



Women

BCSWomen Lovelace Colloquium

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Cardiff University

Proceedings

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Section One: Original Project Abstracts

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How hard is Sudoku?

By Alice Brown, University of Bath

People tackle problems in a number of ways and there are numerous research studies which delve into how humans solve problems and the techniques they use. Interface design is another well researched area in order to discover the best ways of displaying information to users. The two areas, however, have rarely been combined hence this project aims to explore whether a connection lies between a user interface and a user's perception of how difficult a problem solving task is. In particular this project looks at Sudoku, a logic based number placement puzzle, and what makes a good interface to support the puzzle solving techniques. This project investigates numerous levels of mathematically complex Sudoku puzzles and whether interface support impacts the humans perception of the puzzle difficulty. This is achieved through analysing various problem solving techniques, in addition to implementing and evaluating numerous interface features in which to support the problem solving activity.

There is a level of help which is offered to the user which can be changed either by the user or by the application itself. If the application feels the user is struggling then more help will be provided to the user, similarly if the user feels too much help is being given then they can change this. The problem solving interface features will be compared against an unaided version of Sudoku in order to discover whether these features are beneficial. The outcome will concentrate on whether human ratings of Sudoku difficulty correlate with the mathematical complexity of the puzzle. Additionally, does this human difficulty rating differ when interface support is given in which to help solve the puzzle.

Dynamic Physical Education Monitoring

By Sarah Budgen, Open University

"We are keen to ensure the highest possible standards for sport in this country, and to re-establish the UK as a powerhouse in the sporting world."...

...however schools have a problem with the monitoring of students' progress successfully in Physical Education (PE). There is a need for an interactive system to improve health, learning and assessment in PE to ensure that our children can sustain a healthy, active lifestyle.

I am designing and developing an interactive application for students and teachers. This will provide a mechanism to monitor a students' PE progress throughout their schooling (11-16 years).

Teacher assessments will be analysed to present past, current and target levels for each sport category, including levels for each of the five stranded models. The implementation will provide dynamic content for students to be able to interact with the interface acquiring knowledge from definitions and hints on how to achieve their targets. The design will collaborate with the schools data management system and accessed through a VLE to provide personalised learning. This will also provide OFSTED with data requirements of student progress.

Research has shown that there are no schools in Devon using PE data in such an inspiring way. I expect further research will show that there are no UK schools using data in an interactive way.

Once implemented the PE Department at Kingsbridge will be at the forefront of data analysis and interactive feedback not only in the county but the country.

Reference:

DCSM, Department for Cultural, Media and Sport, 2010
Responsible for the Governments policies on the arts, sports etc.
http://www.culture.gov.uk/about_us/sport/default.aspx [accessed 7th February 2010]

Wireless building control using the latest sensor developed by Sun Microsystems

By Chitra Chandramohan, University of Abertay Dundee

My poster is about wireless building control using the latest sensor developed by sun Micro Systems. The abstract of my project is as follows.

Sun has developed a smart technology which allows developer to write embedded application with java as platform. Many applications are created using sunSPOT (Small Programmable Object Technology) technology as wireless sensor network is an emerging technology in the networking area.

The project focuses on developing a prototype of a building control system which is developed using SunSPOT sensor which is then experimented on real and artificial situations to find the effectiveness and the strength of the proposed prototype system. The result of this project is to estimate the best building control system based on the research, observation and development of a prototype application which has the potential to show the temperature readings to the user and allows the user to control the lighting system.

At the end, this new system is compared and evaluated with the other existing building control systems. A set of suggestions are given at the end to the developers and the researchers for the development of better building control applications using sunspots.

Cyber Terrorism

By Katrina Cole, University of Bedfordshire

The threat of terrorists hacking into and damaging national infrastructure control systems is no longer science fiction. Some critical systems which may be vulnerable to attack include railroad signals, traffic signals and the national electric grid. Recent examples of international incidents include the 2003 Titan Rain attacks on US computers, and the 2007 cyber-assault on banks and government systems in Estonia. With ongoing conflicts between states and terrorist groups, of unknown technical capability, the future of Cyber Terrorism is unpredictable. Understanding the risks is very important to national security.

This poster provides an overview of the issues and events which make Cyber Terrorism an important area of research. It also highlights a number of basic security procedures which can be undertaken to restrict the opportunity for incidents to occur.

Image segmentation

By Maria Lena Demetriou, University of Bath

The presented project is based on the notion of image segmentation. This is the process of finding a connected region within the image characterised with a specific property. Project's purpose is to examine the differences between machine and human image segmentation, as well as machine segmentation algorithms performance. It extends research of Berkeley University of California (2004).

While the referred research studied image segmentation on natural images (both greyscale and coloured), this project extends to blurred images to observe how the quality of images being used affects the conclusions. From the results of the project, it will be examined in which way, at what level and at which blurring degree an image affects both machine and human image segmentation.

Main aim of the project is therefore to design and implement a system for evaluating the differences between machine and human segmentation results, focusing on blurred images. Project will include experiments, using both greyscale and coloured images grouped by the amount of blurriness. Humans will be asked to segment images and on the same image, machine segmentation will be executed using various segmentation algorithms.

Results from the experiments will be gathered and at the end compared. Attention will be given to the different levels of blurriness of the images and whether this affects either the human or machine performed segmentation.

Expectation regarding the conclusions of this project is for the use of blurred images to minimize the difference between human and machine segmentation.

Finally, poster shall be a representation of the progress of the project so far. It shall contain information regarding the methodology used, the user experiments' procedure, the first results based on the data gathered at the current state, as well as whether expectations agree with the predicted conclusions based on the results.

Modelling the intentions of pedestrians in public places

By Kimberley Jackson, Leeds University

My poster is based on research I am interested in being undertaken in the School of Computing at Leeds University concerning modelling the intentions of pedestrians in public places, such as car parks. The aim of the research is to predict the movements of pedestrians in public places using scenes/photographs and manually identifying possible entrances and exits out of the scene. This allows a virtual model to be made showing the obstacles in a given scene and therefore allows calculation of the possible paths the agent may take given the position of the obstacles, entrances and exits using goal-based Artificial Intelligence techniques and Psychology principles.

Future uses of this research may include ensuring objects are not placed in the way of a common path of pedestrians, which has become a particular issue in the local news in Sheffield, where certain signs had become a hazard to the partially sighted and blind.

I can see the future possible benefits of this research being extended to minimising other health and safety issues, for example suitably placed emergency exits, positioning of surveillance cameras and lighting. Also, this may aid in the positioning of information signs so that they are easily seen on common routes. Taking a more futuristic view, the concept may also eventually be able to extend to the vision of computer-driven cars that include technology able to predict the movements and intentions of pedestrians so that the computer technology can react accordingly.

The Effect of Technological Advances upon Internet Addiction, with Particular Focus on Social Networking

By Victoria Jones, University of Bath

The poster I produce will illustrate a project I am undertaking as my final year dissertation titled 'The Effect of Technological Advances upon Internet Addiction, with Particular Focus on Social Networking'.

Previous research has alleged that excessive use of the Internet can be deemed to be an 'addiction'. The problem with such research lies in the fact that it is so difficult to define 'addiction' in measurable terms. The research available in this area must be treated with caution, since almost every article and paper uses different criteria to test participants for Internet Addiction. On the whole, studies have found that males are more likely to be addicted to the Internet than females, and that students are a particularly vulnerable group.

In pursuing research in the area of Internet addiction within this project I am hoping to make comparisons between research completed prior to the huge revolution of the Internet beginning in 2004, in the form of broadband, social networking sites, wireless Internet access, etc. , and my own personal studies relating to Internet use in 2009/10.

Secondly, I hope to be able to design a Facebook application that keeps track of the amount of time users spend on the site in a particular week. I am hoping that by informing the users of this information and where they stand amongst their peers, and then reassessing their Facebook use over the subsequent week, to be able to draw conclusions about using time logging as a potential solution to Facebook addiction.

Visualization, Semantics and Ontologies

By Thamanna Khanom, Cardiff University

The poster will be titled “visualization, semantics and ontologies”. It will contain a brief explanation of the types of visualization, the problems with classifying techniques, the advancements in the use of ontologies, web services and the work Gao Shu has outlined in two of her research papers. Then, I will outline the purpose of my project, to complete the visualization ontology and expose it on the semantic web to allow users to comment, interact and most importantly search.

This will lead to the design section, which will demonstrate the way in which I have designed and mapped the ontology on to a web service. This will also demonstrate the functionality of a wizard that has been created to allow users to classify visualization techniques. I will include an example of the typical scenario of a user and demonstrate the benefits of an inquisitive wizard which draws information by leading the user through a series of steps, displaying the available visualization techniques and displaying the picture via NAG IRIS Explorer.

The web-service will also allow the user to view where they are in the ontology during search stages, to allow them to view which path they can take through the ontology (which is demonstrated graphically via OWL Viz)

Finally, the poster will end with a conclusion on the system created, issues that the system has and potential further work.

Brain Computer Interface for Creative Expression

By Joan McAleer, University of Ulster

A Brain Computer Interface (BCI) provides communication from the brain to a computer. Consider the memoir of Jean-Dominique Bauby, who suffered a stroke at the age of 42, which left him with a condition known as 'locked-in syndrome'. Bauby could not speak, but he developed a system of communication with his speech therapist by blinking his left eye as she read a list of letters to spell out his messages. In 2002, Wolpaw et al. [1] offered the vision: "BCI systems could eventually provide an important new communication and control option for those with motor disabilities and might also give those without disabilities a supplementary control channel or a control channel useful in special circumstances". Allison [2] stated: "BCI systems have just begun to provide significant assistive communication technology to people without other effective means of communication in their home environments."

Along with this possible control, components of the EEG exist, which are seemingly 'random' in nature, but relate to mood, arousal, and mental activity. These components could be extracted and used for example to 'modulate' a piece of music [3] or 'influence' a painting's colour [4]. Thus BCI is applicable to investigating 'creative expression'. This project explores the creative side of BCI in order to provide a 'fast' real-time channel for environmental interaction. It comprises signal processing, feature extraction, interaction with computer based painting, and development of an appropriate user interface.

Supporting References

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2. Allison, B. Z., Wolpaw, E. W., & Wolpaw, A. R. (2007). Brain-computer interface systems: progress and prospects. *Expert Review of Medical Devices*, 4(4), 463-474.
3. Hinterberger, T. and Baier, G. (2005). Parametric orchestral sonification of EEG in real time, *IEEE Multimedia*, vol. 12, no. 2, pp 70-79.
4. Brain painting – Actof Volition,
http://www.gtec.at/Press/Adi_Hoesle/Brainpainting.htm

Distributed Computing for Virtual Worlds

By Hazel McKendrick, University of Abertay Dundee

Directing large numbers of autonomous characters in a virtual world can have extensive processing requirements, leading to excessive power usage and running costs. A distributed system of computers can mitigate costs by allowing scalability based on actual requirements at given time, as well as offering benefits in terms of redundancy, expansion and geographic positioning. By dividing a populated two-dimensional environment over multiple computer systems, this project investigates the benefits of distributed computing for such a simulation.

Employing a node based client-server approach, methods relating spatial partitioning of the world to workload balancing between systems are researched and applied. Particular consideration is given to the dynamic nature of the entities being processed, aiming to optimise character migration between systems and to handle events occurring at a node boundary with efficiency.

Through decreasing hardware use to match reduced problem sets in line with Gustafson's Law, preliminary recommendations will suggest whether the system can be scaled flexibly in order to minimise running costs. By considering the characters to be processed in terms of the actions they must complete, a flexible task-centric approach to parallelism can be applied. In this way, the simulation is relevant to a vast range of problem domains including online video games, commercial 'cloud' computing and scientific simulation.

Green IT in Organisations

By Irene Melo, Cardiff University

With the Copenhagen 2009 Conference on the highlights and the climate change already making its effects noticed it is paramount to think 'green' nowadays! Technical progress has been a key factor in the development that led to the current environmental crisis, it is now essential to turn to technology once again to help us solve those problems.

With this poster I will present a brief introduction to the problem my project tries to address: the environmental crisis and how does it affect organisations. A Rich Picture will show the dynamics between environment and different aspects of our society. From my research results, I will develop a table to contrast the two different positions regarding this situation: the ideas of people who believe the problem exist and that organisations can benefit from becoming green; and on the other hand those who believe the environmental crisis is 'created' and based in false scientific data, and that environmental regulation will change our society and the way organisations work, for worse. The research methods included a literature review of relevant and peer-reviewed academic papers, information taken from books, and contacts with people in the 'industry'.

I will also show a high-level influence diagram (a systems thinking tool) that shows how the adoption of green behaviours and technologies may affect an organisation.

Finally, I will conclude the poster with some thoughts based on the results of my research towards this project and what conclusions that may be derived from it.

Business Analysis & IS implementation for a Vehicle Service & Repair Group

By Stephanie Nicolaou, Cardiff University

Business Analysis and Implementation of a Bespoke Information Management System is the title of my third year dissertation that I will use to present my current progression of work into my poster. The SME under investigation is a vehicle service and repair group, SMS Garages based in Cardiff. The poster will introduce the problem domain and motivation of my project. It will incorporate hard and soft difficulties encountered whilst undertaking analysis, with systems and people, business problems established, including the techniques employed to uncover these, and various theoretical and practical ideas for solutions/ new services considered. In addition to this, I will also include current software developments and designs envisioned for the accomplished system. Finally, I will conclude with the expected impact of its success to customers, employees and the overall business which will be documented or graphically represented.

It is important that the implementation of this project maintains customer and client focus in order to deliver the correct and effective requirements that will bring benefits such as process efficiency and enhanced customer communications to the day-to-day running of the SME. It is a ideal SME to apply my project on as paper based file systems are still in place as well as multiple software systems that the users find difficult to use or ineffective. SMS Garages, like many other businesses are now aware, having received much feedback from disgruntled customers, that acquiring new and generic off-the-shelf systems (COTS) is simply not sufficient and need to keep ahead of competition.

The next generation of annotation systems: designing to support the making of online private and public notes

By Ceenu Puthuparambil, University of Bath

Computer Supported Collaboration (CSC) is the key to the majority of successful group projects, as it aims to simplify repetitive tasks and incorporate all contributions in a structured way. There is, however one task within CSC, that has not been successfully integrated into this type of tools, namely annotations. The notion of annotations has been around for centuries in the form of hand written notes added to papers sheets. Although they are proven to be useful as a personal resource the process of reusing and making them publicly available has not been fully explored yet. Several computer based tools have been developed to support digital annotations both on the web and as local software. These tools help the user to annotate and even share comments with other users, but very few of them support the differentiation between private and public notes. This poster aims to identify motivations for creating annotations and discover possible differences between public and private annotations. Moreover, the project investigates changes that occur during the status transformation of annotations, the process from where they are not only privately but also publicly available.

In order to acquire the above mentioned points, a computer supported collaborative system is being implemented which will support the making of private and public notes. The aim is to design a system that will aid the status transformation process. The implementation will consist of a firefox extension and a wiki, which share the same MySQL database. The tools have been chosen as they are well known collaboration tools, where there already exists a shared understanding of general usage.

'Artificial artists': Reality or not?

By Sarah Rench, University of Birmingham

If we take Andy Warhol's quotation, 'Art is anything you can get away with,' and the fact virtual art galleries online are displaying everything from digital copies of originals to links to 'new' computer-generated art, sites like 'Word perfect',¹ the use of computers in art is therefore undeniable. This allows one to question whether computer's can now be deemed 'artists'.

Artists like Leslye Bloom who collages a number of artistic mediums², 'now, dissatisfied with mere technical solutions [. . . and] work through and beyond the computer, using it as any other *art tool* [...]'. Researchers at New York University, Hertsman et al., present a new framework for processing images by example, called '*image analogies*'. Rather than attempting to program individual filters by hand, the software attempt to automatically learn filters from training data. Whilst in Bloom's case, when using the other mediums she is the artist, the latter illustrates the computer 'choosing' the processes, not the human.

So, if philosophical theories³ on 'us' all living in a 'virtual reality' are to be believed, it could be argued that humans are in fact the 'tools,' which, in the art world currently are given little credit in their use and importance in creating art pieces. One must then question whether we can recognize a computer version of art, even if it is being created.

Certainly, work by Matthew Brand, creator of the 'Artificial artist,' which is a robot sculpture called 'Aaron' looks at 'animals and studies the drama in their bodies' centre of power, tension, and expressiveness'. It describes what it sees by designing kinetic sculpture, taking artistic license to create artifacts. As Brand comments,

'Unlike most computational art, an artificial artist is not an image-altering filter nor a blind generator of pretty pictures, but a quasi-intelligent agent that has some understanding of its subjects

¹ Pollard (2010), discusses being the programmer of 'Word perfect', please see artist Takahashi (2000) 'Word perfect' artwork itself.

² Bloom (2010) states her mediums include; 'computers, acrylics, encaustics and collage fuses [... and tries] to use some impossible thing [technology] in every piece.'

and that makes aesthetic decisions about how to express that understanding'.

Even if a computer can create art and be deemed the artist, at the moment computers still require 'human' *programmers*, thus, are *they* not in fact the artists of today? This point aside, even if computers can be called 'the artists', can they enjoy viewing it, or understand aesthetics? It seems like the subjective experience is where AI currently fails.

However with advances in robots, in the physical 'humanoid' sense and in turn their debatable 'consciousness,' computers are set to only become more advanced and creative in the future. This in turn means, 'an artificial film editor' that uses computer vision to pick out important actions in the film, or an, 'artificial graphic designer' that reads narratives and makes diagrams showing what happened, whilst currently only in its 'sketching' stages currently, are the premise of the future of computer art and 'Artificial' artists. Thus, presuming such advances are achievable, will humans perhaps even begrudge or fear the competition? Who knows who or what will win the future Turner prize...

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The Usability of the UML

By Josephine Stenlake, Durham University

Since its introduction, the UML has been widely criticised for providing too many types of notation and notational elements. Whilst the UML was designed as a general purpose modelling language, research suggests that software designers do not make use of it, mainly due to its complexity. Current UML tools cater for designers to record their design using the UML but do not facilitate the design process, which is known to be generally opportunistic. Thus, to encourage the use of the UML in software design, a way for designers to arrive at UML diagrams from their own freeform diagrams is needed.

This is what my final year project hopes to achieve. Specifically I aim to assess whether it is useful for software designers, especially novice designers, to be presented with a means of evolving a block diagram of a system to UML diagrams. As, such I am designing a tool to support this process of evolving a design, and will shortly be evaluating its success. My tool will allow software designers the freedom of the classic whiteboard, but with the ability to link multiple diagrams of the same design together and navigate between them. It will also provide the traceability of the design that is often lost when multiple methods of documenting a design are used.

My poster would outline the background and context of my project, the solution that I have implemented and the results from my evaluation. I would also hope to be able to make suggestions for future work.

Intelligent Summarising and Browsing of Mathematical Expressions

By Ivelina Stoyanova, University of Bath

The main focus of the work presented here is the representation of large and complicated mathematical expressions in a form which facilitates their understandability. Most Computer Algebra Systems (CASs) output the result of the symbolic computations in expanded form with all the details which usually makes the result difficult to read.

The poster presents an application for summarising and browsing of large mathematical expressions as well as outlines the main principles and techniques implemented. Important features of the implementation described in the poster are: efficiency of representation of expressions, improved understandability, options to vary the degree of detail and navigate through the structure of the expression, ease of information exchange between applications. In order to enable the exchange of information with other applications OpenMath is adopted as the standard for representing mathematical content. There are various resources available for linking OpenMath to Maple, Mathematica, etc.

The main purpose of the application is to supplement any CAS or other software for mathematical manipulations and provide means for various types of summarisation in order to facilitate understanding of mathematical formulae. The research in this area relates to and could be applied in the field of education in Mathematics and presenting mathematical content to visually impaired people where the suitable representation of the structure of expressions is crucial.

Visual Comparison of Waterfall & Spiral Model

By Man-Chie Tse, Middlesex University

Visual comparison can aid managers in the decision making process. The study provides a comparative analysis and evaluation discussed in the light of two software development life cycle (SDLC) models - Waterfall and Spiral using a Composite Feature Diagramming (CFD) framework developed by Georgiadou (2003). As a benchmark control, one researched the characteristics of an "ideal" SDLC model. Each model were mapped accordingly, highlighting the present attributes which indicated the absent ones. Both models still incurs criticism caused by lack of explicit requirements from today's constant agile changes.

Expert respondents ranked using a five point likert-scale of importance to measure attribute opinion. The scores determined the overall "strength" of each sub-characteristic. As a supporting method, the final results were plotted into a Kiviati diagram; thresholds of 40% or 2.0 were assigned as benchmark value for each characteristic of the ideal model.

The qualitative and quantitative evaluation results suggest waterfall should be rejected as the benchmark value was violated twice; and missing two of the major primary characteristics present in the "ideal" (planning and risk). Spiral model emerged to be more feasible as the threshold surpassed three times. Moreover, the illustration attempted to introduce potential benefits, capability issues and problems that arise from the models itself. Both models are neither perfect during the execution phase as there are no measurement(s) to determine the completeness for each stage. Equally important there is still much more significant work to be done.

Reference:

Georgiadou, E. (2003). GEQUAMO—A Generic, Multilayered, Customisable, Software Quality Model. *Software Quality Journal*. Vol.11, No.4, Pp.313-323.

Can Scratch when used in conjunction with appropriate scaffolding be used as a suitable pedagogical approach for computer programming with children in Primary 4/5?

By Amanda Wilson, Glasgow Caledonian University

Undergraduate computing science student numbers have been dropping since 2001. Previous research has shown attitudes towards computing and even the age at which children are introduced to computing are some of the factors that affect their decisions to undertake a computing science course. However with the rapid pace of technology change happening skills developed need to be kept up to date as well to meet this demand. Recent studies recommend that the computing skills for children do need to be enhanced to ensure that there is no skills shortage in the future. At present a new curriculum is being implemented in Scotland and within the computing area many changes have been made from the old curriculum. These new guidelines are causing frustration with some teachers feeling they have been left without adequate resources and professional development to introduce them into the class.

The project aims to see how best to teach programming to children using Scratch as a means of supporting their learning. As an experimental project two classes of primary 4 /Key Stage 2 children will be used to investigate their enjoyment and learning when being taught programming with Scratch. They will be given 8 one hour lessons and tested on their work to determine their learning. Children will keep a weekly log of their thoughts on how the lessons made them feel. It is hoped that the results will show educators that programming can be introduced within the new primary curriculum guidelines.

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Is agent-oriented software engineering a Silver Bullet?

By Charlotte Backus, Emma Carey, Anne-Marie McCabe,
Emma Stephens and Hannah Wilkinson, Cardiff University

Our poster is to discuss the approach of agent-oriented software engineering and evaluate whether it is a silver bullet.

We will begin by giving an introduction to our approach. This will consist of the four concepts we believe to be the most significant to agent-oriented software engineering and explain how these concepts will contribute to the development of complex software systems. The concepts we will discuss are: Modularity, Autonomy, Social ability and Encapsulation.

We will discuss the effect of agent-oriented software engineering on software quality, identifying the three most significantly improved factors and the two most adversely affected factors. To do this we will be referring to McCall's Quality Hierarchy.

Next we will critically evaluate how an agent-oriented approach to software engineering addresses each of Brook's four essential difficulties of software development, providing advice on where the approach is and is not appropriate. This will help us to evaluate whether our approach is a silver bullet.

Memories for Life

By Siobhan Bamber, University of Reading

Memories are a precious thing, we as humans constantly strive to save and capture them whether it be through photography, diary keeping or online blogging. 'Memories for Life' is an exciting project, that has been recognised as a Grand Challenge for computing by the United Kingdom Computing Research Committee. Creating technology that enables humans to save every aspect of their day-to-day ongoings could revolutionise our society.

An interesting aspect of this project to consider is the role of forgetting in memory. Some psychologists consider the ability to forget integral to human development and sometimes in the overcoming of grief.

"We forget because we must, not because we will." - Mathew Arnold.

The development of technology that is sophisticated enough to recognise those memories that are best left forgotten and the ability to retrieve these memories when, or if, the individual is ever emotionally ready for them would be a major breakthrough. However, the inability to enforce any level of forgetting in an individual's computerised memory could have potentially emotionally-damaging effects.

Issues such as the the trust and privacy concerns that are inevitably to be invoked from the computerised storing of memories, the potential improvement of memory efficiency and recall that 'Memories for Life' could create and the challenges in the development of prosthetic memories all contribute in making this project a challenging and thought provoking one.

With psychological, sociological and neurological concerns, 'Memories for Life' Truly represents the diversity of Computer Science.

Whole brain emulation

By Martha Bond, University of Bath

Whole brain emulation is essentially the detailed scanning of the structure of a particular brain and, from this, constructing a computational program that, when run, will behave in the same way as the original brain. One aspect of this currently being developed is research into 'downloading' memories from Alzheimer's and Dementia sufferers' brains to try and naturally prompt their memories. Another possibility would be the full 'upload' of human brains to a digital form, which would effectively remove the natural effects of ageing and indeed mortality. Furthermore, it may be possible to extend the digital simulation of natural processes to the surrounding universe. This would mean a fully-functional virtual reality governed by the same laws as reality could potentially be created with these uploaded people 'living' within it. In my poster I want to explore the computational practicalities of such a theory looking at the possibility of using a Turing machine for the computations and also such things as how the image processing and interpretation of memories could be practically carried out. I will also look at theoretical models that have already been developed and current research into the area such as the Blue Brain project, the 'first comprehensive attempt to reverse-engineer the mammalian brain, in order to understand brain function and dysfunction through detailed simulations.' The amount of storage and computational power required to realise such a theory could potentially be huge however with trends such as Moore's law seemingly continuing, this could be a very real future possibility.

Privacy and security issues in e-Government

By Uzma Chaudhury, University of Bedfordshire

E-Government is an initiative which attempts to apply Internet technologies to support government tasks and activities. It promises to deliver services to the population in an efficient and cost effective way, however such services often require access to sensitive personal data and managing this in a secure way which ensures privacy is a major challenge. Many fear hyper-surveillance, the constant and intrusive monitoring of individuals by the state which may have a negative effect on civil liberties. The potential effects of inaccurate or inconsistent data, stored in e-Government systems is not well understood and recent mistakes, such as the loss of private data by HM Revenue and Customs in 2007 highlight other risks such as increasing the impact of identity theft. This poster will draw attention to the privacy and security issues of e-Government, potential risks and some possible steps to address these.

Evaluation and Comparison of Two Software Quality Models: McCall and ISO 9126

By Nelma de Jesus Narciso da Conceicao and Taiwo Busola
Jalekun, Middlesex University London

Quality models are used to evaluate and set goals for the quality of a software product. This study involved visual, qualitative and quantitative evaluation of ISO 9126 and McCall quality models in order to establish a standard to effectively measure software quality.

An ideal model was created and used as a basis to compare the models under evaluation considering the user, developer and sponsor requirements. The data used in the study was collected at Middlesex University Hendon Campus using Composite Features Diagramming (a visual framework) and the respondents were asked to assign values from 0 to 5 to attributes of the software characteristics based on their level of importance.

During the research, it was found that:

- Many of the characteristics defined in McCall quality model can only be measured subjectively compromising the determination of accepted values since the understanding of the software characteristics vary from person to person.
- The McCall quality model does not include functionality and to develop software that does not work compromises the assessment of all the other attributes.

The results of the comparison and the highest similarity to the ideal model created led us to conclude that ISO 9126 quality model should be the standard used for the measurement of software product quality. However, as software attributes are mostly measured subjectively there is a need to devise objective measures that must be included in future versions of the standard.

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Image Processing and Graphics

By Sophie Dare-Edwards, Nia Davies & Kaushalya Kularatnam, Swansea University

Image processing has been focus of development and research for many years, essentially used with simulations, art, virtual reality, multimedia and design.

Our very own Swansea University also researches into this field and has done so since 1992 (Volume Graphics: Data Visualization, Interactive Software Techniques and Tools, Intelligent Methods for Visual and Interactive Computing), along with a taught second and third year modules covering a wide scope of Graphic related topics.

"Computer Graphics includes almost everything on computers that isn't text or sound".

Our group decided to use Image Processing and Graphics as the main focal point to our poster, this topic was recently introduced to us at the beginning of this academic year and has inspired us to explore it further. This varies from animation, to studying how to represent 3D objects, lighting and even down to core elements of the implementation of Graphics such as RGB and YMC colour models, use of filters in the processing of images, rendering and texture usage.

We intend our poster to represent many of these aspects, hopefully portraying exactly what we feel is the essence of image development techniques and approaches, focusing the attention on 3D images and the processing involved in producing such graphics.

Google Writer – A Mash-Up

By Amy Guy, University of Lincoln

The internet is rife with online writing communities, and the industry offers various specialised software for every kind of writing, from novels to screenplays, poetry to research papers. **Google Writer** combines these two basic concepts, and expands upon them using a mash-up of existing Google technologies along with some new ideas to provide everything an author needs from first ideas through to publication of a manuscript, all accessible with an existing Google account.

Google Writer allows members to share, critique work and be inspired by others. Networking and collaboration is easy, increasing the possibility of meeting writers in the same area with whom real life writing groups can be set up. Writers can advertise their skills or publish example work online, making it available to agents or publishers seeking new talent.

Google Writer is modular, and can easily incorporate RSS feeds from relevant writing news and networking sites, as well as subscriptions to blogs and online magazines, allowing writers to be instantly informed about competitions or events in their area.

Google Writer allows authors to customise and specially tailor the interface in which they work to store notes, research material, images and inspiration alongside their manuscript for easy reference. Personal writing statistics, targets and deadlines are incorporated to make tracking progress simple and provide often much-needed motivation.

Writers from a variety of backgrounds gave suggestions of important features they would require. Summaries of these inputs are presented, along with an initial plan and design for the **Google Writer** interface itself.

Intellectual Equals

By Kaushalya Kularatnam, Swansea University

This poster is about the super computer Deep Blue, designed by IBM in 1996. Chess is a game that requires concentration, experience, knowledge and most importantly the ability to think. To program a machine to do the above is just amazing and that would be the time when a machine could actually beat the human brain. IBM's, Deep blue designed in 1996, played the worlds greatest player Garry Kasperov in 1996 and lost. Agreeing to Kasperov's request for a rematch Deep Blue came out in 1997 and thrashed the world champion. IBM retired deep blue in 1997 and it never competed again. Today inexpensive computers with their large memory and sophisticated software could play as well as Deep Blue. The poster tries to highlight the importance and wonders of Artificial Intelligence and give some insight into the man vs machine debate. The world of Artificial Intelligence is seen through the eyes of Deep Blue, an artificial intelligence milestone in itself. It would discuss the future of this technology and would look into strategies/concepts/ideas used in the game of chess used in today's computers. Deep Blue can play as well as a grandmaster but it used a brute force approach to the game where it analysed over 200 million positions or variations in a second and didn't think. A machine that can think still remains the dream.

IT in the Pharmaceutical Industry

By Lynette Mae Yen Lee, University of Bath

My poster will be about the importance of IT in the pharmaceutical industry. I am currently on placement at GlaxoSmithKline as an IT Business Analyst in the Research & Development division. The reason I applied to GSK was because I wanted to know how IT is applied in the Pharmaceutical Industry. 8 months into my placement, and I dare say I was very lucky to be given the opportunity to broaden my knowledge and to satisfy my curiosity.

The main project that I'm working on is called the Electronic Lung System. This project involves building the next generation breathing simulators, namely the tidal eLung. I play a business analyst role in this project. Hence, it is my duty to draw up a format specification of the requirements, the design of the system and finally perform some testing. The scientists have the equipment necessary for the system, which was purchased and gathered over the duration of the past 5 months. On top of that, I was responsible for aiding the scientist as to what electronic devices are needed for this system, as well as doing research to help them make the best choices. In my poster, I intend to elaborate further on the projects I am working on at GSK and to give a brief overview of how important IT is to all of the projects in the corporate division, as well as the developing sciences.

Multi-core Processing

By Ruth Nakakande, University Of Bedfordshire

Multi-core processors combine two or more independent cores on the same processor chip. They are now found in many different devices, from PCs to mobile phones and PDAs, and manufacturers say they will enhance performance and reduce power consumption. However, writing efficient software for parallel programming systems such as multi-core processors is known to be a difficult task. This poster focuses on the potential impact of multi-core processors and some of the modern high-level programming languages such as Java, Erlang and StreamIt that will help the process to improvement. The potential benefit as cores increase in number is more computing power but for applications not designed to exploit from that power, this will mean little or no improvement. This poster describes some of the challenges of parallel programming such as overcoming sequencing errors, race conditions and deadlocks.

Amazon Web Services and Cloud computing

By Indra Niedre, University of Bath

The recent innovation, cloud computing, makes it possible to use computing power from a third party over an internet connection. This can help companies and developers avoid capital expenditures on both hardware and software, as it is possible to rent the necessary resources from a provider and pay only for the time they are being used. One of the leading such computing resource providers currently is Amazon Web Services.

This poster will give a basic overview of cloud computing and look into cloud services offered by Amazon, discussing advantages as well as possible issues, such as concern about safety of user's data.

The Design of a bilingual web site showing the history and attractions of Cardigan and the surrounding area

By Sarah Pearce, University of Wales Lampeter

The critical questions being asked are what can be done to entice tourists to the Cardigan area using a web site? How can a tourist planning a vacation be made simpler using a web site? The poster explores the options a tourist has to plan a vacation in the area without having to research the area through separate sites. The purpose of the project is to create a web site and plan an itinerary schedule.

The poster will summarise the web site design, methodologies used in the design and the software used to create the final product. A critique of the design process and the tools will be presented. The web pages will be created using Adobe Dreamweaver, including CSS for the designing of the pages. The photographs will include some panoramas of places which will be created using QuickTime VR and then imported into Dreamweaver. Images will be enhanced and manipulated in Photoshop where necessary. The items to appear in the itinerary will be created using SQL in the form of a small database to link to the web site. For example, forms will be used to allow the user of the site to choose Cilgerran Castle and all the details of this will be placed in the itinerary including charges, facilities and estimated time for visit. Formulas will be used to find and display the attached information on a particular item. A fun quiz sheets will be created in Microsoft Publisher and attached to the website to enable the user to print them. The adult quiz will be interactive within the web site using SQL. Letters will be written to various local people who have extensive knowledge on the history of the town and the surrounding area for me to meet with them to gain more knowledge on the subject.

The future of humanoid robotics

By Kate Pilcher, University of Birmingham

Albert Einstein once said "imagination is more important than knowledge. For while knowledge defines all we currently know and understand, imagination points to all we might yet discover and create." These words apply also to humanoid robotics; although there is a basic structure it took Honda's team of engineers a lot of imagination to create its humanoid robots, as reliable, walking biped robots have been developed only recently, much less research attention has been focused on developing complete global navigation strategies for biped robots (Footstep Planning for the Honda ASIMO Humanoid Joel Chestnutt, Manfred Lau, German Cheung, James Kuffner, Jessica Hodgins, and Takeo Kanade 2005). First developed was walking and this came with a set of problems such as programming balance into a robot, but Honda's team didn't stop there. Their aim was to build the first humanoid robot; therefore they wanted their robots to have arms too. They achieved this with their P1(Handa's website) robot, robots find it hard doing what humans can do instinctively and the hardware of the time was limiting. This meant that to get a robot that could truly act like a human they would have to push the boundaries again, and with P2 and P3(Handa's website) they did. They were the first to have wireless control; this made them look more human like than the predecessors and was the beginnings of ASIMO, a robot that doesn't rely on the workstation. With wireless connections the Honda team realised that they would one day be able to have a robot that could go into the outside world, however there were limitations to the P2 and P3 Robots that meant that ASIMO would be the first robot to achieve this. Now with ASIMO coined the "Friendly Robot" (Handa's website), and also the most advanced of its kind, being lent out to offices already to carry out light administration work, and the i-WALK, which is said to be more efficient and human like than P3's walking style that was slow and awkward, Honda has moved onto their new project of Inelegance, they're not the only ones. With the introduction of the i-cubs, a fascinating project that involves many different subjects, from human development to robotic itself, are we on the cusp of humanoid robots with near human intelligence?

E-Government: Issues of Access

By Aushrat Quyyom, University of Bedfordshire

The effective management of public services by the government has a significant effect on public well being. In recent years the government has looked to increase the proportion of services managed on-line and electronically. This initiative known as e-Government has a number of benefits such as improved interaction with the population, environmental benefits and overall better levels of service. However this policy may also cause difficulties for those who do not have access to a computer and those who lack the basic IT skills.

The poster will examine the issues involved in access to electronic government facilities for citizens and discuss why this approach is better than the old paper based services.

How Computer Science has Changed the Face of Film

By Victoria Shakspeare, University of Bath

Over the past 50 years advances in computer science have changed the face of film. As technology has improved it has become increasingly difficult to be sure that those blue aliens on the big screen aren't actually real. On my poster I would like to present a timeline of those changes through the years, from key frame and stop-motion animation through to motion capture in all its forms as well as looking at things to come. There is a great deal of research in the field of motion capture, particularly in the area of marker-less motion capture on delicate areas like eyeballs and lips, aiming to make animations even more lifelike using software and techniques which are being improved all the time. I think this would be a good subject for a poster because everyone loves a good film but very few people realise the processes which go on behind the scenes to create a magic-making blockbuster.

Google Street View: is our privacy at risk?

By Karen Templer, University of Birmingham

With each decade that has passed, computer technology has come on leaps and bounds but in March 2009, it took one step forward to many UK doorsteps.

The launch of Google Street View may have been controversial, but no matter which angle you look at it, it does show a massive progression in technology. Using a fleet of vehicles, Google drove approximately 22,000 miles of British roads(1) to allow internet users the chance to experience the streets of Great Britain from the comfort of their own home.

A mixture of a unique 11 lens camera (developed by Immersive Media), gyroscopes and GPS allows (2)(3) you to freely 'walk' down streets with a full 360 degrees of vision. This was achieved by stitching together screenshots taken from the video cameras and combining it with zoom and drag functions to give an amazing interactive experience, all free of charge.

However a proportion of the population see it as one step too far. Google Earth (originally launched in 2005 (4)) allowed users to view satellite images from across the UK and many felt the up close and personal approach from Street View a step to far. To tackle this Google implemented an impressive blurring algorithm to hide faces and license plates and protect people's privacy(5).

But no matter what side of the argument you reside on, it is still amazing to see the developments in technology and it can't but help leave you pondering where the next step forward may take us.

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Graphic Design in Games

By Dung Hoang Tran, University of Bath

This poster will be all about the growth of graphic design in Games.

As we already knew that the game industry has been developed significantly since the idea of human interacting with machines for entertainment was first explored in the early 50s. Along with many improvements in the intuition of the game devices, the impressive music and sounds in each game etc, the modern spectacular graphic design easily catches people's attentions.

If we take a look at the history, for example, in 1976, the game called Night Driver was produced by Atari Company as a sit-down first person vision game. Back then, they staged the game at night to reduce the complexity of the graphical design as they thus only needed to represent the left and right boundaries of the driving surface by using two sets of white blocks and the car itself. Even though this sounds very poor designed nowadays but it was amazing at that time.

Here we are in the 21st century, benefiting from the recent developments in computer/ game console hardware, software and data storing (using DVDs instead of cartridges like the early systems), the graphic now is much more attractive than it has ever been with the real looking 3D animation and even the effects such as how badly one character gets injured based on how hard (s)he was hit are well taken care of. All of these factors allow the latest games to achieve a better ?look and feel? that surpasses the retro ones.

Tackling Cyber Bullying

By Rupinder Kaur Uppal, University of Bedfordshire

Cyber bullying is where a person is victimised using interactive digital technologies. It can have a greater impact than traditional bullying because it may permanently leave humiliating material in public forums. Some studies suggest that as much as sixty percent of students have been victims of this kind of bullying. It is an important area of study because the effect on the victims can be devastating, and new technologies create new opportunities for this kind of unpleasant behaviour.

This poster will highlight some of the legal issues around cyber bullying and the type of actions which can be taken to prevent it. It also describes some more general strategies for managing this problem.

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