his preference of restaurants types, hotels, attraction sites, and type of events. These preferences are used with other contexts like location, time, and weather to provide the user with best recommendation that fits his preferences. The application uses GPS to locate user position on the map and to provide him with best route for his destination. Moreover, the system interacts with the server in order to advice the user about events that might be of his interests. The application provides "Write on the Wall" services which allows user to post his own comments related to the locations where other tourist can see these comments when visiting this area.

During tourist walks around, the application provides him with notifications of nearest places of interest based on rule-based algorithm. These rules control recommendation process in order to display the most appropriate points of interests at specific situation. The rules specify size of area that system search in, current weather, and user preferences.

The system is composed of two sides: server side and mobile application. The server holds database of the tourist events, other tourists' comments, and latest data about weather. The application on the mobile interacts with the server to update events data, or to retrieve other tourists comments regarding current location. The mobile application is implemented using Android platform which is recent technology facilitates developing applications using Java programming language. The application uses Google maps services to find best route for the tourist, and to display locations of places of interests.

Locomotion Assistance for the Blind

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ABSTRACT

The purpose of this study was to develop a visual aid for blind people. When talking about aids for the blind, the scope becomes broad because there are many scenarios that a person can come in contact daily and the project was specifically focused on assistance while walking through a space with simple obstacles. The test room was a cuboid shape with different tables and chairs placed in it. The objective was to create a locomotion assistance device that would help the visually impaired navigate their way through a space while avoiding obstacles. Since vision cannot be reconstructed, other senses need to be utilized to substitute for this inefficiency. Hearing is one sense that can be used to replace vision; for example the blind bat has the ability to utilize sound waves to navigate through the dark. The bat sends high frequency sound waves and waits for them to rebound of objects informing them of the shapes around them and the location. Drawing from this natural phenomenon, an ultrasonic sensor that emits and receives signals was selected.

The locomotion assistance device created is comprised of three ultrasonic sensors placed around the waist. Because of the sensor type chosen, the range is only two meters, which is significant for the scope of the study. To make the system more general for a larger range of applications, two types of indicators will be used. The auditory indicator will sound to let the user know if they are close to an object. The kinetic indicator will move and touch the person giving them another form of indication. These two indicators were chosen to accommodate and individual that may be in a situation where they can not hear the auditory cue, or in a situation where they can not feel the kinetic indicator.

According to the World Health Organization, the total number of blind people in the world is about 45 million. This is between 1-2% of the population of industrialized countries. Many blind people rely on leader dogs to navigate their way. Unfortunately, these dogs are expensive and their prices range from $15,000 to $30,000. For this new system, the estimated cost will be about $350. This is mainly because an already existing reprogrammable system is being used. If a new circuit were created for this specific task, the price would reduce significantly.

In order to understand the time and distance calibration to use for our system, we carried out a study. This study focused on measuring the response period of the user to the warring signal. This was done by measuring the amount of time it takes the sonar signal to travel to and from the obstacle and by measuring the time taken for the average person to respond to the warning sound generated by the system. For this analysis, an assumption was made that a visually impaired person walks at a steady, constant speed of about 1.5 m/s. after carrying out the study, it was determined that the ideal distance for the warning signal to sound off, was between 60-90 cm away from an object. We also determined that the time response of our sonar sensor is 1694.6 microseconds at 60cm and 2581.4 microseconds at 90cm. With this data collected, we determined that a range of 60cm to 90cm is safe for the majority of people.

The development of locomotion assistance devices at a reasonable cost compared to the currently available alternatives will give blind people better quality of life. With the technology that is being proposed, motion would no longer be a hindrance, and blind people will be able to focus their time and energy in other tasks. There are many applications for this technology in the medical and non medical field. Future applications of this technology could extend to creating a fully autonomous wheel chair that can avoid obstacles and climb stairs, or to a device that can help firefighters navigate through thick smoke by mapping their location through ultrasound.

Cloud Computing

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ABSTRACT

In compliance with Software as a Service (SaaS), Data as a Service (DaaS), Infrastructure as a Service (IaaS), and Platform as a Service (PaaS) models, cloud computing has recently emerged as a new computing paradigm for creating a shared and highly scalable (a.k.a elasticity) computing infrastructure from physical and virtual resources to deliver seamless and on-demand provisioning of software, hardware, and data as services. The cloud is a kind of parallel and distributed computing designed to dynamically stretch and share computing resources among multiple consumers. This yields improved utilization rates, as resources (or servers) are not unnecessarily left idle but made available according to different schemas of use and billing like ``pay per use", ``lease it", or ``pay for it". Several cloud computing middleware systems (e.g., Eucalyptus) and programming models (e.g., Hadoop) are available for building cloud-based infrastructures and cloud-enabled applications.

The purpose of our research is to cover a new topic which is cloud computing. It will have an introduction to illustrate the meaning of cloud computing and the problems and motivations of cloud computing, the Characteristics, benefits, and what are the benefits of cloud computing for today's enterprise. In addition to some models of cloud computing, such as: SaaS(AaaS), IaaS ,PaaS. Also types of cloud computing will be discussed, which are: Private cloud, Public cloud, Hybrid cloud, and Main cloud computing vendors (tools). . We will also discuss the Cloud computing initiatives in the Arab world with an example which is Q-Loud (Qatar). Finally with a comparison between cloud computing VS. Grid Computing vs. Pervasive computing.

Implementation of an Intelligent Landmine Detection System using Microwave Imaging

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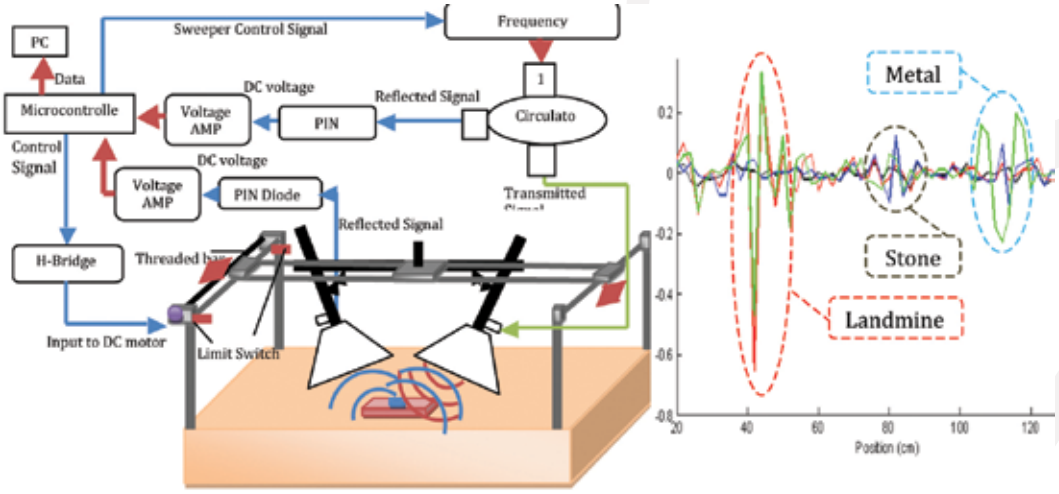
ABSTRACT

An anti-personal landmine detection system which utilizes Microwave Imaging has been developed to solve the problem of the wide spread of anti-personal landmines all over the world. The developed system works on computing power provided by a microcontroller and a PC where the microcontroller does real-time detection and after a full scan the PC implements an intelligent detection using Matlab software. The system was designed with several challenges in mind, including manufacturability, reliability, and environment. The system has to be manufacturable with the minimum cost while ensuring reliability. This means that the system should be of a low cost, while having the ability to detect landmines with a high probability and low false alarm rate. In addition, the environment, health and safety were also considered, the system is based on microwave frequencies which although is environment friendly, but could be harmful to human being if used with high power. Therefore, our system works in low power rating in the order of tens of milliwatts. Previous solutions usually lacked one of these, for example, GPR (Ground Penetrating Radar) is very reliable; however, it is expensive and uses high power. The developed system has the potential to be used in other applications which require imaging behind barriers. For instance, in cases of disasters, the system could be adapted to find people who are buried below concrete or below ashes.

To implement and test the system, a virtual landmine field has been built in the lab where the automatic scanning system was deployed. The system consists of two horn antennas which are mechanically connected to a motor and electrically connected to the controlling and automation system and other equipments. A synthesized sweeper continuously sends a 9GHz signal which goes through a circulator and is then emitted with a single antenna. The signal is received with a second antenna as well as the transmitting antenna. The received signals are detected using PIN diodes and read by a microcontroller. The microcontroller processes the output of the two antennas and determines in real time if there is a landmine or not and also sends the data to Matlab using a serial connection. The microcontroller also controls the motor to scan over the landmine field.



The obtained data sets are processed in software by multiplying the output of the two signals point by point and then taking the second derivative to remove the effect of the sand surface variations. The result of this processing is that the landmine appears as sharp varying peaks while the metal and other objects appear as much smaller peaks. This said, a simple threshold can be used to detect the landmine easily in real-time which was implemented in the microcontroller or the whole dataset can be entered to a classifier. A Feed-Forward Neural Network classifier was created (using Matlab's tool box: Neural Network) and a detection rate of 95% with a 10% false alarm was achieved.

I-TACAS: An Intelligent Traffic Alert and Collision Avoidance System

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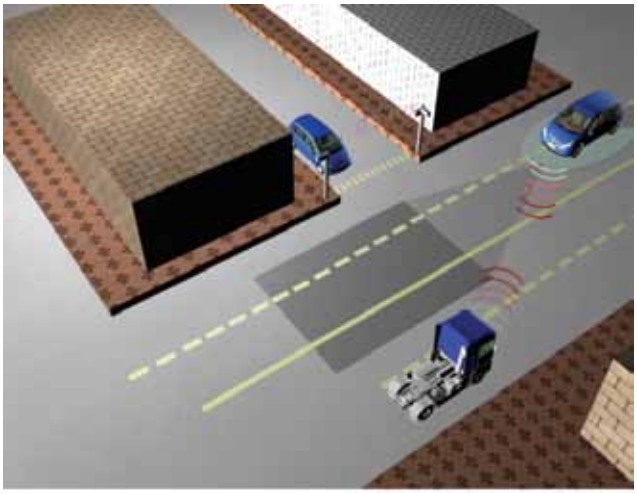
ABSTRACT

Recent research on Techniques on Traffic Conflicts, Time-To-Collision is an effective measure for discriminating critical from normal behavior and for ranking the severity of traffic conflicts. The results of several studies point to the direct use of Time-To-Collision as a clue for decision-making in traffic when building a helper decision support system for the car. The present development of driver decision support systems based on the application of recent technologies makes it necessary to have knowledge on how drivers operate a car and when a system should warn the driver and how critical it is. One of the most important development phases for a Collision Avoidance System (CAS) is to define a suitable warning strategy and protocol that warns the driver when the driver is at danger and immediate action is required, and to provide information of traffic about important surrounding sites or highways. Accuracy is an important point where misses should be avoided, as many false alarms may cause the system to become an irritation to the driver.



The present project deals with the use of the Time-To-Collision measure to define an adequate criterion for activating a driver support system such as CAS in order to reduce the number of rear-end collisions on a motorway and using the sensory system to define the safety range for driver. Reduced visibility conditions (e.g. due to fog) frequently cause multivehicle crashes with very severe consequences. The system uses sensors that send and receive signals from cars, traffic lights, or even obstacles in the road. A good example of how the system works is when a driver is about to switch lanes on a highway, and there exists a car in his blind spot. The sensors in the car will perceive that car and tell the driver before he does that, and hence preventing a very potential serious accident.

Tests with our Collision Avoidance Systems intend to show that warning strategies based on a Time-To-Collision standard are preferable as it is a crucial measure of what is coming close to the car or what the car might run into. Some studies on driver behavior in fog enable a more precise definition of system's critical situations and relevant criterion values for Time-To-Collision.

The system should make the best reaction; trying to avoid any expected collision with any dynamic or fixed obstacles, to work correctly. Our system will be especially useful in bad weather conditions. The sensors in the car would detect the poor conditions and hence inform the driver of what is coming ahead and hence how to drive safe.

For instance, fog surely affects visibility, and hence the sensors would detect with an early warning to the driver of any dangers that lie ahead like another car, allowing the driver to slow down or avoid that obstacle without rushing into a sudden critical situation. In Conclusion I-TACAS will provide a safer driving way in critical conditions and avoid many expected accidents in expected conditions.

Virtual Stress Analysis of a Crane using Integrated Custom-Built Software

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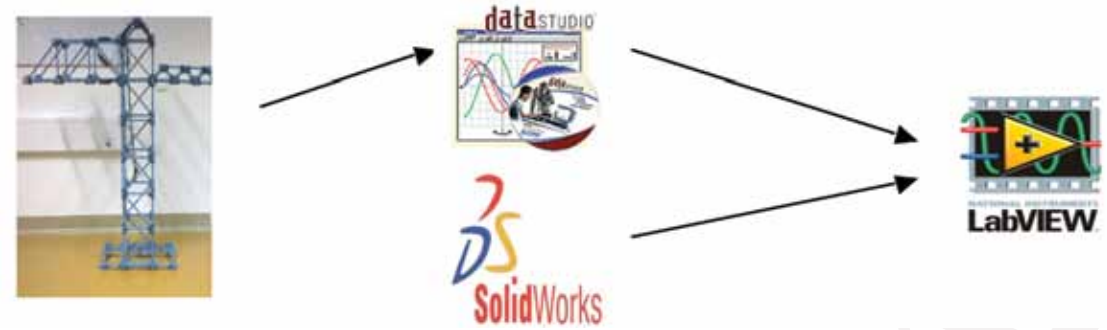
ABSTRACT

The objective of this project was to analyze cranes with LabVIEW-based custom built software, TRUSSIM. The truss simulation –TRUSSIM- type software determines the overall performance and force analysis, and it can also study the individual truss members of the crane. By analyzing individual truss members, unnecessary members and zero force members associated with a crane model can be identified accurately. Previous solutions provide less analysis on detailed structures; for instance, Cranesim simulates the motion of the crane, the applied load on it and the sway of the load.

In this paper, static and dynamic loading scenarios were analyzed on the crane structure using the LabVIEW-based TRUSSIM. The static loads applied on the crane, the internal force in each truss member and the stress concentration were analyzed. Also the effects of the variation of the jib angle (the angle between the body and the load bearing arm) on internal forces and identification of zero force members were analyzed. The dynamic loading vibrations produced at different points, varying tension and jib angle stiffness were studied.

A physical mock-up of the crane was built using PASCO Advanced structure set and fitted with PASCO load cell sensors. The team analyzed the data obtained by the PASCO Load Sensors using a series of equations and interfaced software. The sensors were connected to a NI-DAQ interface. DataStudio was used to acquire the values of forces from the sensors and a model of the crane was designed on SolidWorks. The model and the acquired data were exported to LabVIEW and integrated. Visual stress analysis was performed using 3D Sensor Mapping Signal Express VI. Based on the results from LABVIEW analysis, the structure was modified to remove problems associated with the previous structure. Equations used included rectilinear and rotational equilibrium, methods of joints and sections, and variation of natural frequency with the stiffness coefficient, global mass and mode shape.



This project is very relevant to the Middle East due to the construction boom in the region. Construction companies are trying to minimize the cost of construction materials due to global inflation. However, heavy construction equipment like cranes will be in demand to meet the construction boom. Also, while taking cost efficient factors into consideration, safety is also an important issue. Most of the time, structures are built to satisfy minimum safety requirements to reduce cost. This is one of the reasons for failure and accidents in the construction industry. Using the custom built software TRUSSIM, companies will be able to analyze crane structures by using only a simulated model. It will also be able to reduce costs, resources and time by deriving an optimum solution prior to construction.

Computer Modeling, Simulation and Implementation of a Wireless Sensor Network for Pipeline Leak Detection

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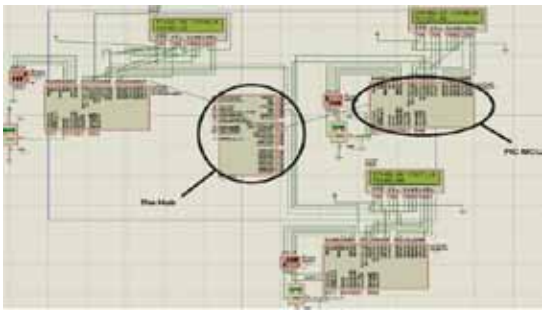
ABSTRACT

More than 48 billion m3 of water is lost in underground distribution systems worldwide per year. In the Middle East most of this water is produced through a long and expensive desalination process, therefore water leakage creates a huge economical problem. In this project a Wireless Sensor Network is used to detect and locate leaks in water pipeline systems, providing a simple yet efficient solution for the water leakage problem. A large number of nodes can be deployed along the pipeline system. Once a leak occurs the nearby nodes will report the approximate location of the leak to the main control room.

The wireless sensor network developed ensures reliable two-way communication between the nodes by implementing an efficient Layer-Two protocol that employs advanced error detection mechanisms and reduces the possibility of collisions through the use of CSMA/CA technique. To reduce the power consumption of the nodes a simple routing protocol was also implemented. A simulation environment was then developed to test the network protocols for different situations. Finally, LabVIEW was utilized to measure and analyze the power consumption of the nodes.

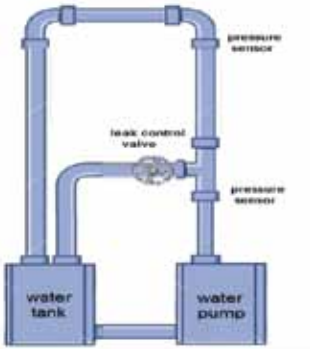
PCB implementation of a node



Simulation of a full-mesh network

A leak generates a pressure wave which propagates in both directions along the pipeline; these waves tend to attenuate as the distance to the leak location increases, but since the nodes are distributed along the pipeline system, nearby pressure sensors can detect the sudden change of pressure. Moreover, if the distance between two nodes is known, the exact leak location can be calculated by computing the difference between the time the pressure wave hits the first node and the time the wave hits the second node.

A simple model was built to study the pressure transients caused by a leak. The model consists of a 2″ plastic tube connected to a pump where the water is flowing at a constant rate. An artificial leak is constructed by dividing the pipeline into two sections using a T junction. A faucet is connected to the T junction in order to control the size of the leak. Each section contains a pressure sensor to measure pressure transients. Initially, the signals produced by the pressure sensors were very noisy but sophisticated signal processing VIs of LabVIEW were used to filter the output signal to get more accurate results. The system was then tested with different leak conditions.



The nodes were capable of detecting sudden leaks with acceptable sizes but failed with leaks that gradually increased in size, since those leaks did not generate a sudden change in the pipeline pressure. However, the leak could still be detected by monitoring the difference in the pressure before and after the leak.

An Intelligent National Electronic Health Record System

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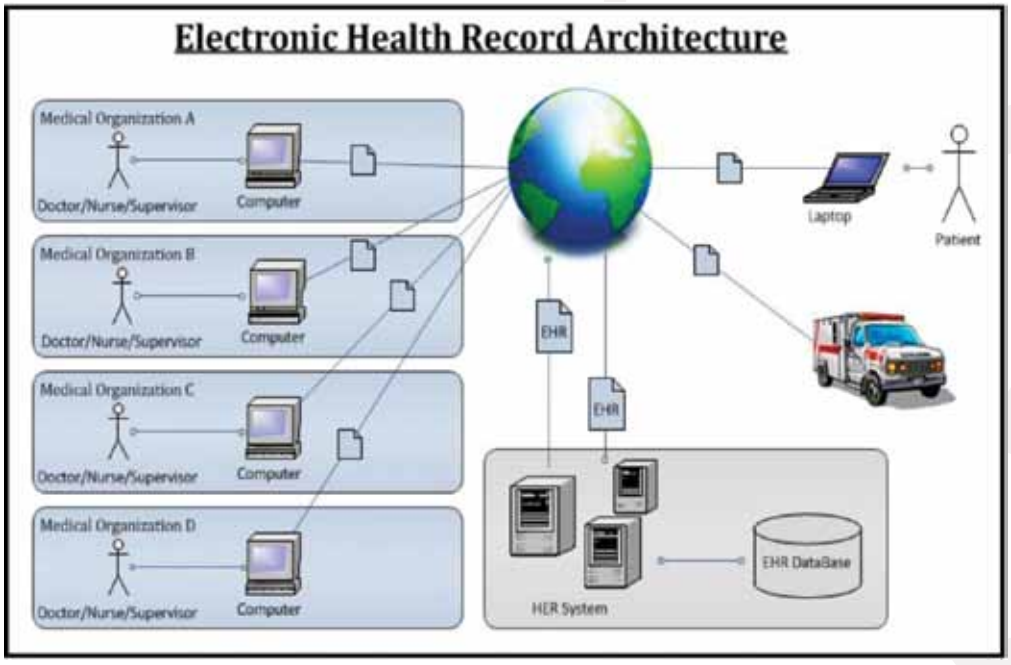
ABSTRACT

An intelligent EHR is a current and active research area that belongs to Health Informatics. The idea is to build an intelligent system (could be based on data mining) that helps medical and healthcare professionals to choose the right treatment and medications based on the patient medical history and the current situation.

Electronic Health Record (EHR) is a system where patient medical information is stored in one system that can be accessed through the Internet. In this project we designed a web based system to combine all the required information in one place where patients, doctors and other healthcare professionals can have different level of access to patients and clinical data. Patients are the main actors in the system. Every patient has his/her own profile where all his/her medical history, medical information, outpatient visits, inpatient visits & emergency situations are recorded in this profile. So whenever a doctor or a patient wishes to have a look at a patient's record then he/she will just login to the patient's account through Internet. Patients are free to visit any medical organizations/hospitals, and all these organizations share one file of that patient. With this significant centralization, all the doctors are out of pressure when making such a decision because of the help of centralization of the patients' information, according to the medical history of the patient. It does not stop here, but this system includes the outpatients and inpatients to take care of. Outpatients have the abilities to book a visit to a particular doctor in a specific hospital/medical organization through the web. Inpatients are, also, involved in this system. They are able to be tracked for accuracy (e.g. to record every action has taken by a doctor or a nurse). All the visits and emergency situations can be converted into an inpatient situation where the doctors and nurses will be tracked, also, for forming a medical history that will benefit all the doctors who will treat that specific patient in the future.

The system keeps all events data in a database which will help researchers to conduct research studies based on patients data.
The intelligent aspects of the system will manifest in assisting doctors to choose the most optimal treatments and the suitable medications.
Figure below shows the high level architecture of the system.



System Development for Proving the Credibility of Iridology

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ABSTRACT

In this paper we have proposed an efficient password security of Key Exchange Protocol based on Elliptic Curve. Iridology is a diagnostic technique that purports to use the colors and patterns of the iris of the eye to reveal information about disease and health. According to iridologists, details in the iris reflect changes in the tissues of the corresponding body organs. Iridologists generally use equipment such as a flashlight and magnifying glass, cameras or slit-lamp microscopes to examine a patient's irises for tissue changes, as well as features such as specific pigment patterns and irregular stoma architecture. The markings and patterns are compared to an iris chart that correlates zones of the iris with parts of the body. Typical charts divide the iris into approximately 80-90 zones. For example, the zone corresponding to the kidney is in the lower part of the iris, just before 6 o'clock. The problem is that medical doctors do not recognize the results of iridology because it is not based on scientific evidence. The objective of this project is to develop iridology software that reads the iris of the eye to reveal information about disease and health AND create a mechanism to be scientific proof of the credibility of the results of the iris. We compare the medical record issued from the hospital which is based on the results of laboratory to the patient with the results of iris of the same patient. In this project, we will use a large sample of medical records from a King Khalid Hospital located in Riyadh, Saudi Arabia to prove the credibility of iridology. This is an undergraduate project of three B.Sc. students. The project went through two phases: The feasibility study and design (Phase I) completed in semester Fall 2010. The implementation part (phase II), is under development to be completed by Spring 2011. Figure 1 shows some images about the eye charts.

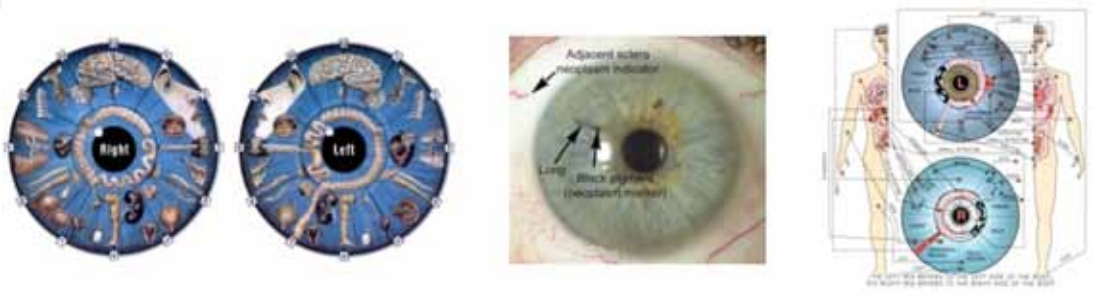

Figure 1:"eye maps" or charts showing parts and qualities of the eye that reveals information about the body's condition.

E-Diagnosis by Body Map

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ABSTRACT

E_Diagnosis system provides users ability to analyze their particular symptoms to give them clinical description of the most likely conditions. E_diagnosis by body map is a website that assists patients to find the right description of their cases and suggest treatment advices to patient based on medical history and tests.

System is based on the classification of symptoms according to the different body parts, that means when the patient use of this web site and it appears to the Body MAP according to the sex of the patient (male or female), so, will be the possibility to press on the pain's part on Body Map, then it shows him all the symptoms that can be occur related to this part. Based on the choice of the patient's symptoms and diagnose the illness according to these symptoms (for example, there are different degrees of fever so, according to percentage of the rates of fever associated with other various symptoms , system gives different result such as, if the degree of fever (High and fast-rising) that causes Measles But if the fever average so, that shall be causes Mumps).

According to the selected symptoms, system expected some diseases in different parentages then system request specific medical tests from patient, therefore, according to the results of the medical tests and patient's medical history the system provides a brief estimated report of the exact disease and suggest treatment advices for patient according to his conditions.

In order to develop this system, we must gather Doctor's experience that assist in diagnosis process.

Through the system the patient can reserve a medical appointment with Dr. detect selecting the appropriate time limit for a medical examination and selected specialty doctor who wanted?

Many of the E_Diagnosis systems tried to solve the many problems faced by patients, for example, difficulty booking appointments in clinics doctors to congestion and the inability of the patient to ask all the questions and taking drugs is not suitable for cases of sickness, although it is insufficient to treat the disease that these systems have helped patients to diagnose illness Through the introduction of the symptoms, which suffer from, and answer a lot of questions.

E_Diagnosis by body map system can superior to other systems, as in some cases it is expected(suspect) more than one disease and the system should identifies the more accurate. Our system is asking about more medical tests according to the percentage of uncertainty in specific disease, and recommended him proper treatment for his condition and based on the medical report. On the other hand our system is providing reservation service appointment with doctor when the patient's condition need body examination from doctor.

Our system is superior to other system, In the case that it is expect (suspect) to more than one disease and so that it appears the disease is more correct, it is asking medical tests according to the percentage of uncertainty in specific disease, and recommends to proper treatment for his condition and based on the medical report and providing reservation service appointment with doctor in case that the patient's condition need to body examination from doctor.

Are Students Ready to E-Learn? A Study of a University in the Gulf Region

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ABSTRACT

Success in e-learning can be achieved by understanding the needs as well as the readiness of all stakeholders in a particular e-learning environment. This research provides a discussion on the students' readiness and their perceptions towards the implementation of e-learning in a university located in the gulf region. The institution under study is in the beginning stages of implementing an e-learning environment for a number of its courses. Students in the College of Information Technology were selected to participate in this study. A survey was conducted to identify and analyze key components of e-learning readiness: technology, Internet usage, general understanding of e-learning and culture at this institution. Here is a summary of the findings:

As e-learning success depends on ICT infrastructure, respondents were asked about their ownership of a computer at home. All students indicated that they own a laptop and/or desktop computer at home.

In order to understand the effective use of available technology to facilitate student learning, students were asked two questions: The first question was about the ability to remotely access online material from home. About 84 percent of the students responded as having no problems accessing online material remotely. The second question was about the ability to access online material when on campus. About 94 percent of students responded as having no problems accessing online material on campus.

In order to learn about whether the students' technical skills have improved using e-learning resources, such as posted course material, online resources, availability of electronic library resources, and doing online exams, two questions were asked in this survey section: The first question was whether e-learning has improved the students' technical skills, 93 percent of students responded with agree. The second question was whether e-learning has contributed positively to students learning experience, 79 percent of students responded with agree.

In order to learn about the impact of e-learning on the students confidence in taking charge of their learning and whether using online material improved the students' ability to become independent learners, two questions were asked in this survey: The first question was about the impact of e-learning on the students' ability to become independent, 93 percent of the students responded with agree. The second question was "I feel that e-learning has improved my performance". About 85 percent of students agree responded with agree.

One component of the survey consisted of a question to learn about the students preferred mode of communication. Two choices were offered: face to face communication, or virtual. We sorted the answers based on gender. Results show that 78 percent of male students reported that their preferred mode of communication is face to face, followed by 22 percent preferring virtual communication. Results for the female students show that 63 percent of female students prefer face to face communication, followed by 37 percent preferring virtual communication with their instructors.

The majority of students (78 percent) think that e-learning features contribute positively to their teaching/learning experience and some remarked that e-learning features (essentially lecture notes, announcements, exams, grades) make it easier for them to actually learn. The last two questions in this section were to learn about whether students think e-learning is a good idea and about their readiness to take another e-learning course. Survey results show that 81 percent of the students responded with agree to the statement "Using e-learning is a good idea". Furthermore, the majority of the students (78 percent) feel that they are ready to take any e-learning course.

Sound Source Localization for Automatic Camera Steering

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American University in Dubai

ABSTRACT

In the recent years, the extensive development in the field of computational intelligence has been greatly utilized in the living and working spaces as well as in many commercial products. Among the useful ideas of computational intelligence is the idea of localizing an object based on the sound waves emitted from it. Computational intelligence borrows the idea of sound source localization performed by humans and uses it in various applications including automatic teleconferencing, video lecturing, and surveillance. Our project is an implementation of a real-time sound source localization system for automatic camera steering. The targeted application was the video conferencing application. The goal is to have such a computationally complex system implemented and smoothly operating on a general purpose PC. The main reason for that is to cut down the cost of the end product if this prototype is going to be commercialized. Our vision form the beginning was that the system should be a plug and play system where the user just needs to hook it into his/her laptop and run the software. In this paper, we have highlighted the key ideas, important points, and the challenges faced to successfully implement this system.

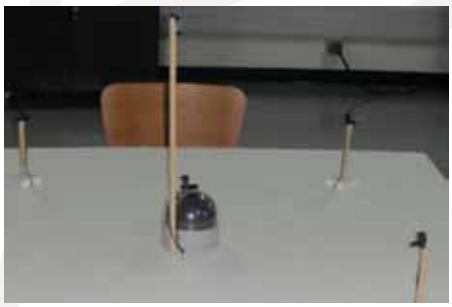

Figure 1: Microphone Array and Camera

An array of microphones is used as sound sensor that supply the system with the sound signals extracted from the environment to be processed for localization. The processing involves approximating the position of the sound source and generating the corresponding commands to steer the camera to that position. The number of microphones in the array depends on the localizing technique used. In general, the computational complexity increases as the number of microphones increases. There are various techniques to carry out the processing. Some techniques are more accurate but not well suited for real-time systems, and others are less accurate but reasonable for real-time operation. In this prototype, Multilateration method is used for localization using an array of six microphones arranged in a symmetrical geometry as shown in figure 1.

Multilateration, also called hyperbolic positioning, is a method by which the time difference of arrival (TDOA) of the sound wave emitted is calculated from three or more independent microphone pairs. Serving as a good option for real-time applications, the TDOA calculation is based on the computation of generalized cross correlation phase transform (GCC-PHAT). The method of least squares is then used to solve the over-determined system iteratively and approximate the position of the sound source. During operation, our system continuously monitors the environment to check for the presence of a sound source. Once a sound source is present, the system loops through the microphone pairs and stores the data in several temporary buffers on which the TDOA computations will be performed. The resultant path difference values are fed to the least square estimator to approximate the position of the source. Finally, after converting the approximated position to spherical coordinates, a set of commands are issued serially to control and steer the camera to the approximated location.

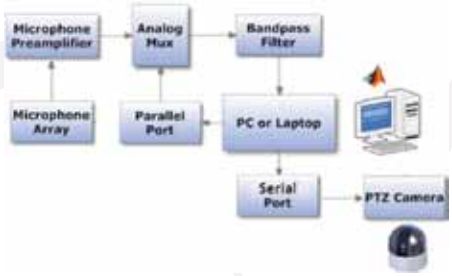

Figure 2: System Architecture

In this project, there are important issues that should be taken into consideration to guarantee a smooth operation. The first issue is the susceptibility of TDOA technique to reverberation noise, which greatly contributes to performance degradation. This problem can be greatly minimized if the room is large compared to the dimensions of the microphone array or if the walls were anti-reverberant. The second issue is the coexistence of several active sound sources at the same time, which is outside the scope of this project and involves complex techniques for multi sound source separation. The third issue is that the sound signal should be long enough to cover the whole capturing time, which is 625 ms roughly. Future work will be carried on to decrease the response time below 250 ms by using multiple parallel samplers. In addition, more sophisticate tools, such as the Particle filter, will be used to greatly reduce susceptibility to measurement errors and reverberations.

Are Online Learning Resources on Demand like Social Networking Sites?

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ABSTRACT

The purpose of this research paper is to know whether the online learning is acceptable here in the United Arab Emirates, more specifically at Zayed University. The online learning is widely accepted and it would good if the social networking sites are being used for other purposes rather than just a way of entertainment. For example, in the U.S, the usage of social networking is increasing rapidly for different reasons that vary according to the users. Most of them are using them to keep in touch with friends. They are also using them for educational reasons. Studies have shown that more than half of U.S students have been using them for their schoolwork. The idea of using social networking is not spread here in the UAE as it is outside the UAE. Therefore, there is a high importance to study the state of art of using this technology in the UAE and compare it to other countries that used this technology for other purposes. The methods that were used in this study are to create a survey, calculate the number who answered the survey and analyze the answers using MS Excel. The survey contains 14 questions about using the social networking sites and the preferences of online courses. The data that was collected is to help the researchers have a clearer answer to their research question which is "What are the educational experiences of ZU students with the social networking compared to their use for the online learning resources?". The survey is created using the SelectSurvey tool and it has been distributed among 95 students of the College of Education in Zayed University. Although 95 students have been asked to contribute, only 40% respond. Figure 1 shows the percentages of the type of preferred class. The students who are very interested to enroll in "online courses" have a percentage of 8%. While, 24% are interested in the traditional classes where students have physical classes. Also, 8% of students believe that having a face-to-face contact is not very important. Whereas 76% consider such opportunity is very important for them in the learning process as shown in Figure 2. On the other hand, in the US, and according to Shannon, Judy and Jeffery, it is estimated that "one out of every six students enrolled in at least one course online" and that counted around 3.2 million students who enrolled in Fall 2005. In the UAE, the culture, the tradition and the lifestyle can affect the usage of social networking sites. As an Arabian country, the UAE's families grew to maintain their reputation and to protect their children, especially the girls. This shows that the UAE's families are still holding their cultural traditions. The visibility of ZU students' profiles on the Internet was examined as well. And that is shown in the results of the survey where the most choosing answer was "Only Friends" with a percentage of 89%, whereas only 11% who chose "Everyone" (Figure 3).

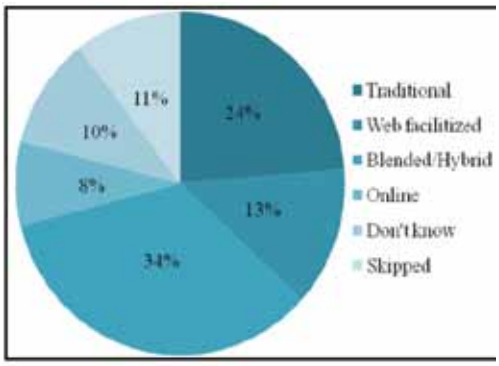

Figure 1: The type of the preferred class

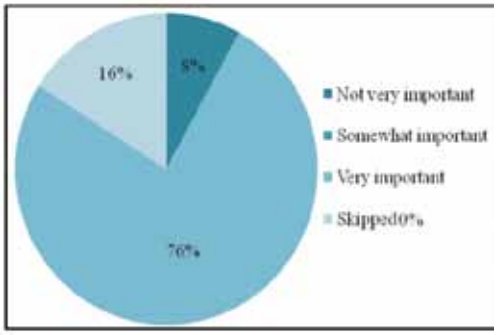

Figure 2: The importance of face-to-face interaction

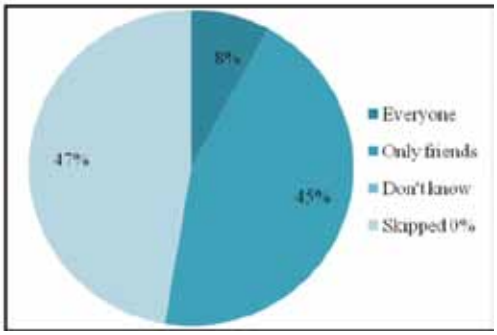

Figure 3: The online profiles visibility

Generating Test Cases from UML State Diagrams

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ABSTRACT

Specification-based testing uses information derived from a specification to assist testing as well as to develop program. Testing activities consist of designing test cases that are a sequence of inputs, executing the program with test cases, and examining the results produced by this execution. Testing can be created earlier in the development process so the developer will often find inconsistency and ambiguity in the specification and so the specification can be improved before the program is written.

UML has been accepted as an industry standard for object oriented analysis and design notation. It comprises a number of diagrams used to describe different aspects of a system including static, dynamic, and use-case views. Among them, our project will focuses on test cases generation from the state diagrams in UML. UML state diagrams are widely-used for specifying the dynamic behavior of classes and are substantially based on state charts which have been successfully applied to reactive systems.

One of the main problems in testing object-oriented programs is test case selection. In most cases, it is impossible to stimulate the program with all data of the input domain.

Test case generation is the most important part of the testing efforts. In this project, we aim to generating test cases from UML state diagrams. We have used the StarUML to design the model.

Our approach of test case generation is draw tree for states and transition. We use depth-first search technique to find all main paths starting form Initial state and finish in the final state. Also we identify all valid possible paths from any state in the diagram.

We have implemented an automatic generating test cases tool that uses an XML format of the designed UML model. The tool takes this XML as an input. We have decided to use the XML format in this project because most UML design tools support the transformation between UML models and XML schema. The parser accesses the information in the provided XML and collects the important information (i.e. states and transitions). After that, the tool will print all possible test cases that are generated. Figure 1 gives an overview of our project.

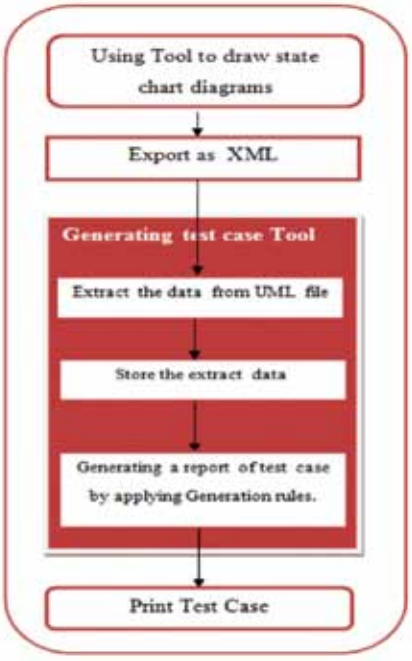

Figure 1: A flowchart of the generating test cases tool

Mobile-Based Interpreter of Arterial Blood Gas Test Results Utilizing Computational Intelligence for Decision Support

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ABSTRACT

An Arterial Blood Gases (ABG) test is performed to evaluate oxygen and carbon dioxide exchange, respiratory function, and acid-base balance in the human body. Nowadays, ABG analysis plays an indispensible role in the assessment and management of patients with a significant range of medical and surgical problems. Thus, accurate and rapid ABG interpretation is undoubtedly a fundamental skill especially in emergency rooms and intensive care units. However, manual calculation and interpretation can be tiresome and prone to a human error or inconsistency in the provided lab test results.

In this paper the design and implementation of an end-to-end ABG interpreter will be presented. The proposed interpreter which automates the interpretation process is capable of providing a quality control (QC) test to assure that the ABG test results under interpretation are consistent and the test equipment are performing to standards. This is achieved by empowering the developed application with the knowledge and experience of specialized physicians using a series of computational intelligence decision support modules that are capable of delivering the appropriate conclusion. The software technologies used to implement the proposed application which can be deployed on handheld devices (e.g. cell phones, iPhones, and other PDAs), stand-alone PCs and Web servers include Java platform, Micro Edition (Java J2ME) and Apache Web Server. A simplified flowchart for the adopted QC and interpretation process is shown in Figure 1.

The proposed system is expected to help healthcare providers in obtaining rapid and accurate interpretation results. This includes the likely diagnosis obtained from analysis the ABG's results and therapy protocols required for different disorders. The measurement in arterial blood of pH, partial pressure of carbon dioxide (pCO_2), partial pressure of oxygen (pO_2), and the calculation of bicarbonate (HCO_3^-), total carbon dioxide (TCO_2), and oxygen saturation ($O_2\%$) are used in a series of decision support modules and formulas to narrow the differential diagnosis until a definite diagnosis is reached. Once the acid-base disorder is identified, the system suggests possible causes, appropriate medications, and management recommendations. This is achieved by using the empowered rule-based intelligence software modules as well as the adaptive rules learned from physicians' diagnoses. Performance of the developed ABG interpreter prototype is assessed practically by performing a wide spectrum of interpretation tests using real patients' data. Example screen shots for the supplied ABG test values and the corresponding interpretation results are shown in Figure 2. The obtained diagnosis, disorder causes and suggested medications in this test and in many other similar tests are found in correlation with those assessed manually by physicians.

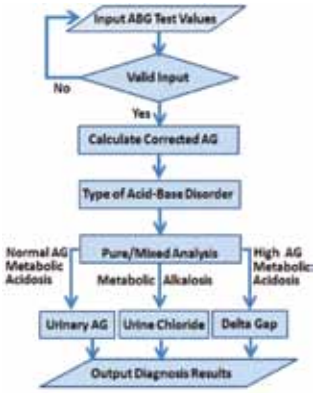
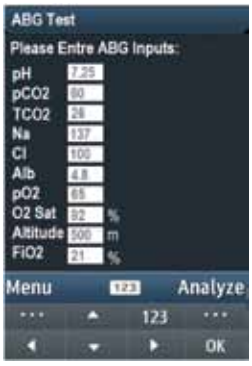


Fig..1. The ABG interpretation process.



(a) Example entry of ABG test values

(b) The interpretation results

Fig. 2. Example screen shots of ABG interpretation test.

A Security Video Game

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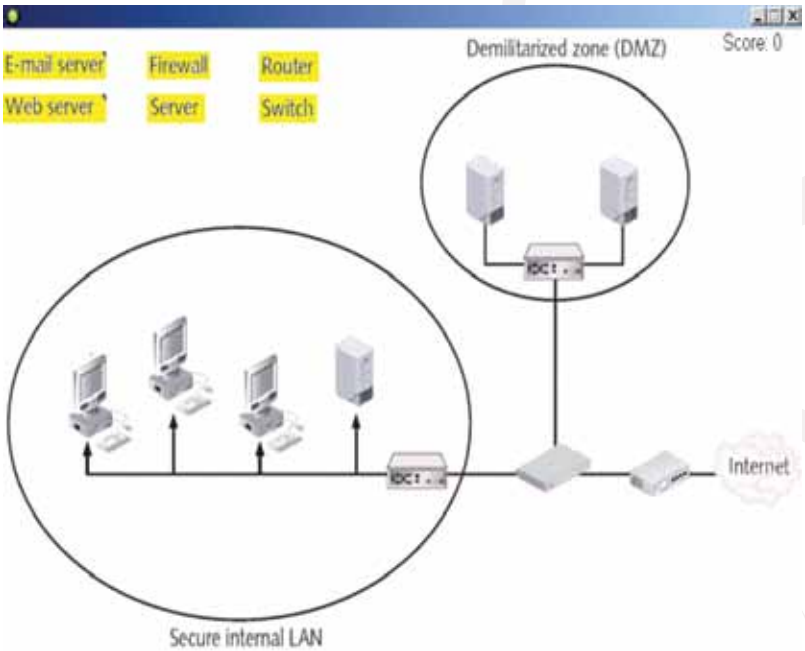
ABSTRACT

Practical fields in Information Technology like security need practice to learn rather than rely exclusively on written materials. When applying security video games, users can learn security in an exciting way with sounds, music and picture. As a result, they could be more interested and excited in learning security. In order for a person to apply security to his personal life, he should practice security rather than memorize its concepts and objectives. For example, the user should not only memorize the types of viruses and worms, but he should distinguish the emails, websites, and messages that contain viruses in order to avoid damage to his computer. To be more precise, if the user had played a video game like Anti-Phishing, he would clearly understand the phishing emails and websites in an enjoyable and exciting way, so he will apply it to his personal life and avoid being a victim to viruses and worms in the proper manner.

We looked at several different softwares to teach videogames. This included Grand Prix Multiplication (http://www.arcademicskillbuilders.com/games/grand_prix/grand_prix.html), Clueless crossword puzzles (http://www.sheppardsoftware.com/braingames/crossword2b/crossword2b.htm), Anti-Phizing Phil (http://www.wombatsecurity.com/antiphishing_phil/index.html) and and Hacker 2 (http://www.arcadecabin.com/play/hacker_2.html). Each of these softwares provided us with ideas that could be used for our videogames. The first three provided a nice interface and an enjoyable game. Hacker 2 did not have a good interface, but had a very good help.

In order to implement our first protoype, we studied gamemaker and flash. Gamemaker was easier and with the help of our supervisor, we implemented a prototype. It allows users to drag the corresponding name of hardware and software components to a network diagram picture. The components consisted of Firewall, router, switch, e-mail server, web-server, database server. The other prototype consisted in creating a Forensics Flowchart. Our next step is to refine these prototypes and expand to create more scenarios. For each diagram or procedure, the user has to match the text with the corresponding equipment or action. A Prototypes on Network Diagram has been implemented. The Figure below displays the network diagram at the beginning of the game. The user drags the text in yellow to the corresponding image on the diagram, receiving points every time it is done properly.



Demilitarized zone (DMZ) with single firewall

Timetable Editor Assistant

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ABSTRACT

The previous timetable system in our college make it by Microsoft Excel ,which is waste time and effort because when decide schedule by this way you should insert and edit the data resources (teachers, courses , rooms..) manually , also you find the conflict occur between this resources which is difficult operation .

As a result, our college required an efficient way to schedule their timetable , the timetable editor and assistant is a web application can make the college timetable easy through keeping all basic data (courses, teachers ,rooms , plans) in a database by insert it once time then add, delete , edit it for each semester.

Also it dedicate the conflict between the data resource automate, in addition it give to user some suggestion to assistant him to solve problem. The timetable editor and assistant is a web application which mean can accessed from anywhere and in anytime.

The timetable problem consists of two parts timetable editor and assistant. The timetable editor and the assistant creates our college tables, that considers as timeslots consisting of course, teachers, sections, levels, and classrooms. These contents are arranged in timeslots with a suitable way. The second part is the assistant which provide suggestions that may solve the problems appear from scheduling.

There are various timetabling approaches to solve the timetable problem. In this project we will use the Constraint. Satisfaction Problem (CSP) to model the timetable editor. The idea of CSP is the consistent assignment of all variables to values in a way which all constraints are satisfied. The result of our project is a web based application capable of editing our college timetable.

The result of our project is the web application with friendly Arabic web pages that will be flexible for editing and maintaining the schedules and interacting with a database which keep track the college's resources details that would be managing by central administrators.

Sequential PassPattern Authentication System

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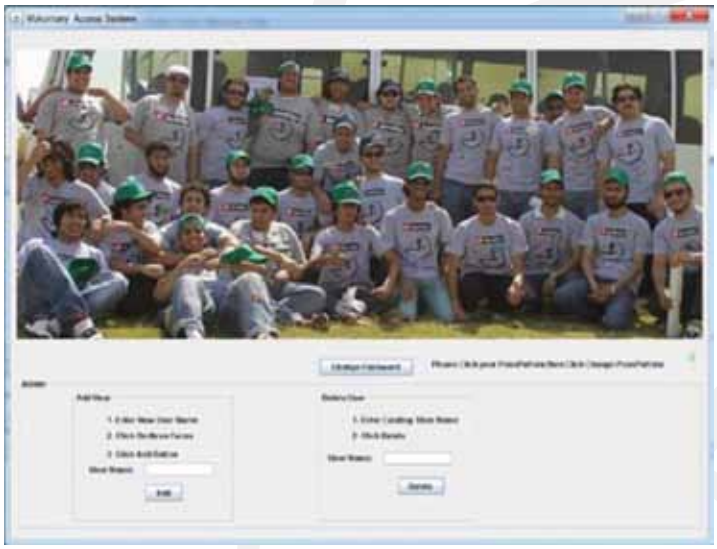
ABSTRACT

User authentication is very important component for the security of a computer system. We use it everyday and everywhere when secure access is required. We need to use methods to keep our private data and information secure and non-reachable for any unauthorized person. There are many types of user authentications. First of all, textual passwords is the most common type used. Secondly, biometrics which detect the identity of the user trying to access the computer. Finally, Graphical passwords which are secrets that user inputs to a computer with the aid of the computer graphical input such as mouse, images and touch screen. I have developed a new system in this feild. I tried to come up with an idea where the user can easily remember his password, very usable, easy to use with preventing from of brute-force attacks and shoulder-surfing attacks as much as we can. My idea is when a user open the program, firstly, it ask for a user name and a passpattern. The passpattern will be choosing a group of faces in specific sequence among of thirty faces in a given picture . Then the program converts the clicked sequence pattern into textual pattern to identify it. If the user entered the wrong password he will be denied from access. The user can change his own password if he would like. The admin user is the only one who has an access to some privileges or properties such as, he is the only one who can create new users. Also, he can delete an existing one. Graphical passwords or "Clicked-Based passwords" are much secure and memorable than textual password. Many textual passwords are either memorable but not secure which will be easy to guess or secure but difficult to remember. For brute-force attacks, my "Sequential Pass Pattern Authentication System" is more secure than textual password. For example, in my system let K = variable and N = 30. K stands for numbers of the sequence clicked passwords whereas N represents the numbers of picture can be clicked. So, if the user inters only 3 faces, there are 30*30*30 = 27000 possible or guessable passwords since we have to choose three clicked faces in sequence patterns. Whereas in terms of shoulder-surfing attacks. As a result of this research, Graphical passwords are more secure than textual ones since textual password can be seen by which key did you use and the attackers can be sure by herring the voice of the key if has been press or not. While in graphical passwords it's basically mouse motion so the attackers would know clearly that if the user has been pressing on this picture or just pass the mouse over it. This scheme has more advantages than the usual password systems. It is easier to remember since human process graphical images easily. In addition , this new system is not vulnerable to dictionary attacks. Talking about brute force attacks, it is much harder for an attacker to break the passpattern by generating all possible combinations. Becouse the attackers tends to use software to generate all possible passwords but when the password is simply clicks instade of easy to generate letters the challenge will be huge to try brute force attack and it will be time consuming for the attacker. All of the above advantages of the graphical passwords over the textual passwords may lead the last one more attractive..



HardWAREhouse

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ABSTRACT

Our Client - The Deanship of e-Transaction and Communication in King Saud University - uses an application (Manage Engine Service Desk Plus) that helps them store every request that comes from every employee if they had a technical issue with one of the hardware. The requests are applied via email or phone when there is a problem with their computers, printers, scanners, network points or any hardware used. The technician is sent for to solve the problem. The client asked our team to come up with an application that could easily store and maintain all information of all hardware in the university.

The Deanship's existing system only receives the requests and stores them without knowing the detailed information of the defected hardware, or if it has been defected before. With no history known of the hardware failures, it is hard to determine its purposes. Also, they would not be informed that a specific hardware is old and needs to be replaced. The Deanship of e-Transaction and Communication need to store each notification and link it with its hardware. They need to store information about all the hardware in the university and keep track with its history.

To store all hardware information in the university, we will design a web-based software for our client - The Deanship of e-Transaction and Communication - that will help them link each notification or request with its hardware in a user-friendly method, and keeps failure history for each hardware stored in an organized database.

King Saud University does not own a system that stores a detailed information for each hardware (computers, printers, scanners, projectors, network points), which includes hardware's location, users that function it, manufacturer information... etc. With this not available for technicians, the time for them to solve the issue might take longer. Also, for the employee who wants to report about his computer for example, he would have to either phone or email the responsible for entering the request into their database. This is announced to be an inefficient way to report hardware failures.

The solution is to create an application that can hold every hardware's failure types and times. We will implement this by creating a database that will store all that information for every computer and such. By doing that, it will enable the user to access and review any hardware he chooses to monitor. The system shall be available on any platform. It doesn't need to be installed in every platform as it is a browser application, so moving (or accessing) the software is easily done through any platform available.

Finally, Deanship of e-Transaction and Communication in King Saud University uses an application (Manage Engine Service Desk Plus) that helps them store every request that comes from every employee if they had a technical issue with one of the hardware. They have asked our team to come up with an application that could easily store and maintain all information of all hardware in the university. The team has successfully created a web-based program that covered all the client's requests.

Learning Disability System

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Supervised by
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ABSTRACT

Learning Disability (LD) is a disorder. A person is diagnosed with learning disability when he/she has problems or difficulties in learning, than their normal peers. It could also be known as a learning disorder, or a learning difficulty, these terms however are classifications that include several disorders, such as dyslexia, dyscalculia, or dysgraphia, these disorders target oral language, reading (such as comprehension), written language (such as spelling), and/or computation . The factor(s) that cause it is/are still unknown. It has been found that a person's, with a LD, brain ability to receive and process information is not the same for people who do not have LD. where they cannot learn at the same speed as their peers. However, LD does not mean the person is not intellectually smart or otherwise. Due to the fact, that it does not affect the intellectual level.

We aim in this project to deliver software that addresses this issue and help improve the learning ability within people with LD, by using a simple illustration, an easy language, and comprehensible context, all to help them focus and understand.

The Problem:

["Children or young people who have a general learning disability are aware of what goes on around them. However, their ability to understand and communicate may be limited, and they can find it hard to express themselves. Speech problems can make it even harder to make other people understand their feelings and needs. They can become frustrated and upset by their own limitations. When they compare themselves to other children, they can feel sad or angry and think badly of themselves. "

The solution:

Our software aims to teach "hamzat" ,which are special kind of Arabic language letters to learning disability students on primary school. It helps the teachers of those students by letting students practice by themselves as well as it helps the students to learn with having fun due to the multimedia, friendly interfaces and attractive subjects in the software.

"hamzat" either come at the beginning of the word, in the middle, or at the end of the word". The "hamza" that comes at the beginning of the word is either "hamzat wasel" or "hamzat qate'e" depends on the way it is pronounced. Therefore, the software uses conversations and natural voices that teach the student differences between them. The "hamza" that comes at the middle of the word is called "motawasetah". And the "hamza" that comes at the end of the word is called "motatarrefah".

The software, basically, teaches more details and with different interactive ways such as stories, conversations, tutorials, and practices. Taking into consideration the audience on the software. Which are the students, and teachers of them.

This software will use the layer of students who have difficulty learning and using also oversees the education of ramble class.

T.kamela was attached our system with her own book which is to educate the LD students. The parents can use our system to help them to teach their children who have LD. We meeting with teacher who used our system in her class she said:"it is very excellent and help me more to educate students easier, Also students like it and attractive with it".

MAROFEX-1: A Smart Mobile Robot

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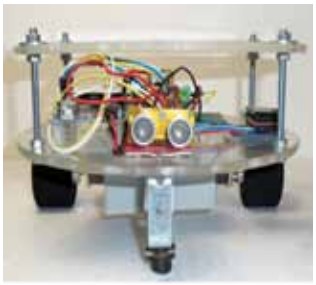
ABSTRACT

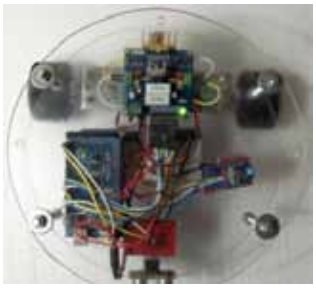
The goal of this project is to design a versatile small sized robot intended for surveillance and monitoring applications. MAROFEX version-1 is a robot meant to be operated remotely from a control station which sends orders wirelessly to the robot or autonomously.



The robot uses modern technology devices and components: An Arduino microcontroller based board, two independent DC motors controlled through an H-bridge board for the motion of the robot, and Xbee wireless communication devices to provide short to medium range (~30 meters indoor / ~100 meters outdoor) interaction with the robot. Xbee uses ZigBee wireless communication standard that implements the IEEE 802.15.4 protocol. An ultrasonic range sensor is used to detect obstacles and allows the robot to avoid them. The robot is intended to incorporate a small robot-arm that will expand its functions and capabilities. MAROFEX-1 will implement tasks such as detecting moving targets and sensing capabilities for detecting fire and gas leakage in hazardous areas. An electronic compass is used to stabilize the MAROFEX-1's trajectory; the Arduino reads the bearing from the compass, and adjusts the robot direction. The robot is also equipped with a wireless video camera that transmits live video or scene pictures to the control station.

Figure 2 - System schematic

The vehicle is made up of different layers. The base layer includes the microcontroller board, the power module, the H-bridge and the sensing devices. The sensing devices include sensors used for both navigation and environment sensing, to measure temperature, humidity and gas levels, a communication module for remote control and communication and a top layer that houses the robot arm.



The project went through a number of phases. The first phase was dedicated to studying different designs and searching for available hardware and software components. Acquisition of the required items for the project and materializing design was the main part of this phase. The compass added, and the algorithm to let the robot maintain a straight trajectory was implemented. The communication devices added, and communication established between the robot and the control station. Sensors were connected later and tested. The remaining components; camera and robot arm are to be added later. The whole design once finished, was tested and worked as expected. Though, some modules need further development.

The proposed project will serve to the initiation of students in universities and colleges to the field of robotics. It can also be used for the development of remotely controlled vehicles for many other applications such as surveillance, pipe line inspection, air-condition ducts inspection, and environment monitoring.

Student-Faculty Meeting Scheduler

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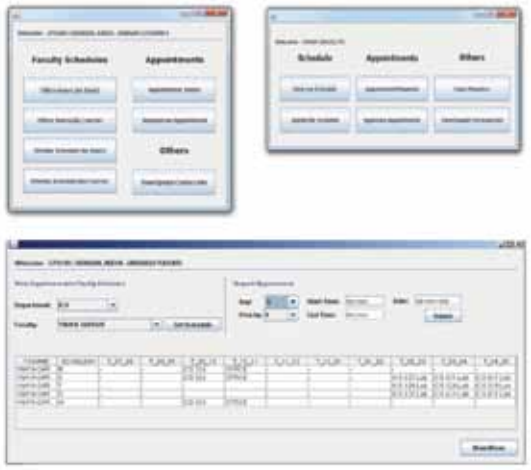
ABSTRACT

A university generally has hundreds of students enrolled in courses offered by various departments and instructors. The instructors set office hours during which students can approach them for doubts or help regarding their academics, research or any other issue. A student may be taking different courses each with a different instructor and even in different departments. As a result, remembering the details of his instructor such as the office hours, office location, contact details, etc. often becomes cumbersome. Moreover, if an instructor's office hours are not convenient, or the instructor isn't available at the convenient time for the student, etc. then it is an even more tedious job to find out about office hours or schedules of some other faculty teaching the course. In addition to this, currently, different instructors have their office hours and other details posted on their personal homepages, or their office doors alone. All these add to the complications for the students with regards to contacting/meeting the instructors.

In this project, we propose to create a centralized database of the office hours and weekly schedules of all teaching faculty which will enable students to view the office hours and schedules of teaching faculty based on the desired department, or course, or day/time of availability, etc. and even request appointments outside the office hours. Also the students will be able to see and modify their contact details. On the other hand, the faculty will be able to set his schedule and set office hours whenever convenient to him. He can also approve/disapprove the requested appointments by the students based on their time schedule, priority, etc. In addition, a faculty can also view and update his information stored in the database in order to allow the students to easily contact him.

With such a centralized database based computerized system of managing student-faculty schedules, appointments, meetings, etc. both the faculty and the students will be benefitted by easing many transactions that need to take place between them on a day-to-day basis. Furthermore, we shall present another very important solution that comes about on extending this application to cater to the department chairmen, meeting schedulers/organizers, etc.

Fig.1. Conceptual Design of the Student/Faculty Database



a b c Fig.2. (a) Student's Menu; (b) Faculty's Menu; (c) Sample output of a faculty's schedule with options to request appointment

Road Safety and Saif Awareness Campaign Website

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ABSTRACT

Problems:
It is well known that congestion and car accidents are increasing rapidly in the UAE nowadays. The stats stated that there were 830 fatalities due to roughly 6800- 7000 roads accidents in 2007[1]. There are also lots of people do not know about the accidents' cases and they are not aware of being safe from these accidents. This crisis encourages us to expand traffic awareness in the UAE because there are few sites which are concerned about this issue.

Solution and Result:
The solution for this problem is to create a web site that is focused on people's safety on the roads in the UAE. The web site includes multimedia features and its avatar to attract the eye of the users and draw attention to the message delivered throughout the web site. The avatar is called Saif and it is a local name which has similar pronunciation for the word safe. In hence, we called it Saif so UAE community will accept this intuitive because they will feel it is belonging to them. Furthermore, the avatar wears UAE custom so it comes as an icon that people can use in different places such as schools and on cars as stickers to remind them about road safety and how to stay safe in streets.

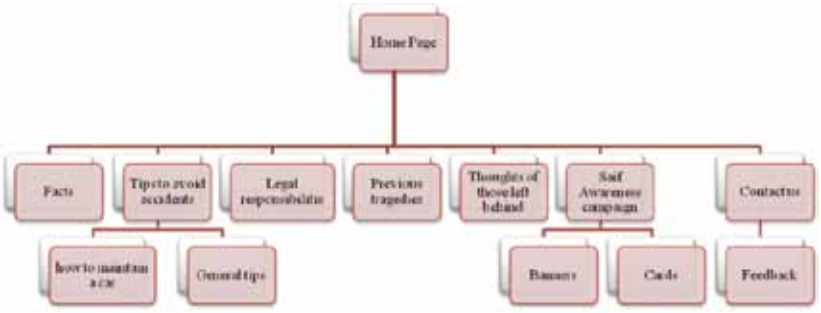
Project Objectives:

- Spot the light on the roads' facts, statistics and problems in the UAE in order to reduce the percentage of accidents and their effects on the society.
- Spread roads' safety awareness among the targeted audience.
- Showing the targeted audience some previous tragedies to inform them with the consequences of their irresponsible behavior on the road.
- Giving the targeted audience some advices and tips on road safety, and Encourage young people not to drive without driving licenses.
- Commit people to the laws of traffic, and to wear seat belts.
- Identify the causes of accidents

Targeted audience
This web site is created to be used by UAE citizens, men and women, from the age of 14 years old till the age of 60, who have driving license or eligible to have one in the future. The web site users are from the age 14 years old, in order to increase the level of awareness among the national teenagers for the sake of their safety and the safety of the others as well in the future. This website is also for high school and universities' students to benefit them, and for teachers to make awareness among their students. Our audience can be also the policemen and officers who can suggest this website for people who need it.

Website Link: http://saifawareness.webs.com/

Website Diagram:



Reference: [1] "Traffic in Dubai and Driving in Dubai." dubaifaqs. 2.10.2010 http://www.dubaifaqs.com/driving-in-dubai.php

Economic Supercomputing using PlayStation3

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ABSTRACT

Supercomputing has dominated the field of scientific research and high level computational and calculation intensive tasks since its introduction in the early 1960's. In the present scenario constant technological advancements have made home and office computers more powerful than some previous generations of supercomputers.

For almost half a century, gaming consoles have been used exclusively for gaming, however the last decade has seen how game consoles can be utilized for various commercial and research processing tasks. Various research studies has shown that game consoles are the best choice in processing tasks because of their high performance hardware (CPU's, GPU's), ready availability, cheap setup and maintenance costs. Hence game consoles are perfect for researchers on a budget. Some examples:

- The usage of Sony PlayStation3 for various high precision floating point computations such as Folding@Home which has been recognized by the Guinness Book of Records as the worlds most powerful distributed computing network as well as its predecessor SETI@Home.
- The United States Air Force uses a cluster of almost 1800 PlayStation3's to allow scientists to better identify objects flying in space, where blurring occurs with high-quality images caused by high speed movement at long distances.
- Nintendo Wii's being used by surgeons and for rehabilitation of recovering surgery patients and to aid in therapy for patients suffering from Parkinson's because of its cheap motion sensor technology.

In 2006 Sony released the Playstation3 which is currently the most powerful console on the market with IBM's new 8 core Cell Processor, Nvidia RSX Graphic Processor and the ability to dual boot with Linux operating system.

Supercomputers are currently very expensive and very hard to get ones hands on. The cost of supercomputers can easily go into millions of dollars. A single high-precision simulation can sometimes cost more than 5,000 hours on supercomputers. For the same cost, you can build your own supercomputer using PS3s. It works just as well, has no long wait times and can be used over and over again, indefinitely.

Our research focuses on finding a cheap alternative to using supercomputers, which are not available easily or at a low cost. A cluster of two PlayStation3 consoles will be part of our implementation to demonstrate a simple benchmark as well as how it can be used for some low level processing tasks. The cluster will be constructed using two PlayStation3's implementing Message Passing Interface (MPI). The benchmark run will be LINPACK Benchmark which is a standard supercomputer benchmarking tool. The benchmark will be used to create a table including benchmarks on various clustered as well as standalone systems to have an estimated cost to processing power ratio allowing us to be able have a general idea of the economic benefits of using a PlayStation3 cluster as compared to various other systems. Future studies could include various methods of integrating the implemented cluster into actual processing intensive applications such as data mining or complex mathematical computations.

Design and Development of the CheerUp BlackBerry Application

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ABSTRACT

CheerUp is a BlackBerry application providing pop up messages designed to inform, educate and motivate the users. The application will contain different categories. These categories are: wisdoms, quotes, athkar, facts, motivations and random quotes. Each of these categories will contain 365 messages and each day one message will be appeared. It will contain alarm to set the time and colors option to change the pop up message background color. The application will be available in both Arabic and English language. This application will be like a small Portfolio with different cards, which will send positive messages, reminder of important religion issues, and give some information to the user.

This application will have a significant rule in changing the negative and an evil people idea about the life, which have a negative impact and destroys the subconscious mind, and replace them with positive and powerful impression. However, there are five main objectives for this application: to give the user positive impression of the life; educate user about important quotes and information; offer a way of changing people's mood; focuses on social relations between people; and make people subconscious mind have a positive massages over the day.

The interface of this application is very simple and easy to use. Once the application starts, the user needs to choose the language (Arabic or English). The application will then provide a list of categories with setting option. The categories will have check box, which the user will have to check to choose it. However, the setting option will be like the remote control since the user will be able to change all the pop up massages setting such as, changing the message color, attach a photo, set an alert, etc. The following screenshots demonstrate the application's interface.

Zayed University Students Behavior on Facebook

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ABSTRACT

The study and survey was conducted to evaluate the effects of Technology on modern communication among the student body, taking into account the Culture affects that influences either positively or negatively on how students used the Facebook.

Additionally our team of analysts made some quantitative conclusions to determine the benefits of the Facebook in view of added value of the Facebook, likewise the team has revealed some Disadvantages of the Facebook in view of moral and ethical misuse of Facebook. The census was carefully segregate and analyzed to quantify how students behave on Facebook ; We have take the findings and plotted them in a manner that reflect the best situation to reflect the general populations respond to our survey. We have created Pie charts to determine the outcome of the most critical questions, which helped us to form a quantitative fact about the subject in question.

The census was directly and in directly conducted on the Zayed University campus and analyzed to quantify how students behave on Facebook, so we group them in themes that reflects the general idea and turns it into readily visible results. The four themes are: How the new technology changed the communication between the student, The culture effect the way that the student use the Facebook, The Benefits of using the Facebook, and The disadvantages of using the Facebook.

After we analyzed the themes, we found that they are direct relations between the themes. First relation is between the culture and the technology. Our culture influences how student use the technology that they have on their hand. Culture never compromises or restricts modern technology, but for the female it's not accepted in our culture to be opened with strangers and not covered. So it's just draw a limited and rules for the female in how she should behave in public places and among audiences of different kinds. However, there are a lot of benefits from the new technology that used by the student. This benefits are also effect the culture in many ways. On the other hand, the new technology can also affect the culture negatively. Some student use the Facebook in way that not accepted in UAE's culture which reflect negatively on culture's image.

To cover the topic more we have to compare the result that we got from the survey that we have conducted the survey with local student , and researched some statistical data that was available for comparison from the global similar survey's that done under the same topic.

When we compare the themes in UAE and USA, we find a lot of similarity in terms of the Advantages of technological applications and the business advantages of having ready access to advertising and promoting products worldwide and differences in terms of the perceptions of Facebook user in terms Cultural considerations, and having no restrictions to privacy and social networking among heterosexuals. It was also noted that there are several types of users of Facebook applications even in the Global places, not all users tend to miss use the Technology for the purposes that are not legitimate. After all it is all related to individual life style of the user and how they perceive Values and ethics.

Role and Importance of Information Technology in E-Banking to Satisfy Customer Needs

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ABSTRACT

As we know that banking has been an integral part of the people living in the society. Banking provides the essential financial needs of its customers. Banks are continuously trying hard to provide the best services to customers at the convenience of their doorstep. In the current scenario it is becoming increasingly difficult for banks to retain existing customers. Past experiences show that banks cannot compete just on price but to provide exceptionally good services to their customers. Customers are demanding highly unconventional services and expecting high class services in quick time. As their demands keep continuously increasing, it has become essential for banks to take the help of technology to meet the customer requirements and expectations in near future. In the past it has been seen that some banks are still following obsolete technology but quite a few banks have initiated to implement technology in their processes but have failed to inform their customers. Those days have long gone when people used to come to bank for any small to big banking work and spend hours at the bank to get required services. Time has changed, technology is rising to new heights day by day and customers are thinking much higher and expecting more and more. It has become mandatory for the banking systems to adapt highest levels of e-banking with all possible solutions of customers' requirements. To keep pace with growing competition, banking sector have to adapt to the technology age to move further and make sure that the customers' requirements are met with satisfaction. In UAE, banks are providing three levels of channels to do the business, i.e., Branch Banking, Automated Teller Machine (ATM) and Internet Banking. Branch banking has been considered the oldest concept of doing business. ATM technology is not much old and it has left its remarkable impact on the customers. Many services have been offered through the ATM technology. But recently, Internet Banking has become the integral part of banking business and considered to be the best medium between customer and banking merchant. It has also given a new dimension to customer relationship management (CRM). This is currently considered to be the revolution in the banking sector. After conducting thorough Literature Review, the authors have identified the key variables pertaining to the customer's requirements for E-Banking. These variables were used to design a Questionnaire survey instrument and data were collected from UAE residents who are using E-banking services offered by banks. The data collected were statistically analyzed to see the role and importance of information technology in E-banking to satisfy customers' needs. This study has brought forward interesting results as far as E-Banking in the UAE is concerned. The purpose of this paper is to share the results & findings and could be used by banking professionals to evaluate their E-Banking initiatives vis-à-vis the customer requirements.

Keywords
E - Banking
Electronic Banking
Customer Relationship Management (CRM)
Automated Teller Machine (ATM)

Physiotherapy Assistance Using the Xbox Kinect

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ABSTRACT

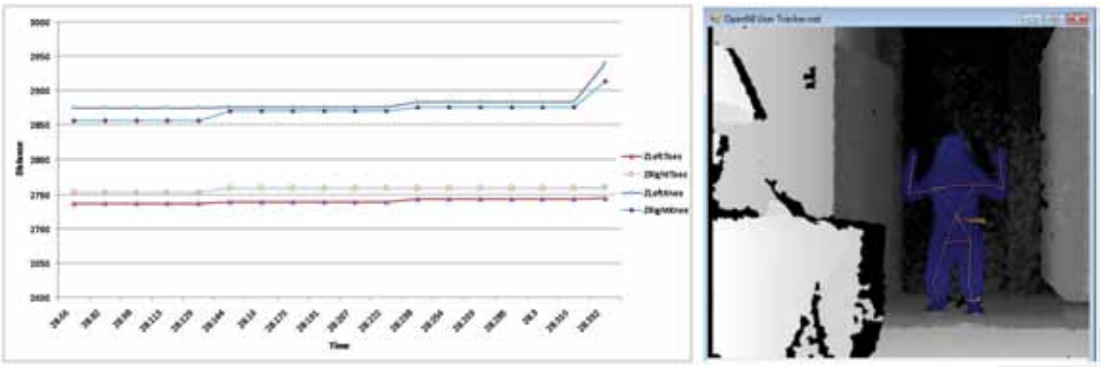
The Xbox Kinect sensor kit hit the U.S. market on November of 2010 as a hands-free, Controller-free gaming console sensor extension, which provides full-body playing capabilities. The Kinect sensor lays down a strong foundation for the development of applications that goes much farther than computer gaming. It provides full-body 3D motion capture, facial recognition, and voice recognition capabilities, along with open source libraries that allow access to the data gathered and processed by the Kinect and its sophisticated software. In this project, we are developing a software system that will help patients conduct physical activities pertaining to their Physiotherapeutic exercises in an accurate, harmless, and efficient manner. Also, the system will report to the doctor and/or the responsible nurse the kind of activities done by the patient to aid in their analysis of the therapy progress.

Physiotherapy treatment depends heavily on training individuals to conduct certain exercises to strengthen their muscles, bone frame, joints and ligaments, and sometimes training the brain to issue commands to move these extremities (i.e., cases of head injuries or severe trauma). These exercises need to be done accurately or they will results in adverse effects. Not all people can afford a personal trainer, and not all clinics are capable for receiving patients to conduct simple exercises (in the medical sense).

In this project, we are using the Kinect sensor as a monitoring tool. Patients, who typically perform therapeutic exercises unsupervised, will do their exercise routines in front of the Kinect sensor. In place of interpreting the patient moves as gaming gestures, our software system will study the patient's skeleton and compare it to the optimal body posture for that specific exercise and give immediate feedback to the patient on his/her performance. A complete system will be built to accept a rich set of exercises along with a user friendly interface, and a feedback system to be used by the doctor. The system is comprised of the following components.

- Skeleton identification: In any exercise, the positioning of the joints relative to each other dictates whether the exercise is done correctly or not. So the first step is to identify the patient joints and skeleton.
- Image capture and analysis: The skeleton image is compared to the correct posture for doing the specific exercise. This is a dynamic activity that can be done of video segments as well as still images.
- Graphical User Interface: An interface is necessary to specify the exercise to be performed along with other options (e.g., log, stream to doctor office, exercise reps, etc.)
- A networking interface that allows the doctor to remotely supervise his patients.
- A database interface: to add, remove, and modify, existing set of exercises.

Figure 1 shows a partial screen shot of our system, where the Squat exercise is being conducted by our test subject. While conducting Squats, experts greatly emphasize that the knees must not be bent in a way that extends them out beyond the toes level. Otherwise, great and immediate harm will be inflected upon the knees. By using live tracking of the skeleton, we are able to detect the correct and harmful positions of the knees and immediately inform the test subject of her mistake. Other issues pertaining to this exercise are also checked, but are not shown for lack of space.



Master Of Science (M.S.) In Information Technology With Specialization In Cyber Security

Introduction

The College of Information Technology at Zayed University offers a Master of Science (M.S.) in Information Technology program that includes advanced work in information technology with a specialization in cyber security. The program's focus is on the development of concepts, knowledge and skills to enable successful participants to become experts in the area of information security, internet crime prevention, and digital crime investigation. The goal of this program is to develop highly qualified technical experts to meet the demands of the national, regional and international workplace for information and network security.

Cyber Security is the protection of data and systems in networks that are connected to the Internet.

Learning Outcomes

- Perform a needs analysis of an enterprise to determine the appropriate levels of security needed for systems and data;
- Identify the management and technical controls that can be used to architect an enterprise security structure to protect the confidentiality, integrity and accessibility of critical data;
- Understand the IT essentials necessary to deal with computers, storage devices and computerized data in the context of a crime scene.

Year One

- Research Methods
- Information Security
- Linux Security
- Information Security Policy, Ethics & Law
- Network and Internet Security
- Cyber Forensics

Year Two

- Information Security Management
- Advanced Topics in Cyber Forensics
- Small Scale Digital Device Forensics
- Penetration Testing and Advanced Hacking Techniques
- Database and Enterprise Application Security
- Independent Research or Cyber Security Project or Elective

Delivery Mode

- Twelve 6 week courses grouped into 4 semesters over an intensive 24-month time frame (3 courses per semester with a 1-2 week break in-between)
- Instruction is conducted in-classroom over 2 weekday evenings – no weekends!!
- Strong emphasis on practical (laboratory) work
- Strong emphasis on face-to-face interaction with highly qualified instructors to facilitate the learning process

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