The University of the West Indies

Department of Computing and Information Technology

UWI Computing Forum 2013

Fostering Collaboration in ICT Research and Development

Programme

28th February, 2013

Location: Student Administration Building,
Conference Room, 2nd Floor

Book of Abstracts

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Abstracts

COPS Collaborative Online Problem Solving
Eshwar Bachu

COPS (Collaborative Online Problem Solving) is an online multiplayer game which was developed using a computer supported collaborative learning (CSCL) game based model. COPS aims to improve the problem solving skill of novice programmers by requiring them to collaboratively build program flowcharts. This paper presents the results and challenges of an experiment conducted using secondary school students between the ages of 14 and 17 who are preparing to write the Caribbean Secondary Education Certificate (CSEC) information technology exam. Initial findings indicate students prefer COPS to paper based, traditional problem solving exercises and that students were encouraged to work through the assigned tasks to completion.

A Dairy Management System for the University Field Station (UFS) that employs a Service-oriented Architecture and a mobile voice data entry mechanism.
Karleen Lall

The aim of this research project is to build a Dairy Management Information System for the Dairy parlour operations at the University Field Station (UFS). One of the major challenges in the Dairy Cattle Milking operations is the proper and timely collection and entry of data on a daily basis. This research seeks to solve this issue through employing a mobile voice mechanism for data entry. A Service Oriented Architecture (SOA) framework is also proposed to enable remote access and to support more efficient collection and management of data in the UFS Field Management System.

QoS-Based Pricing Model and Scheduling for IP based Cellular Networks
Ramneek Sekhon

Mobile network traffic has grown exponentially in recent years, and it is expected that this trend will continue in the future. Important driving forces include new affordable smartphones, and the many new connected devices on the market. Also, the rollout of faster HSPA+ and LTE networks is expected to improve the customer experience. Therefore, it is critical to examine feasible ways to manage the huge traffic increase and the hunger from new Internet service applications, especially video or other rich media, to prevent congestion and customer dissatisfaction. One of the alternatives is to increase the capacity by using more bandwidth, but this too is limited by the available spectrum. We expect that at some point, the demand will exceed the capacity. In this work, we have tried to address the above issue by proposing a dynamic and flexible pricing model that limits the network congestion and enhances the service quality for the user while allowing wireless operators to make a profit even when capacity becomes limited. It differentiates between different service plans based on the QoS Class Indicator (QCI) requirements of the applications. Application and service differentiation enables optimal management of precious network resources while providing desired QoS to the end user. We also propose a simple scheduling algorithm that is designed to support the implementation of the above pricing model.

Improving Students' Creative Skills using Creativity Techniques in a Social Network
Diana Ragbir

There is a global call for creativity to improve and expand the knowledge economy. The production of more creative individuals from our education system requires that creativity skills be taught alongside existing curriculum. This research investigates the requirements for developing a system for teaching creativity skills alongside the original course curriculum. The research focuses on two aspects of creativity – the creative process and the aspects of the environment for supporting creativity. Several creativity theories will be used and include Wallas' Creative Stage Theory, Resnick's Creativity Spiral, De Bono Thinking Steps and Roger von Oech's Creative Strategies. An online social network has been chosen as the ideal environment for supporting creative work. Processes based on creativity theories will be integrated into the social network together with design principles for Creativity Support Tools (CSTs). This presentation will introduce the system's design, highlight the contributions of this research in relation to the current research in the field and give insight into future research projects resulting from this work.

User experience design of eLearning systems in neo-tropical animal production
Alexander Nikov

A framework for learner experience (LX) design of eLearning systems in neo-tropical animal production is proposed. For assessment and design of learner experience a checklist is developed. By a ridge-regression-based model the most critical of learning experience dimensions and their checklist items are determined and relevant eLearning system improvements recommended. A case study with an eLearning system in neo-tropical animal production is carried out. By applying the framework the most critical for learner experience design checklist items and problems are allocated. LX design guidelines and improvement recommendations are defined. Further developments of the framework are suggested. By help of the framework important LX dimensions and items can be quickly allocated and thus LX-oriented design of eLearning systems in the area of neo-tropical animal production supported.

Generating Patentable Ideas
Patrick Hosein

The generation of high quality patents is now a major focus of many high technology companies. Many legal battles are also being fought over intellectual property (such as the one between Apple and Samsung). However, there is no repeatable process for generating a patentable idea. If this were the case then countries such as China would have, by now, overtaken the USA in creating novel products (although China now files more patents). It is also now widely accepted that Patents (which must be novel) are much more valuable (to both companies and universities) than even journal publications. In this presentation I will use a number of my granted patents to illustrate the methods followed to come up with the respective novel ideas.

Biography
Patrick Hosein
Patrick attended the Massachusetts Institute of Technology where he obtained five degrees including a PhD in Electrical Engineering and Computer Science. He has worked at Bose Corporation, Bell Laboratories, UWI, AT&T Laboratories, Ericsson and Huawei. He has published extensively with over 75 refereed journal and conference publications. He holds 33 granted and 41 pending patents in the areas of telecommunications and wireless technologies. Patrick is presently the administrative and technical contact for the TT top level domain, CEO of TTNIC and a Senior Lecturer in Computer Science at the University of the West Indies.

Intellectual property

Richard H. Aching

Intellectual property consists of the expressed creations of the human intellect. Some creations can be protection by different types of IP. Depending on what is allowed in different jurisdictions, software may be protect by patents or copyright. They have very different scopes of protection and different modes for acquiring the rights.

Biography

Richard H. Aching

Mr. Richard Aching is a national of Trinidad and Tobago and is currently the Manager, Technical Examination in the Intellectual Property Office (IPO) of Trinidad and Tobago. Mr. Aching holds a B.Sc. in Agriculture from the University of the West Indies. He has previously worked in the landscaping and golf course construction industry in addition to being a market analyst with a well-known market research firm and as a technical cooperation assistant at the United Nations Economic Commission for Latin America and the Caribbean.

Mr. Aching joined the staff of the Intellectual Property Office (IPO) of Trinidad and Tobago as a Technical Information Specialist in 1999. His present responsibilities as Manager, Technical Examination include, among others, performing substantive examination on patents, utility certificates, industrial designs, new plant varieties and integrated circuits and advising the Controller on all technical issues relating to the grant of intellectual property rights

Demonstrations

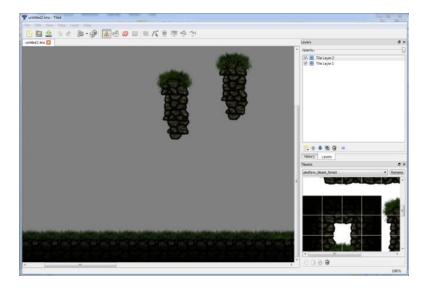## 2D Side Scrolling Game Engine

Keshav Bahadoor

The project is a two dimensional scrolling platform styled video game. The game will be presented on both PC and the Xbox 360 video game console. The game stresses proper design and object oriented programming concepts and will showcase some advanced 2D techniques, such as lighting and shadowing. Some of the features of the video game are as follows:

A data driven game design - The game will have a proper separation of level data and game logic. This emphasizes proper design, and promotes scalability and extensibility.

Level Factory ← Data Parser ← Game Data

Two dimensional lighting and shadowing - This technique is not so often used in two dimensional game development due to hardware requirement issues.

Multiple game levels - Game levels are created externally using a tile map editor and are stored in JSON format. This is then loaded by the game engine and used to build the game world

Wireless Sensor Networks (WSN)
Kuffka Khan

The new demanding real time routing constraints now posed to wireless sensor networks (WSN), such as, military surveillance and video monitoring applications, means that quality of service (QoS) parameters, such as, bandwidth, packet delivery ratio and average end-to-end delay now have an increasingly important role. This research investigates a security protocol and QoS in WSN environments. It attempts to give applications the ability to demand secure routes with desired QoS metrics.

Computerized Version of the Connect Four Game
Jonathan Weekes

A computerized version of the Connect Four game which can be played by two individuals over a network. The game connects the two players via TCP connection. To play the game, players drop their pieces into the board in alternating turns in an attempt to place four of their own pieces in a row (either horizontally, vertically or diagonally) while preventing the opposing player from doing the same. The first player to connect four pieces is the winner. Players can play single games or can opt to play a tournament of 3, 5, 7 or 9 games. The game displays a winner at the end of each game and/or at the end of a tournament. To play, players simply click on the column number they would like to drop their piece into and their piece is placed into the next available slot in that column.

Tracking Foreground Objects in a Video Stream using OpenCV
Sterling Ramroach

To track foreground objects, feature points within the first frame must be detected first. In subsequent frames, these points will be analysed, with its position noted. Using successfully tracked points, the current frame and its points become the previous frame and points for the next iteration. In order to extract foreground objects, a model of the background will be dynamically built by computing the running average for each channel of each pixel and compared to each frame.

Phones
Group Leader - Kevin Isaac

Formal Game Overview - "Phones" is a basic 2D Side-Scroller made using HTML and Javascript. It features traditional platforming elements and is centered around the task of acquiring a high score by way of collecting items called "tokens", attaining a fast level completion time, and defeating or avoiding enemies. The gameplay mainly focuses on these elements, along with small puzzles and chase sequences. The game features two modes; Single player and Co-op. In Single Player Mode, the player must control the main character throughout the multiple level sections, using the abilities at his disposal to progress. In Co-Op mode, the gameplay changes slightly, as the levels are distinctly different from that of Single Player mode. Players must interact with each other in order to progress through certain sections, and as the two characters gain new unique abilities during game-play, their interactions with the enemies and environment become greater and more diverse, allowing for situations where the fate of both players is dependent on only one player's actions. The game consists of four main levels divided into sections which will require special "keys" to traverse. There is also a special ending section of the game, reserved for those with a predefined high score.

Zombie Frenzy

Jherez Taylor

The inspiration for our HTML 5 game came from the arcade racers that were all the rage in the 80s and 90s. The basic idea is to drive and attack the zombies on that are populating the road. The aim of the game is to defeat as many zombies as possible and rack up as much points as you can before the timer runs out. The game demonstrates the usage of some of JavaScript's advance features. These features include:

1. JavaScript's prototypal object based to make the creation of multiple games objects easier. It allows for the addition of custom properties and methods to all instances of an object. Think of it as cloning.
2. We used Request Animation Frame method which instructs the browser that an animation is going to be performed and to schedule a redrawing of the window for the next frame in the animation. This method pauses the canvas activity when the tab or window it is running in is not selected. This saves CPU cycles and in turn, battery life (even if minimal on a PC, would have more impact on a mobile device) as the canvas is not constantly being redrawn when it is not in active use.

Transcribing Trinidad and Tobago Sign Language

Ritesh Sahadeo

This final year project for Electrical and Computer Engineering at the University of the West Indies investigates the use of appearance based features for signer-independent, vision-based, isolated and continuous sign language recognition. It focuses on a non-tracking method by using the template matching of motion history images for the recognition of isolated signs then applying this to the segmentation of a continuous sentence using a level building algorithm. More focus was placed on comparing three different methods for template matching in order to select one for use in the recognition stage. The selected method was successful in attaining over seventy percent recognition rate for more than seventy-five percent of all signs in the selected vocabulary while proving to be fairly signer independent with the use of just three trainers.

COPS - Collaborative Online Problem Solving

Eshwar Bachu – Presenter Edward Ramkissoon

COPS in an online multiplayer game aimed at improving the problem solving ability of novice programmers by requiring them to collaboratively build program flowcharts. Through the use of flowcharts, COPS helps build the cognitive and metacognitive skills which novice programmers require. COPS aims to coordinate and guide the learning process by providing text and visual feedback, provide motivation, promote positive interdependence between learners and encourage argumentative discussion and analytical reasoning.

PascAL Builder

Eshwar Bachu and Edward Ramkissoon

PascAL Builder is a single player game aimed at enhancing Pascal programming fluency. The focus of PascAL Builder is on building program comprehension rather than program generation and enhancing programming fluency rather than programming literacy. Throughout PascAL Builder, students are required to quickly read and understand Pascal code snippets. To win the game, students have to play certain steps repeatedly and with time constraints. This repetitiveness reinforces learning and helps the student to become more fluent with Pascal programming.

Improving the Efficiency of Encoding - Steganography

Andrew Rudder

An application that implements existing techniques used in the spatial and compressed domain of digital watermarking and steganography. It also implements new techniques and improvements in both of these domains. It is used as a launch pad for testing new algorithms and to compare them against existing techniques.

Product Report Tracker – INFO 2415 Database Project

The Product Report Tracker is a database application that was designed based on the production cycle of the Bermudez Biscuit Company. The application records and generates reports of the daily production of a particular product or several products. In addition, it also records information such as the formula use to create each product, the raw materials involved in creating each formula, the ordering of the raw materials, and the suppliers who are associated with the orders.

Members of the Panel

Nigel Chinapoo

Chairman, e-Business committee of Trinidad & Tobago Chamber of Industry and Commerce

Nigel is a Director of Rolley Holdings, a local financial and information communication technology consulting firm, and has held positions with a number of local and regional ICT and financial service companies. Nigel is a graduate of the University of the West Indies with a BSc. in Economics/Mathematics and is a Fellow of the Association of Chartered Certified Accountants (F.C.C.A.) and chair of the Trinidad Chamber of Industry and Commerce E-BITT committee.

Dr. Wayne Goodridge

Lecturer, Computer Science

Dr. Permanand Mohan

Senior Lecturer, Computer Science

Ms. Joanna Rostant

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