Altawairqi, Abdullah (supervisor Peter King)

POWER AWARE ROUTING IN MOBILE AD HOC NETWORKS

Development efficient protocol in consumption of energy is needed for ad hoc networks today. Although develop effective systems for battery to be low-cost and complexity, is still critical issue. In order to facilitate communication within the Mobile network dedicated, and efficient routing required protocol to discover routes between mobile nodes. Energy is one of the most important criteria for ad hoc networks as batteries provide a limited ability to work on mobility. Power outage of the mobile node not only affects the node itself, but also its ability to forward Packets. Mobile devices typically have restricted battery life and radio transmission is a great drain on battery life. This project will modify The Dynamic Source Routing Protocol (DSR) to be power aware routing protocol based on power source aware routing protocol (PSR) and make comparison between them, via using the ns2 simulator to find which better technique in terms of affect life time of the network. Utilising the ability of wireless devices to read the remaining battery energy of the device helps to create a certain point to activate power aware protocol which represent by threshold. In describing the project we have: • Established the requirements for Power Aware Routing Protocol in which has the performance metrics • Enhanced the evaluation methodology which concern in accuracy of evaluation at the project. • Implementation section which contain both phases. Phase1 which is based on delay in sending packets after reaching threshold. However PHASE2 is send to their neighbour that notify of low energy. • Simulation has been done , which contain tow scenario to describe the behaviour of each protocol. • The result shows that the PHASE2 is better than the DSR in terms of average network life time.

Amobi, Okaja (Supervisor: Monica Farrow)

Design and Implementation of a Lift Sharing Website Project Report

The high number of passenger cars on the road is increasing traffic/congestion and emission of carbon dioxide is causing pollution that is harmful to the health and agricultural sector. Also transportation cost is on the increase due to high cost of fuel. This report describes the processes that would be used to design and implement a lift sharing web site. A lift sharing website would create an avenue, where people can easily find those traveling their route through the internet, share lifts and save cost on energy, thereby decongesting the roads and reducing pollution from CO₂ emission. A literature review was carried out on some technologies that will be required to carry to carry out this project. Design principles are also review in other to get the right skills to develop a user friendly website.
To gather requirements for this system, students and workers, who would be the potential users of this website, were interviewed to know what features they would like in the website. Existing lift sharing websites were also studied to know what features they provide and their usability.

The design of the system was carefully planned and outlined to describe the relationship between the various components that make up the system. The system architecture showing the interactions between the front end and backend was outlined; component diagram showing the relationship between components and the database design was also discussed. Finally, the front end layout system was outlined. This was necessary to ensure a maintainable system was built.

The implemented report is discussed. Showing how the design was converted into building the application. The system testing was carried out and reported to ensure that the application is bug-free. The system was finally evaluated and the results analyzed to find out how if our system met its set goals or not.

Condie, David (supervisor Monica Farrow)

Extending the Software API Concept to the Civil/Structural Engineering Field

As any software developer will know, when programming there is usually an Application Programming Interface or “API” to assist in the development process. This API provides comprehensive libraries of material that a programmer can refer to, including descriptions of what different code methods do, how to use them, whether there are any related methods etc. In short, if there is any doubt in the programmers’ mind when trying to write a piece of code, the material is there to assist them in any capacity necessary. This work will focus on testing this concept of information delivery in a field other than programming, specifically the structural engineering field. Obviously, the term “API” does not precisely apply to this work as there would be no program to directly interface with. That said the concept of having the clear, comprehensive library of material (in this case of mathematical equations) should in theory, prove useful regardless of the subject material. As such, the main goal of this research is to determine whether creating this resource location in the style of a programming API is beneficial, or made redundant by other material currently available.

IJEH, NKEIRUKA AUGUSTA (SUPERVISOR: MONICA FARROW)

DESIGN AND IMPLEMENTATION OF AN ONLINE AUDIO/VIDEO CONFERENCING APPLICATION FOR HWUC DISTANCE LEARNING STUDENTS

This document outlines my MSc. Dissertation which is designing and implementing an online audio/video conferencing for Heriot-Watt University Computing distance learning students. This audio/video conferencing application is an existing application that would be used as a virtual classroom for teaching. Users would be able to log into the system and carry out audio/video conferencing with each other, with one participant acting as a moderator for the conference. The application of choice is the BigBlueButton open source conferencing application as it meets the various requirements of this project. BigBlueButton is a project built by a community of developers. The application features include audio (voice), video (webcam), desktop sharing, presentation, raise hand (getting the lecturers’ attention), chat
and whiteboard. This application is setup with several modifications made to meet the requirements of this project. This report describes what the project is all about. The project is being introduced, the literature review which consists mainly on the existing similar applications and their functionalities are described. The technologies that were used to design the system are also described. The project requirements were described and analyzed, the methodology that was used to achieve the goal of this project was also analyzed. The implementation is described by means of screen shots and also detailed explanations of the functionalities. Finally, the testing and evaluation of the system is described to show that the system meets the users’ satisfaction and the project will be concluded and future work will be described.

Elaswad, Abdulfatah.M.KH (supervisor Phil Trinder)

ONLINE MODULE SELECTION SYSTEM (OMSS) FOR WESTERN MOUNTAIN UNIVERSITY, LIBYA

Western Mountain University is one of the seven main universities in Libya. It seeks to contribute to the development of scientific research and academic study within the country. It consists of many research centres, colleges, scientific and literary. This project will focus on the College of Economics and Accounting (CEA), which is one of the most important branches of the university. Web based applications have evolved notably over latest years and with improvements in security and technology, there are many of organisations where information systems could be improved by transferring them to a web based application. This thesis describes the extension of an existing student record system, in the college of Economic and Accounting, at Western Mountain University, Libya (EAWMU). The enhancement of the system provides an online service for module selection and some other online services, which reduces the effort for both the staff and students during the enrolment period. In addition it will provides online services to the management of the university. In describing the Online Module Selection System (OMSS) we have: • Established the requirement for an Online Module Selection System (OMSS), for the College of Economic and Accounting at Western Mountain University, Libya. These requirements have broken down into functional requirements and non-functional requirements. We also prioritise the tasks of the OMSS, and select appropriate technologies. • Designed OMSS uses Client Server Model. To describe the design structure of the new system, a UML diagrams is used to explain the interfaces that enables the user to deal with the system. These diagrams can be used as guidance in the implementation phase of the system. Moreover it can be used in case of any future developments on the system. • Implemented OMSS using appropriate technologies, the implementation consist of three parts. Implemented of student site pages, consisted of two tasks: Selection modules and view/print these modules. The staff college pages provide four tasks: View/print Arabic language transcript, view/print English language transcript, Add new student and Add new module. These tasks are mainly founded to serve only students registered under the college system, where only the staff can access to this site and provide these services. Finally, the university staff pages, provide the following: View list of current student in the college, View list of current staff in the college, View list of current taught modules in the college and view list of graduated students.
Filippou, Ioanna (Supervisor: Dr. Lilia Georgieva)
Experiments with Theorem Provers

The purpose of this study is the evaluation and comparison of the functionality and features of SPASS and LoTREC theorem provers. Automatic theorem provers are computer programs used for deriving proofs of mathematical statements automatically and they use formal logic as the language for expressing the problem. Nevertheless, various kinds of analytic proof systems exist. The proof system used by LoTREC is the tableau method, whereas SPASS uses resolution based on superposition calculus. TPTP library is going to be used for selecting the test problems of SPASS and LoTREC and then their functionality is going to be evaluated with respect to their features, their ease-of-use, their syntax and finally the kinds of problems they can solve and the different techniques used by the provers. The outcome of the project will be a recommendation about which system is more suitable to use for educational purposes.

Mitchell, Emily (Supervisor: Lilia Georgieva)
The Application of Support Documentation for the Mitrefinch™ Time Management System (TMS), a Client-centred Approach

Everyone has a preferred way of learning whether it involves seeing charts and graphs, hearing a lecture, or physically doing something. Software support documentation usually comes in only one format. This project addresses the use of multiple support documentation formats. Furthermore, the project reviews literature on learning styles, documentation structure, and usability, specifically looking at two learning style models: the Dunn and Dunn Model and the Felder and Silverman Model. This information is used to create a client-centred approach to software support documentation for Mitrefinch Ltd’s Time Management System. Three types of materials were created: visual guides, audio guides, and simulations based on the Top Five “How do I...?” queries from a Mitrefinch Ltd support department survey. This information provides the support department with a range of materials to guide clients toward a preferred learning method to suit any client.

Molnar Monika (Supervisor: Dr Lilia Georgieva)
Green Community Portal and Map Application of Bristol

The objective of the MSc project is to develop the Green Community Portal and Map Application of Bristol. It is a company-based project, supported by Innogistic Ltd, a GIS software company from Bristol.

The aim of the project is to implement a web application, which motivates people to consider a more environmentally friendly lifestyle by providing “green” information such as National Cycle Routes, charity shops and recreational places. The community portal is unique in the way that it is developed by using the software of a Bristol based company and it has a specific topic – becoming more and more relevant – which is sustainable living.

The project consists of an ASP.NET website and an embedded GIS application, developed by using Cartology.NET. The main map data source is MasterMap and OpenData, provided by Ordnance Survey.
Psaltoulis, Alexandros (Supervisor: Lilia Georgieva)
Security of web-sites that handle sensitive data

This project studies security threats that Electronic Commerce faces. Potential weaknesses of the following e-commerce protocols SET (Secure Electronic Transaction), TLS (Transport Layer Security) and SSH (Secure Shell Protocol) are identified using the AVISPA framework. These are well-known protocols for securing electronic transactions, providing among others authentication and non-repudiation. Each one has a different purpose, with SET focusing on securing online payment card transactions, TLS providing secure connections to online stores and e-banking transactions and finally SSH providing high level security network communication between two parties over the Internet. The purpose and properties of each protocol will be formalised and analysed using the AVISPA Framework.

Refae. Eshrag (Supervisor Robert Pooley)
Ontology Driven Rich Pictures

Addressing complex situations has become a primary concern in the last two decades. In this context, Soft Systems Methodology has been considered as a leading approach that was introduced to tackle such ill-structured situations. As a vital part of SSM development, rich picture shows a detailed representation of a system in pictorial terms. Its major role comes from its ability to capture a large amount of data about a system being addressed to promote the degree of understanding.

An ontology is used in computer science to introduce formalisation to the systems or applications in which it is applied. This is achieved by defining the elements which are relevant to a particular domain and the relationships among them.

The project aims to investigate the usefulness of using an ontology as a supporting tool to enhance rich picture drawing and analysis capabilities. Property management is chosen as the domain to build an ontology on, due to its clarity and familiarity for most users. The structure of the domain is defined by identifying its elements. The ontology fed into protégé – frames as the selected editing environment for our ontology. To allow the engagement with rich picture, a set of images are added to the ontology to represent each single item in it. The resulted ontology is extracted in appropriate format to help building an interactive tool with a system picture drawing capability. The tool is evaluated by a group of users to ensure its validity, usability, and feasibility, and to ensure that ontology will not impose limitations on the rich picture drawing flexibility.

Robb, David (M. Chantler)
The Dendrographmer A Cross-Browser, Cross-Platform, Web Application to Generate Interactive Dendrograms from Clustering Data

An interactive web-based application to render dendrograms from clustering data is to be created. The application is to allow interested parties and researchers to visualise and interact with word co-occurrence clustering data from the EPSRC Grants on the Web. This interactive visualisation of the data will allow grouping of the grants in a logical and transparent way such that effective consultation groups can be formed. The application should allow visualisation and interaction with other similar clustering data. The application exploits the latest web technologies, including the Raphae! JavaScript graphics library, to
allow cross browser and cross platform access including iPad. The first version of the application (The Dendrogrammer) has been installed and used as part the web site in the developing EPSRC project, ICT Perspectives (an ICT Next Decade proposal).

Dendrograms and their role in cluster analysis are described. Some of the background to the analysis that produces the project clustering data, and also the possible technologies that might be used to create the application are investigated. The requirements are analysed, technologies selected, and prototyping by progressive development is used to create the Dendrogrammer. The key stages, problems and solutions in the development are related. The structure and key parts of the code are described. The Dendrogrammer is evaluated and its strengths and shortcomings are exposed. Suggestions for improvement are made.

**Sallau, Latifat Yetunde (Supervisor: David Corne)**

**Design and Implementation of Telemedicine System (Case Study Nigeria)**

The main objective of this project is to design and implement a telemedicine system using Nigeria as the case study.

This expert system would be used by healthcare workers and the patients in the rural areas in Nigeria. It would diagnose and prescribe treatment for patients in the rural areas.

A web page would also be designed and developed for Offa general hospital where the system would first be implemented. This web page will contain the information about the hospital. And at the same time give all the necessary information the use of this telemedicine system.

This system would extend the distribution of experts in the medical field to the rural areas in Nigeria. Meaningful consultation would be established between the rural healthcare worker and the medical experts located in the urban areas of Nigeria, thereby providing quality health care to those residing in the rural areas.

**Usman Shamsuddeen Sanusi (supervisor Hamish Taylor)**

**Metadata Search Service for a Web Site**

This project developed an application that supports the indexing and retrieval of Internet resources. Using a web crawler and other software components, a web site for a given URL can be searched and its indexed pages added to a list. RDF metadata can then be harvested from these documents and stored in a suitable database system, that readily field lookup through an appropriate querying and indexing mechanism of various Dublin Core fields. This enables structured discovery of the Internet resources, based on a user’s query supplied via an interface (simple website), supported by some useful web services such as SOAP/REST or any other Remote Procedure Call (RPC).

A web service using the REST approach was developed that meets these requirements. The technologies, tools and methods used were chosen after careful study, comparison and analysis of different options available. The methodology employed in the development primarily emphasized incremental procedures, using an Agile Programming approach that moderately involved users.
The application was evaluated formatively and summatively. The formative evaluation was done with a set of potential users. The summative evaluation was done after completion during which it was introduced to the general users. Their experiences and perceptions were elicited through a questionnaire. While the former exercise provided checks and even dictated the pattern of development, the later provided the authority to claim the application met the project’s aims and objectives.

This dissertation reports on background studies of relevant literatures, detailed development processes, achievements and limitations as well as recommendations for future work.

Vinoth Venkatachalam (Supervisor Phil. Trinder)

Developing an Online Parallel Haskell Programming Tutorial

Parallel programming aims to improve the performance by executing a number of operations in parallel. Functional programming languages are support high level languages and Haskell is both a pure functional programming language and a standard language. Glasgow parallel Haskell uses evaluation strategies to specify parallelism.

The project aims to construct online tutorial to teach Glasgow parallel Haskell language (GpH). The reformulated evaluation strategies are explained in this tutorial and main aim of the tutorial is to provide efficient materials which guide users to learn the evaluation strategies of GpH easily. This tutorial provides materials to teach the users about new formation of GpH language with example programs. This tutorial also provides practical section to give practical knowledge to the users. The practical section also explains how to compile and execute the GpH programs. This tutorial is very useful in wide area and many people like students, IT employees, new learners to parallel language, etc.

The tutorial’s main strength is having good example programs with proper explanation. The project started with literature survey of the project and then planning the project. In planning stage, the structure of the project, how the project going to implement and how the project is to be evaluated are planned. The requirements of the project is also analysed in planning stage that covers software requirements, functional requirements and non-functional requirements.

The project is designed and implemented as per project plan. This project is developed with functionalities like quizzes, explanation diagrams, examples, etc. Users can send their feedbacks about this tutorial through this site itself. After implementing, project is tested to correct the mistakes available in the tutorial. For example, check the spellings, testing all links are working properly, testing feedbacks are saving in database, etc.

After testing, the project is first evaluated with experts in Glasgow parallel Haskell language. Their suggestions are very useful to modify and add more contents in the tutorial. Then the tutorial has been evaluated with peers and members of the public. The evaluation is done by two ways, one is paper based and another one is a survey on the site.
Oilfield scale formation represents a very significant flow assurance challenge to the oil and gas industry, with increasing water production worldwide and higher oil prices. Scale Inhibitor (SI) Squeeze treatment is the most effective method to combat downhole scaling. In order to predict SI squeeze treatments accurately for further optimisation, it is necessary to simulate the SI retention in the formation, which may be described by a pseudo-adsorption isotherm. While these are often derived from core flood experiments, issues of representativity mean they are inappropriate for large field scale simulations. In practice the parameters of an analytic form of the isotherm equation are modified by trial and error until a match is obtained between the prediction and the return profile of the first treatment. The main purpose of this study is to propose a Simple Stochastic Hill Climbing Algorithm for the automatic pseudo-adsorption isotherm matching. The algorithm performance was assessed against two test problems and validated using two field cases. The results demonstrated that for this particular problem, overfitting is not significant. In addition, the existence of the multiple local minima was demonstrated. The equivalence of these local minima was studied. And finally, the proposed algorithm was validated against two field cases, which were treated several times, with very good results.