

**SCHOOL OF COMPUTER SCIENCE AND ELECTRONIC
ENGINEERING**

FINAL YEAR PROJECT OPEN DAY

**Project Abstracts
Monday 20 March 2017**

Presentations will take place in various laboratories throughout the School.
The abstracts are listed by laboratory and poster number.

School of Computer Science and Electronic Engineering
University of Essex
Colchester Campus
Wivenhoe Park
Colchester
ESSEX CO4 3SQ

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Human Adaptive Manipulation of a Baxter Robot

Name: Abiye Danagogo
Degree course: Electronic Eng (3 Yr)
Supervisor: Huosheng Hu

Abstract.

This project aims to create a more natural and easy way for human machine interaction between the user and the Baxter robot, namely human adaptive manipulation. A 3D visual sensor, Kinect, is used to replace manual control systems like keyboards or controllers. The gestures from the user are tracked with the Kinect sensor using the "Skeleton Tracking" technique, which tracks the position of the user's joints in the 3D Cartesian coordinate system. The skeleton tracking is done by the use of the libraries "skeleton_markers" and "OpenNI" for ROS Indigo. The OpenNI library is an open source library for 3D sensor applications, while the skeleton_markers library is a library that is able to publish a list of joint markers for viewing. From the published joints, the positions in the 3D Cartesian coordinate system is obtained and then the joints in the arm i.e. (shoulder, elbow and wrist) are published to the program that controls the arm motion of the Baxter robot. The angles in radians between each of the joints is calculated using the trigonometric functions, the resulting angles are then used to set the position of the Baxter robot.

Virtual Reality: Better Pilot Game and How to Mitigate Motion Sickness

Name: Gulam Zulmie
Degree course: Computer Science (3 Yr)
Supervisor: John Woods

Abstract.

Virtual reality (VR) has sparked the technology world in modern times as one considered to have significant impacts on human/computer interaction. VR systems simulate a physical world by use of 3-dimensional (3D) virtual objects and real world attributes. The purpose of VR builds is to separate users from the real world and direct their senses to believe in the virtual world without the immersion of physical objects in the real world. Motion sickness is a key issue and is often experienced by users that indulge in VR systems for long periods of time. Motion sickness has existed for as long as human transportation has and can occur without physical motion of the subject. This work examines the effects of motion sickness in a 3D game. In this work, we develop a flight-based game, named Better Pilot, for the Oculus Rift using C# and Unity to investigate ways in which motion sickness can be mitigated within 3D games.

Robotcup@Home

Name: Thomas Harris
Degree course: Computer Sys Eng (3 Yr)
Supervisor: Hani Hagras

Abstract.

My project involved designing and building a robot in order to assist an elderly person in their everyday life. This would include a variety of tasks, including collecting their medicine at the right time and getting help at their request in the form of a SMS message to a phone number (or numbers). The robot is fully autonomous and uses two DC motors to move about, uses voice recognition to have natural interaction between human and robot and has a camera which can recognise different objects using two colours next to each other as a colour signature. My robot will be in the robot arena waiting to demonstrate what it can do.

iFridge

Name: Ayomide Sonuga
Degree course: Electronic Eng (3 Yr)
Supervisor: Vishwanathan Mohan

Abstract.

The exponential growth of technology during the past decades and its implications on our everyday lives has led to a mass demand for information and convenience. It is this demand for information and convenience which drives the development of smart appliances. The Intelligent Fridge is capable of tracking its contents through the use of RFID (Radio Frequency Identification) tags. This information will then be stored and processed to provide beneficial applications for the user. The Intelligent Fridge will allow its user to be able to view its contents online, warn the user of products with upcoming expiration dates to avoid wasting food and even help users create their next grocery shopping list based on what they usually buy. All this features will provide users with a convenient way of planning and managing their groceries

CYOA Tool and Game

Name: Leantro Aristidou
Degree course: Computer Science (3 Yr)
Supervisor: Richard Bartle

Abstract.

The StoryCreator is a Choose-Your-Own-Adventure authoring tool. Authors have the ability not only to write their stories and games but also the ability to format the output of the

game in a form that it is playable to the user. Hence the tool constitutes a medium that facilitates the creation of a Choose-Your-Own-Adventure game. In addition to that the tool provides assistance to the author on tracking which blocks of the story have been written and which blocks have been referenced but not written. The game that was created using StoryCreator is about a detective receiving a mysterious call mentioning a dead body. Deciding to investigate it further, he finds himself caught in a game of corruption.

Energy Hero

Name:	Michael Ababio
Degree course:	Computer Science (3 Yr)
Supervisor:	David Bebbington

Abstract.

Energy prices in the U.K are reaching an all time high with no signs of going back. Britain's biggest energy suppliers are very likely to raise the current prices. In addition the current economic climate means saving money is now on everyone's mind. This is why Energy Hero is the ideal application to help you manage and maintain your energy consumption at home. Energy Hero works by using a Zigbee enabled plug adapter connected to your appliance, the Zigbee then communicates with an Arduino connected to a wireless access point. Energy Hero accesses the data through the wireless access point (via WIFI) and presents you with live information about the energy being used. Energy Hero also calculates the running cost of the appliance and estimates your carbon foot print based on the information received. All of this information is stored for reflection allowing you to keep track of your energy consumption. Energy Hero is also the perfect application to keep up with the latest energy news and is also packed with helpful information on how to keep costs down on your energy bills. Becoming environmentally conscience has never been easier!

An Algebra Training Game

Name:	Ugne Aleknaviciute
Degree course:	Computer Science (3 Yr)
Supervisor:	Arsenia Chorti

Abstract.

Automatic Home Automation

Name: Jumah Alkaabi
Degree course: Electronic Eng (3 Yr)
Supervisor: Dr. Martin Reed

Abstract.

The aim of this poster is to present the “Automatic Home Automation” project. This project presents the integration of hardware devices with software and networking protocols in a low cost and lightweight product that could be implemented in a home automation. IoT expansion in home automation has brought innovation in hardware, software and networking. The new market requires low cost technology with fast response and user friendly applications. “Automatic Home Automation” integrates in a number of components into a product, using the latest technologies. The RIOT OS is utilised as it is capable of running on a low power Nucleo board, providing real time response and low energy consumption. The Docker platform makes development easier by providing the full RIOT development as provided by RIOT. The CoAP protocol makes the use of IPv6 network addressing and allows easy communication between the clients (sensors and user application) and the server (implemented on the Nucleo board to harvest sensor data and respond to user requests). An Android application provides a user-friendly interface to interact with the system at a very low cost. Advanced Wi-Fi technologies (smart wall plugs and bulbs) are embedded into the system improving the efficiency, aesthetics and safety of the users. The poster presents the architecture and the layout of the software integration. A web server is implemented on the NUCLEO board, powered via PoE. IPv6 protocol is used for the communication between the board (server) and the Laptop with a Linux OS (client) and RIOT OS running. HTTP protocol is used for the communication between the router and the smart bulb and plug. The Android application (client) is using CoAP for Java to communicate with the NUCLEO board. A detailed design of the Android application is presented. The application consists of four windows. The main window is displayed on the application opening and initiates the communication with the server via a IPv6 address. The main window presents three buttons that redirect to the Manual control page of the system, Automatic control and the Statistics page showing the state of the sensors used. For data collection within a home four main sensors are used: temperature sensor to be able to control the heating and the cooling, LDR sensor for automatic light control of a room, motion and camera sensors for security implementation. The poster shows details on project architecture and technology implementation. Latest results and shown and explained. Main challenges on IoT, RIOT, CoAP and system integration are discussed in the poster. Key words: IoT, RIOT, Docker platform, Automatic Home Automation, Android App, CoAP Protocol.

Non-Emergency Medical Transportation Web Application

Name: Leonidas Antoniou
Degree course: Computer Science (3 Yr)
Supervisor: Ersi Chorti

Abstract.

The Non-Emergency Medical Transportation Web Application is aimed towards Non-Emergency medical Transportation businesses. It allows for the managing of the business's assets, personnel and customers by creating a secure database to hold all this information. The main aspect of the program is that it has a simple and intuitive User Interface. To access the program, the user must first log in as a user or an admin. The user is allowed to add new customers, book appointments, check the customer's details and for active or past appointments with them. Moreover, the user will be able to see the details of the personnel and also which personnel is available for dispatch. Also, the business's vehicles details. The admin on the other hand will be able to do all of the above but also delete customers, add and remove personnel and vehicles. All the information are stored in the database which is located on a dedicated server. The Web Application installation is easy and minimal and requires very low system requirements. The Web Application is not yet in its final stage, as it still needs some improvement and addition of some extra features. The additional features will include a printable form of the patients, personnel and fleet details. Also a printable form of past and future appointments. Moreover, the ability to create logs with the user that logged in and the time that they used the system.

Network Vulnerability Analysis

Name: Alfonso Arroyo Gutierrez
Degree course: Computer Networks (3 Yr)
Supervisor: Dr. Martin Reed

Abstract.

Vulnerability analysis is frequently used to maintain the infrastructure of a network to ensure it is secure and stable. However, the output provided by vulnerability scanners may contain so much information that it might not be practical to handle, therefore testers generally write specific software to filter the results and organise the information onto something more meaningful. In this project we are applying the theory into an exercise that try to be close to the industry. After performing an evaluation with the commercial vulnerability scanner software "Nessus", over a controlled environment (a penetration testing laboratory of virtual machines), the information items are processed using two software tools designed for this project. The first tool is a filter that purges vulnerabilities according to their levels of risk, it is designed as a command line Linux application so it can be easily automatised as part of a script. The second tool is a graphical application that helps

the tester to evaluate the network, add information collected by other means (for example, human engineering) and help them produce a reduced meaningful report. Both applications are designed to be executed by a trained user at a penetration tester level.

Fpga Arcade Game Machine

Name: Charles Ballardini
Degree course: Electronic Eng (4Yr)(Iya)
Supervisor: Stephen Sangwine

Abstract.

The FPGA Arcade Machine is a digital systems electronics project. The aim of this project was to implement two classic arcade games (Pong and frogger) using VHDL (VHSIC Hardware Description Language) for VGA output. The hardware used to implement this is the Digilent Basys 3 Artix-7 FPGA Trainer Board. At its core, this board contains an integrated circuit called an FPGA (Field Programmable Gate array) where the digital circuit modelling the two games will eventually be built. In order to implement this, the games are first coded in VHDL on the Xilinx Vivado design suite, then once the designs are ready, they are synthesised, then implemented, and then finally downloaded onto the Basys 3 board via a bit stream through a USB cable. Video output is displayed on a monitor via a direct VGA (Video Graphics Array) connection between the Basys 3 board and the monitor. This outputs timing signals defined by a VGA controller (open source code supplied by Digilent) and 12-bit RGB signals. Pong involves two players, in this case a user and an NPC. The aim for the user is to take control of the bat and deflect the moving ball into the opponent's goal while defending their own goal. Each score increments by one and the first to 10 points wins. Frogger involves one player; the user. The aim here is to control a playable frog character in step by step 'hops' to avoid oncoming obstacles (cars) while moving towards the safe area (goal). Once the safe area is reached the players score is increased.

Speaker-Independent Audio-Linguistic Sentiment Analysis

Name: Ryan Byrne
Degree course: Computer Science (3 Yr)
Supervisor: Vishwanathan Mohan

Abstract.

Sentiment analysis is the process of categorizing opinions expressed. This area of research has been used in to find emotion in text, audio, images and video. This research has been boosted by developments in natural language and artificial intelligence techniques and has become an important area of research. This project, proposes a method of multimodal sentiment analysis of speaker-independent spoken words through a microphone making use of textual & audio modalities extracting key features to perform sentiment analysis. The

results from both modalities are combined using decision level fusion providing a prediction of the speaker's sentiment. The idea behind this is a way to achieve higher accuracy in sentiment analysis by making use of two modalities instead of one.

CYOA Tool and Game

Name: Hansong Chen
Degree course: Computer Science (3 Yr)
Supervisor: Richard Bartle

Abstract.

CYOA stands for 'Choose Your Own Adventure'. The reader or the player makes their own decisions based on their current knowledge and personal preferences, which ultimately affect the plot and the ending. The story is usually told in a second person view point. The aim of this project is to design and implement a Cyoa Game Writing Tool, which allows Writers or Game Designers to focus on the story writing, rather than node/branching management. The Cyoa tool has a user-friendly interface, each node is a clickable button, which allows the user to edit the content of that node. The user can add up to 5 options for each node, and beside each option is a check box for guard, which when ticked, the option will not be shown in the game if the player has already chosen that option. A Cyoa game was also developed using this tool, to demonstrate how the tool works. The tool is developed in java. Cyoa tool and game as can be seen from the above image, there are 105 node button, when clicked, the contents of that node will be loaded or if there are no content, an empty form will be loaded. There is a save and load button, allowing the user the save or load their project at any time, and the project will be saved into a csv file. On the left is an example of the output html webpage by the tool. The guard function was implemented using cookies, it records every node that the player visited, and if one option is guarded, then hide that option if the player has visited that destination node before. When the player restart the game, the cookies will be cleared.

Multiplayer Draughts for Android

Name: Matthew Horrigan
Degree course: Computer Science (3 Yr)
Supervisor: Michael Sanderson

Abstract.

The project involved creating a game of draughts on Android, that can be played simultaneously on two opposing Android devices connected using a web server hosted on a third device. The server was written in Java and uses a TCP socket network to connect multiple users together to play against each other at the click of a button. Users only have

to launch the Android application, it will automatically connect to the server, and then they only need to click one button to start searching for an opponent, when one is found the server will connect the two in their own 'room' and allow them to play a game of draughts against one another, if anyone closes the application or disconnects then they will forfeit the match. Both the client and server verify moves before they are placed, preventing any form of cheating from either user by using modified clients. All data sent to and from the server and clients are encrypted to prevent any leaking of user information (A future aspect where users will have an account and a record of previous games, implemented using a SQL database)

Olympia Wafula Foundation: Android Application

Name:	Mihenea Negoescu
Degree course:	Computer Science (3 Yr)
Supervisor:	Dr. Ian Daly

Abstract.

The Olympia-Wafula Foundation has a dedicated team of people working hard to raise money and support for people in need. To this end, an Android Application is to be developed in order to complement the already existing website. The Application will serve mainly as a chat platform, a news feed reader and event organizer. Users will be able to login/register as well as manage and customize their experience. Many other features are to be implemented. The design of the application is very important. The color schemes, fonts and user interfaces have been carefully chosen and implemented in order to find the right balance between "good looking" and "user friendly". Keep in mind this is an application which will launch on Google Play Store starting April. Some of the key aspects of the actual implementation include: the use of Android Studio, Java, XML, Firebase. The application will run on any Android machine using 5.0 Lollipop or any later version. During the Open Day Event I will showcase the Application in a simulator as well as on a mobile phone so feel free to stop by and try it out yourself!

Secure Delivery of Cached Content Via the Web

Name:	Blake Garwood
Degree course:	Computer Science (3 Yr)
Supervisor:	Nikolaos Thomos

Abstract.

This project investigates approaches which can be taken when attempting to deliver cached content securely via the web. In the ever-evolving world of computer networking, many trends come and go in an attempt to make our internet communications faster, more secure and more reliable. The two trends which are intrinsic with this project are; the use of

a proxy-cache within a network to reduce traffic loads on an origin server, and the reliance on secure protocols such as Transport Layer Security (TLS) for end-to-end encrypted delivery of content, which when implemented correctly, provides encryption, authentication, and data integrity. Given a small amount of information, it can be seen that the fundamentals of these two trends clash. Caching content requires an intermediary device between a client and a server, unlike TLS which prevents intermediary devices from having an effect. A proxy-cache forwards HTTP requests from the client to the web-server, storing the responses for use if the same request is sent on another occasion. TLS makes use of public-key cryptography to ensure the only device that can decrypt data is the web-server that the data is destined for, meaning a proxy-server (or any intermediary devices) can never understand the encrypted requests. The project looks at two approaches that can allow implementation of both a proxy-cache and Transport Layer Security. The project requires the creation of a testbed system which includes three virtual machines; a web-server, a proxy-server and client. The virtual client will aim to stream video content from the web-server, each approach will be monitored to analyse their impact on performance and security.

Reduction of Noise on a Temperature Control Circuit

Name: Celia Rodriguez Martinez
Degree course: Electronic Eng (3 Yr)
Supervisor: Huosheng Hu

Abstract.

This project is an industry-oriented project and aims to reduce noise on a temperature control circuit board that was originally designed by the company Poulten, Selfe & Lee Ltd. The circuit board contains a 4-wire Resistance Temperature Detector (RTD), an Analogue to Digital Converter (ADC), memory elements and headers that connect it to the microcontroller board. The project is mainly focused on the noise reduction and improve the overall performance of the board. Until now, the project work has been concentrated on the connections between the RTD and ADC, with a goal to achieve an accuracy of $\pm 0.001^{\circ}\text{C}$ by the end of the project. The circuit board design has gone through 3 revisions and the third revision has achieved an accuracy of $\pm 0.003^{\circ}\text{C}$ from the previous accuracy of $\pm 0.01^{\circ}\text{C}$, which is a significant improvement when it comes to high precision measurements.

Optimum Clouds Network

Name: Jasim Alobaidli
Degree course: Comms Engineering (3 Yr)
Supervisor: Dr. Martin Reed

Abstract.

The software is named "OPTIMUM CLOUDS NETWORK", and it is a graphical user interface

(desktop application) that portrays the idea of cloud interconnectivity in a very simple way. It basically shows how clouds can communicate with each other within a network and how different algorithms can lead to different results in terms of weight, capacity and traffic movement. Nevertheless, this software does not deal with actual clouds in an actual network, but rather uses random graphs with different nodes that are given the exact properties of a cloud. This is because the aim is to find the effect of the different algorithms and not to review the performance of real clouds. Moreover, this software generates random graphs from networkx with random nodes and then calculates the weight and the capacity between a sink node and a target node. This software also provides the user the ability to select the starting and ending node along with three algorithms that are used here. The three algorithms that are used here are the Shortest Path, the Critical Path and the Maximum Flow algorithm. The Shortest Path algorithm depends on sending the traffic through the shortest route between the starting node to the target node, regardless of the traffic and the properties of the nodes of the network. Whereas the Critical Path algorithm is based on finding the route with the least congestion between the initial node and the final node. Whilst the Maximum Flow algorithm depends on flooding every path between the starting and finishing node with traffic until it reaches its destination. Further, the result is shown in a graph that is generated according to the options that the user selects in the beginning (start node, end node and algorithm). To conclude, the Shortest Path and Critical Path both depend on the weight of the edges, whereas the Maximum Flow calculates the capacity of the edges between the sink and target node.

A Physiologically Inspired Artificial Neural Network for Character Recognition

Name:	Nadia Baptiste
Degree course:	Computer Science (4Yr)(I)
Supervisor:	Francisco Sepulveda

Abstract.

Optical character recognition (OCR) has rapidly increased in use throughout the years. Many tasks that were previously, tedious or not even possible have become quicker, easier and possible using OCR systems. As a result of this increase in use, the demand for OCR systems to recognise characters with a high degree of accuracy has also increased. Human beings are able to recognise characters accurately and are able to recognise different versions of handwritten characters effectively by generalising characters he or she has already seen, even when characters are partially obscured by noise. OCR systems are not as smart. Unlike humans, OCR systems often struggle to recognise handwriting varying from person to person and struggles even further when faced with noise. This project uses a supervised Multilayer Perceptron (MLP) neural network modelling the visual system to investigate and demonstrate the struggle OCR systems face in recognising characters in challenging

situations. The network consists of three layers: an input layer representing the retina, a hidden layer representing the Lateral Geniculate Nucleus (LGN) and Visual Cortex and an output layer representing an associative layer in the brain. Currently the accuracy results of the MLPs ability to recognise images with text, handwriting and characters containing noise have been gathered. An unsupervised Self Organising Map (SOM) is now being used to cluster images and its accuracy compared to the MLP is being analysed. Further research to this project will include if a combination of supervised and unsupervised networks will improve or hinder recognition accuracy.

Investigating HCI Principles in an Agile Environment

Name: Thomas Wan
Degree course: Computer Science (4Yr)(I)
Supervisor: Anthony Vickers

Abstract.

Has anyone ever told you that functionality is more important than form-factor? How many times have you heard a programmer or engineer say under their breathe "well, as long as it works"? If that's an all too familiar concept to you (especially if you're in the business of creating applications for the lowest common denominator) then you may find what I have on offer intriguing. In my project I have analysed concepts found in HCI (Human Computer Interfaces) that directly deal with issues to do with usability, UX (User eXperience) and good form. The website I created essentially acted as a test harness for me to experiment with, in order to ascertain which HCI principles would be most applicable to use on a web application. Additionally, I used several different HCI testing mechanisms to garner which method would be the most repeatable in a corporate setting, in order to encourage more corporations to adopt these methods for their applications and products. HCI and UX is an wide, varied and often loosely catalogued subject matter. However, through this project I'd like to put all these findings together in one place, so that others may share HCI and UX principles and use them for their projects and work too. If you're interested, feel free to come by.

Cloud Interconnectivity

Name: Charles Bos
Degree course: Computer Sys Eng (3 Yr)
Supervisor: Nikolaos Thomos

Abstract.

Software defined networks, once an academic curiosity, are rapidly growing in importance in the commercial sphere. This is particularly true in the realm of cloud computing where the traditional network model is struggling to keep pace with increased demand on network

infrastructure and new trends in network usage. In the traditional network model, switched networks are interconnected with routers and decisions about where to send traffic are made by the routers, with the decisions being based primarily on the packet source and destination IP addresses. This model is becoming increasingly outdated in today's world. Businesses and institutions are increasingly moving away from maintaining their own IT infrastructure in-house and are resorting to renting resources from cloud providers. Thus, much traffic that might once have flowed over an organisations' internal network is increasingly being carried over public infrastructure. This trend has a number of implications. For the cloud provider, the primary issue is that of load and how to manage it. If multiple organisations make use of a provider's infrastructure then that provider's border routers could potentially become overwhelmed. Software defined networking is an alternative network architecture that can help overcome these problems. In a software defined network, control over where packets are sent in a network is logically centralised and handled in software. This means that networks can be easier to manage and it also increases network scalability. SDN also introduces the concept of flow based networking – an approach to networking that allows traffic to be categorised dynamically and flexibly. Traffic can be organised into logical groupings known as flows – the criteria for what constitutes a flow is broad and is ultimately limited only by the forwarding hardware – which can be blocked or forwarded by the forwarding hardware. This allows for much more fine grained traffic management than would be possible under the traditional network architecture. For all the benefits of SDN, some of its implementations do suffer from the drawback of only being able to add flow rules to switch flow tables in a reactive fashion, meaning that they have to wait until a new type of traffic is encountered before a rule can be added to the switch flow table. This project explores the possibility of being able to edit the flow table of a flow switch directly, bypassing the central SDN controller, meaning that a network administrator can add flow rules to deal with as yet unseen types of network traffic.

Weather Classification Using Convolutional Neural Networks

Name:	Andrei Ilie
Degree course:	Computer Science (4 Yr)
Supervisor:	Dr. Klaus Mcdonald-Maier &

Abstract.

The constant state of change in the environment is an important factor that impacts our day to day lives. What one would consider a conversational piece, a simple question such as "how is the weather?", poses far more difficult complications when it comes to accurately determining the correct answer. Modern systems on which we rely for weather prediction, such as satellite data and statistical modelling provide an accurate estimate with the downfall of being expensive in both, the financial department and computational costs. By exploiting the large pool of visual information that can be gathered from photographic

devices and applying the practices of computer vision onto a categorised dataset of images depicting a variety of weather scenarios (sunny, cloudy, rainy, snowy, etc.), a classification model can be trained to accurately and efficiently determine if a single image can be sorted into one of the classes used for training. This particular classification task is relatively difficult to solve using linear modelling techniques that use a set feature vector composed from weighted parameters that take into account image luminosity, saturation, hue, shadows or any other desired combination of image properties. The approach taken in this project makes use of the latest trend in state-of-the-art classifiers, convolutional neural networks (CNNs). A series of CNNs is used to determine which combination of layer structure is most suitable and produces the highest average precision given a dataset for training and testing on the task of weather classification. Acknowledgments: I would like to thank Mr. Grigorios Kalliatakis for his assistance in setting up the infrastructure for CNN integration and I would also like to thank my supervisors for their initial literature review recommendations and their ongoing feedback on the development of the project.

Collaborative Whiteboard Website

Name:	Matthew Bibby
Degree course:	Computer Science (4Yr)(Iya)
Supervisor:	Huosheng Hu

Abstract.

Students, Professionals, and creative groups often need to work together and share ideas. Sometimes it is not possible for these people to collaborate effectively due to constraints such as geographical distance, or lack of space. This project aims to create a shared whiteboard space that allows users to work together collaboratively no matter where they are. The shared whiteboard provides multi-users with access to an internet browser and a connection. This system has been created by using a number of web technologies that allow collaborative work on a HTML5 canvas. These technologies include regular HTML and JavaScript as well as interesting technologies such as TogetherJS which provides the ability to broadcast messages to users over the internet. The collaboration takes the form of a number of tools such as the ability to draw, insert text, and chat to other users. This system will allow many groups to work together, interact with a collaborative canvas, and see each others work in real-time.

Fantasy Graphics Using OpenGL

Name: Azeez Awotunde
Degree course: Computer Science (4Yr)(I)
Supervisor: Michael Fairbank

Abstract.

The purpose of the project is to develop an application which renders a 3D scene to the screen by implementing multiple techniques using the OpenGL Library. OpenGL is a graphics library which interacts with the graphics card. OpenGL is one of the main graphics libraries used in game engines such as Unity and Unreal. This project has allowed me to understand the fundamentals behind great engines like Unity and the techniques to create high quality visuals in an efficient way. The application will also make use of Shaders which are small programs that run on the graphics card which are used to add colour and shade the objects on the screen.

The project involves techniques such as per-pixel lighting where the lighting calculations for each pixel are done within the shaders. It contains mesh rendering which is the rendering of objects constructed from vertices and lines. The application involves texturing which is applying images on to the meshes. It contains water rendering which contains a combination of techniques, this is used to draw lakes and rivers. Alongside the water rendering, is the terrain rendering which draws a large terrain with applied texturing.

The application is written in Java and uses LWJGL 3 as an OpenGL wrapper. It also uses GLSL which is the shading language for OpenGL shaders.

Netengine Android Application

Name: Mehmet Ibili
Degree course: Computer Networks (3 Yr)
Supervisor: Anthony Vickers

Abstract.

Netengine – the perfect networking tool for both commercial and academic use. Packed with fundamental features to simplify networking. Netengine is built full of functionality used by network designers and students in their day-to-day work routine. It provides sub-netting, route summarization and prefix or netmask conversion instantly at anytime and anywhere; it can handle these tasks on the go – as the built-in character recognition makes it easier and quicker to subnet. You can rapidly and effortlessly retrieve the network range of a host device to conclusively define if your device remains within your given network configuration. Netengine also functions as a simple subnet calculator that takes the nuisance out of the many complexities involved with the ipv4 subnet system. The networking tool lets users either input addresses manually using the keyboard on their

phone and tablets or by taking a snapshot of their pre-defined addresses for a faster result. The network addresses can be uploaded as an image already existing on the device or by using the phone's camera. You can take a photo of numbers on a printed piece of paper, or by simply taking a picture of addresses on your computer screen; this would process the result immediately. This tool can be used by Network designers and students alike (who designs network infrastructure using simulations software to divide networks into smaller and more efficient subnets to meet host requirements), by using the VLSM (Variable length subnet mask) or a simple CIDR subnet for class A, B and C. Route summarization calculation – a method used to minimise the routing table in the routing entry. The method is used for faster lookup by removing endless routing entries on the router. The overhead for routing protocols is minimised and reduces the CPU workload significantly by using route summarization technique provided in the Netengine application.

Development and Investigation of Wavelength Tuneable Optical Transmitters for Telecommunication Networks

Name:	Changyou Gong
Degree course:	Electronic Eng (3 Yr)
Supervisor:	Dr. Nick Zakhleniuk

Abstract.

The modern optical-fibre multi-wavelength networks require transmitters operating at different wavelengths with high selection accuracy and stability. Instead of employing many fixed-wavelength transmitters, a wavelength tuneable laser diode (TLD) can provide a range of operating wavelengths. Not only for WDM network, but also for many other applications in telecommunications networks, the TLDs are very attractive light sources. They have great potential for further development in future. Currently, various TLDs are under development and investigation, the companies and laboratories are looking for a highly sophisticated TLDs that contain a good capacity of wider wavelength tuning and better temperature stability.

The purpose of this project is to develop and implement a computational model and investigate practical TLD design, quantum-well-based three-section distributed Bragg reflector (DBR) wavelength tuneable laser for telecommunication applications by using one of the most advanced commercial simulation software Crosslight PICS3D. We have designed a model TLD which emits at an important wavelength of $1.55\mu\text{m}$ which corresponds to a minimum attenuation in optical fibres. The main investigation results of the project include design of the laser layers, laser parameter analysis and optimisation, study of the light-current and current-voltage characteristics in each section, analysis of the laser gain spectra, the wavelength tuning performance, wave intensity distribution in the laser cavity, and some other properties. We demonstrate that the developed numerical model of the TLD

imitates very well the operation of the real-world laser and can be used for further development and optimisation of these devices using TCAD approach.

Text Mining for Sentiment Analysis from Twitter and Online Articles

Name: Nigel Burke
Degree course: Computer Science (3 Yr)
Supervisor: Dr Annie Louis

Abstract.

In today's dynamic world there is a vast amount of information from a range of sources that it can be difficult to keep on track on it, however this project should be able to change that by bringing it all to one place. Text mining for sentiment analysis from twitter and online articles involves the scraping of unstructured data from a variety of web sources and twitter for it to be normalized into structured format. This project should enable the user the ability to compare and contrast a variety of information sources that would otherwise be difficult to collect, compare and use under one interface. The project has the means to interpret this data in the form of a variety of graphical outputs that help make sense of the data. It also features a number of ways to compare the mined information by performing sentiment analysis on it providing the user with structured information.

Investigation of Layer-Specific Vulnerabilities and Ensuring Security in Computer Networks

Name: Marcus Van Sertima
Degree course: Computer Science (4Yr)(I)
Supervisor: Dr. Nick Zakhleniuk

Abstract.

The field of secure communication is a hot topic for both theoretical and applied communication research. This project is devoted to the investigation of network security at the physical level and protocols and software level. Furthermore, the investigation and analysis of various human-related psychological interactions with computer systems that negatively affect network security are carried out. The project is based on simulation of the real-world scenarios of network security cases using the PacketTracer software. In the first stage, investigation of security practices and protocols in software to ensure network security at the Application Layer was completed. The main result is that secure protocols should be used wherever possible to ensure that the required security targets/objectives are met in the data transmission. Unsecure protocols are vulnerable to a wide variety of attacks. It has been demonstrated that HTTP is unsecure and should not be the protocol of choice for secure communication between a client and a server. These results were later used when investigating security practices and protocols in software at the Transport,

Network and Network Access layers. In the second stage, experiments were carried out to investigate the effects of a Denial of Service attack on Internet of Everything (IoE) devices. The main result is that strict network security mechanisms should be in place to ensure availability of IoE devices and prevent such attacks. Throughout this project, key security vulnerabilities in computer networks have been identified and explained. Demonstration and comparative analysis follows regarding how these vulnerabilities can be addressed and mitigated. The suggested approaches and the obtained results can be utilised in investigating various security vulnerabilities and their mitigation in the real-world networks of various functionality and for a wide range of applications.

Text Summarisation System

Name:	Liam Dixon
Degree course:	Computer Networks (3 Yr)
Supervisor:	Dr Annie Louis

Abstract.

The project that I will be implementing is a text summarization system for the online Guardian Newspaper. The purpose and aim of this project is to provide users with informative feedback on the best comments that is related to the article. When users are searching and reviewing comments online, sometimes they may struggle to read a good review that will benefit their need. This is one of the main reasons why this system is being implemented, this program could serve useful to online comment sections such as the Guardian Newspaper as it could increase the amount of new user accounts based on beneficial comment reviews. The system will take a data set of 50 comments from an article and produce findings and results through various algorithms. The outcomes of the text summarization project will be to generate multiple friendly graphical user interfaces that cater for all users, from basic computer knowledge to expertise level. There will be error messages if a user makes a mistake whilst operating the system to ensure that the processes are carried out comfortably. The output will be the top 3 comments from that article, and also graphical interpretation such as bar charts. There will be two different bar charts; one of the charts will display how many of the 50 comments are in each cluster. A cluster is a group of comments that share a common topic. The second chart will display the top 10 words in the article and the frequency of each of these words. Users will be able to save both charts for further use, such as conducting their own analysis to produce reports.

Spoken Voice Interface for the Ispace

Name: Harrison Frith
Degree course: Computer Science (3 Yr)
Supervisor: Franciso Sepulveda

Abstract.

Outcome of the project is to have a functional natural language model of interactivity that is easily integrated with the iSpace - with the ability to issue a variety of commands in various ways, and be understood naturally, leveraging its application programming interface and the echo SDK. Another project outcome would be the ability to create, define and interpret data from iSpace sensors using a rule engine and form a 'brain' of the system, augmenting its overall capabilities. Demonstrating the potential of rule based logic and using graphical representations of rules will show the flexibility and power of such a system. The creation of an MQTT based generalised plugin for both OpenHAB and ESP8266s is also general progress and would allow a vast array of things to be created or upgraded to fit OpenHAB and subsequently the voice control - effectively providing a simple means of introducing new IoT devices using switches and other such means. It also provides an excellent demonstration platform on account of being able to use it to demonstrate the general rationale behind voice control and its potential applications - the plugin could be used to simply turn on and off a lightbulb, for instance - or as part of something more complicated.

A Path Planner for a UAV Quadrotor with Visual Capturing Abilities

Name: Liam Griffiths
Degree course: Computer Science (3 Yr)
Supervisor: Dongbing Gu

Abstract.

Drones have become a growing industry with their many applications that span across military and commercial sectors. Originally a drone's purpose was to perform reconnaissance missions for the military, but now, due to the better support and sophistication of the hardware and software, it has expanded to the commercial sector as well. These applications range from delivering packages to a consumer to using the drone for entertainment purposes.

A quadrotor is a drone with four horizontal motors. This allows more freedom of movement than a traditional fixed winged plane. The aim of this project is to create a path planner for a quadrotor UAV in order to capture images in a remote location using an Android application as an interface.

QR Code Generator

Name: Alexandros Hadjivarnava
Degree course: Computer Science (3 Yr)
Supervisor: Dr Vishanathan Mohan

Abstract.

The project is a user based website that generates QR codes and provides information for each QR code that is scanned. The application can generate various types of QR codes with different levels of correction levels. Different types of QR codes will provide the users more options to generate their preferred QR code as they are suitable for certain uses. Different levels of correction levels will provide the users options to choose how "scannable" each QR code is as QR codes have error correction capabilities to restore data if the code is dirty or damaged. The users can view and track the performance of each QR code that its generated and view by what devices the code has been scanned with what browser the link was opened with, when the code was created, in which country and the total times it has been scanned. The user will be able to distinguish how effective each QR code's campaign is as the application will include a trending QR code feature.

Real Time Strategy Java Game

Name: Mihai Fumarel
Degree course: Computer Games (3 Yr)
Supervisor: Dongbing Gu

Abstract.

My final year's project focuses on creating a video game of my choice and as such, I have chosen to develop a Real Time Strategy game. Shrouded in a fantasy theme, the game revolves around the conflict between two opposing factions over the control of settlements. The game is won when the player gains control over all the settlements on the map. The main goal of the project was to reduce the overwhelming complexity of RTS games and instead focus on strategic combat elements in order to promote RTS games to a larger audience. In order to achieve this, a number of changes have been made to the classic RTS paradigm. Firstly, the economy model has been changed - Instead of basing the game economy on multiple resource types, Wrath of Titans has a single currency type, gold. In contrast to the classic means of collecting resources, gold is gathered by sieging and holding control points scattered around the map. Secondly, the game does not involve building structures; instead, the player may choose one of the three unique bonuses that every control point type offers. Apart from generating gold, these may be assigned to fulfill several other functions, such as healing units within their area of effect or even looting and pillaging the settlement for an instant gold bonus. These changes allow the player to shift

his focus onto combat elements. More than 20 unit types have been implemented, each equipped with an unique mechanic (e.g. stunning all enemies within an area of effect upon delivering a killing blow, setting enemies on fire upon striking them, etc.). An adaptive Artificial Intelligence model has been implemented in order to create a truly challenging experience for the player. The AI controls what units are created, and where they are directed. The AI automatically adapts to the current state of the game and changes its strategy based on the performance of the player. There are two implemented game modes, a Skirmish mode where all units are available and maps are randomly generated by interpolating elements from different biome types(e.g. a randomly generated map may have elements from a tundra and a mountainous biome) and a Campaign mode that follows the storyline of fighting the hordes of invaders pillaging the protagonist's home lands.

Test-Harness for Mobile Application

Name:	Joshua Bloom
Degree course:	Computer Science (3 Yr)
Supervisor:	Ian Daly

Abstract.

My overall objective of this project, is to create a test harness for the development team at CloudFM. With the intentions of aiding the development of the application. The application under test is a mobile app developed using the Cordova framework. This makes the testing approach rather unique, as Cordova apps are built purely in the web view with HTML/CSS/JS. Thus when testing, one must approach the task in a different way to how one would approach a standard Android/iOS application. Firstly as the application is developed using web technologies, one must also begin writing tests using web technologies. However these technologies are focused towards traditional web apps, making the task quite sepcilized. One of the main testing techniques employed has been automation. Due to the asynchrnous nature of Cordova built applications, and the poor modularity of the application. Logical use-case testing is not possible, thus almost all of the functionality testing has been driven by automation. The automation is powered by Appium and Web-Selenium. Appium provides a free to use open source automaton service; that is both powerfull and highly versatile. CloudFM wanted the test scripts to be written in a familiar language, appium offers the ability to write automation tests using Node.js. Node.js has proved to be a perfect fit for this project, as it lends its self to the asynchrucity of the application and remains fimiliar to the javaScript written application. Upkeeping a level of consistency accros the development enviroment. Web-Selenium offers a powerfull driver with a bountyfull api, designed mainly for testing web applications, however had proved adaptable to testing Cordova built applications. Testing mobile applications is hard, one of the main issues is device fragmentation. This is when users have differening verions of operatign systems that must be accounted for. One of the issues this causes is pages being

displayed incorrectly. Caused by different versions of the webview and differing screen sizes. I attempted to implement a way to test against this issue using visual regression. Visual regression compares a screenshot taken of the application under test and compares it to a base case (a working example). Any divergence is highlighted, thus a page that is not correctly displayed will fail the test and developers can respond accordingly. I want to develop a fully integrated test environment, I have tried to achieve this by creating a GUI using Kivy. A Python framework used to generate lightweight crossplatform applications.

Spot the Difference Game for Android Devices

Name: Samuel Carslake
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Mike Sanderson

Abstract.

Spot the difference game for Android devices has been developed so that it can be used across several different devices that run different versions of the Android Operating System, this allows for the game to reach a very large target audience. The player is able to view global scores, by the use of a MySQL database, that have been obtained by other players. Scoring within the game is done by locating the differences between the images as well as completion time for each set of images, combining this with the psychological techniques creates a high-pressure game, which in turn increases the difficulty without the player manually selecting the difficulty. This version of spot the difference contains several different psychological techniques that are used to ensure that the player finds the game challenging. Some of the psychological techniques that have been employed in the game are the suppression of vision using intermittent white noise, some of the images that are used within the game are visual illusions which play on the player's short term memory causing them to forget the differences long-term enabling a higher level of replayability.

Sudoku Solver

Name: Ryan Stuart
Degree course: Computer Science (3 Yr)
Supervisor: Vishwanathan Mohan/Martin

Abstract.

The Sudoku puzzle is most recognisable as a 9x9 grid in which one has to fill in the numbers 1-9 such that they are present only once in each row, column and 3x3 box of the puzzle. There are also variants of the puzzle which include grids of different sizes, more constraints, different shape boxes, mathematical logic and even multiple interlocked grids. Sudoku can be approached with a brute force method of guessing numbers, but it is more usually tackled using techniques which can guide a user to the solution using logic. The difficulty of

these techniques varies, and some are only used by the most advanced solvers. The main goal of the project was to create a functional Sudoku solver using Backtracking and Constraint Matrix Logic. This was then further evolved to create a broad scope with features such as a hint system based upon the Human way of solving puzzles, the capability of solving different puzzle types and a trainer which is able to teach the user solving techniques to further their skill at solving puzzles. This all needed to be contained within a user-friendly GUI which gives users a valid graphical representation of the puzzle to work with.

A Knowledge-Based Question Answering System

Name: Thomas Broekman
Degree course: Computer Science (4Yr)(I)
Supervisor: Dr Daniel Karapetyan

Abstract.

A Question Answering (QA) System consists of Natural Language Processing and Information Retrieval techniques to produce an appropriate output to a question presented by a user. A Knowledge based-QA System derives this output from a Knowledge base. This project aims to design and implement a system for students at the University of Essex to pose any Natural Language course-related question into a GUI which can determine the appropriate answer type and output for the given query. The system was implemented in Java using various open-source libraries from the Stanford NLP group. The Knowledge base for this system is an extract of current live data used by the University, stored in a CSV file. The proposed system is able to process all relevant question types and perform subsequent processing operations to determine the users focus and produce the relevant answer type. This data is then passed to another Java class which is able to develop the question understanding, before returning relevant sections of a knowledge base of structured data to the GUI to be output.

Singing Tesla Coil

Name: Zijie Cheng
Degree course: Electronics (3 Yr)
Supervisor: John Woods

Abstract.

Project singing tesla coil is basically a hardware wireless power transmission design. A solid state Tesla coil (including drive circuit, primary coil, secondary coil and toroid) being built, the sparks can be seen at the edge of toroid when tesla coil works. Without any other power source, a fluorescent light tube could light as long as put the tube close to the coil. It can also be modified to produce musical tones by modulating the output power of sparks that would make an amazing visual and audio effect. I would like to express my gratitude to my

supervisor Dr John Woods, who gave me much useful advice and inspired me a lot of my project, and also great thanks to lab staff Mr Ian Dukes who helped me many times during the lab work.

Types of Tesla Coils and their Implementations

Name: Huseyn Hasanli
Degree course: Electronics (3 Yr)
Supervisor: John Woods

Abstract.

This project outlines the functionality of a Tesla Coil and describes two ways of creating a fully functioning Tesla Coil as well as ways of implementing them. Three circuits are presented, each uses a different build methodology with a variety of outcomes. For clearer comparison they will share same coil and input. The first circuit will have a simple design with short arks but the full functionality of a Tesla Coil. The second circuit uses more advanced components and design, producing small arks all the time. The third and final circuit is a more complex version of second circuit which can produce notes and play music from various devices through a 3.5mm audio jack used in smartphones, iPads and laptops.

Reusable Learning Objects Utilising Html5 and Javascript

Name: Oliver Daniel Holland
Degree course: Computer Science (4Yr)(I)
Supervisor: Mr. Keith Primrose

Abstract.

Until recently, Reusable Learning Objects (RLOs) available on the web have tended to use Adobe Flash to implement the content. This has obvious disadvantages. The goal of this project is to develop one or more RLOs utilising HTML5 and JavaScript. RLOs are an effective way of reinforcing concepts taught in a particular subject area. For this project, the chosen subject area was Data Structures & Algorithms. HTML has been around for a long time, traditionally thought of as a mark-up language requiring multiple plug-ins to accomplish graphical tasks. This has given programming web-applications bad press among programmers, who find the programming architecture limiting compared to other languages. However, with the introduction of HTML5, HTML is becoming more self-sufficient by including graphical utilities. I plan to show the new found power in web-based languages provided by the new standard, as well as integrating other core technologies such as CSS3, JavaScript and the Bootstrap Framework. This allows for an aesthetically pleasing yet fully-functional, responsive web design that can work across a multitude of devices. Users will be able to learn and test their knowledge in their own time, anywhere, quickly and easily.

Asynchronous Deep Learning with Online Bootstrapping

Name: Eduardo Machado E Silva
Degree course: Computer Science (3 Yr)
Supervisor: Spyros Samothrakis

Abstract.

The aim of this project is to improve on state of the art algorithms for reinforcement learning. Artificial neural networks can be used to solve simple control problems such as cart-pole and acrobot, or in the difficult side play Atari games with human or superhuman level performance. Reinforcement learning works by having an agent take actions in an environment, and receiving a reward signal back. Learning occurs by creating an algorithm that uses these reward signals to create a strategy to maximize total reward at the end of the episode. One of the distinctive features of this project is that unlike most algorithms, the neural network is playing and learning at the same time. Different from the norm where only after a playing episode is finished that the network weights are modified. Another feature is its asynchronous nature, with several threads running concurrently using the same network. This project used Google DeepMind's neural network architecture used to play Atari games as a base, and replaced the exploration strategy from epsilon greedy to bootstrapping. Due to the fact that neural networks have several hyper parameters to tune, and because small changes can lead to poor performance, the removal of hyper parameters is desirable. The replacement of epsilon-greedy with bootstrapping therefore is beneficial due to the simplification of the network.

FPGA Based Game Console

Name: Kamal Hassoun
Degree course: Computers W Elect (3 Yr)
Supervisor: Klaus D McDonald-Maier

Abstract.

The FPGA Based Game Console is mainly a design coded in VHDL that is meant specifically for 2D games, the design takes in several instruction codes that builds up the game and allow for any changes throughout the game. There are two games being built to work with this design, one a Pong game and the other an Asteroid game. Both start off by sending storing instructions to the design, which is then interpreted by the Control Unit and stores all the objects in internal registers. When any of the objects that are already stored need to be accessed or updated they will be loaded from their corresponding register. Different instructions take different time to execute, some can be executed in a single clock cycle and require only one operation whereas, some instructions require more than one operation to be completed for example a single pixel can be updated in one clock cycle however multiple

pixels can not be updated at one given time and so to update a whole object made of many pixels the Control Unit has to go through multiple clock cycles. Since the game that is running does not know of the state of the Control Unit, it will always send an instruction code when it needs to and since some instructions take a few clock cycles to be completed the Control Unit can store them in a queue of registers that is meant solely for the instructions, and the instructions placed in the queue can be placed differently depending on the priority of the instruction which the game specifies.

Simulator of Space Satellite Networks

Name:	Aishwarya Balan
Degree course:	Electronics (3 Yr)
Supervisor:	Prof. Stuart D. Walker

Abstract.

The project aims at simulation of space satellite networks and the modern uses of satellite systems. In recent times, Satellites have become a more trusted source for both communication and navigation and have numerous motives in general. The project uses MATLAB software to run the simulation. 3D graphics have been forged with the help of OpenGL tool that is readily available off MATLAB. The software architecture incorporated by the project comprises of MATLAB scripting, OpenGL, GUIs and UML structures. The following goals have been aimed to achieve: a. To run simulation of satellite networks that displays the geostationary orbit of the Earth. b. Calculating of satellite uplink and downlink. c. Performance analysis of satellites by using GUI in MATLAB. d. A detailed analysis involved in studying the satellite co-ordinates and the earth station. e. Realistic assumptions about power, location and dynamics is made use of in order to fabricate a 3D solid simulator for data throughput and hand over. There will be supporting tools arranged to provide the visitors with a clear over-view on what the project is about which comprises of a very interactive poster that has the MATLAB 3 dimensional visual-aid plotted alongside the software architecture described in detail. There will also be a presentation that provides a more detailed description of the space architecture. The software aspect will be demonstrated where-in, a sphere (earth) revolves in the dimensions that are assigned to it and elliptical rings are created that will suffice the needs as that of an orbital ring around the sphere. The transition path as covered by the satellite will be explained in detail with a world map brought to display on a 3 Dimensional scale using MATLAB.

Cloud Interconnectivity

Name: Mohamed Hejres
Degree course: Comms Engineering (3 Yr)
Supervisor: Dr. Martin Reed

Abstract.

To begin with, the main outcome of this project is to provide graphs and tables. However, the objective of these tables and graphs is advising the consumer to choose the best approach for the job allocation. As a software requirement, CloudSim must be used in order to deliver the Cloud Interconnectivity product. In general, CloudSim is considered to be a powerful tool for implementing cloud infrastructure and service. The developer can only use Java programming language if using CloudSim because the libraries contained within the CloudSim are written in Java. However, the most significant reason for delivering this project is to help the consumer avoid network trafficking errors. Today, many users make the wrong choices to allocate their network tasks. Therefore, allocations must be wisely used. In this case, the Cloud Interconnectivity project makes it simple to decide the appropriate allocation by supplying beneficial graphs with the accurate results. Therefore, there are approaches that will success in a particular network but fail in the other. In other words, each network has different size and bandwidth which means that a specific approach will not be useful in all types of networks. For example, the OSPF is beneficial in wide area networks but not in small area network. This software product is developed and designed using Java to calculate the probability of success for each approach to clarify the most successful approach. Technically, there are mathematical equations used in the code to follow the probability distribution to output the desired outcomes. Instead of the user calculating the best network path or approach manually, he/she could utilize the Cloud Interconnectivity product to determine the proper path or approach directly without any manual calculation. To conclude, this company is aiming to deliver this product to simplify the process of allocation decision to the customer.

Medical Transport (Non-Emergency)

Name: Peter Amos
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Ersi Chorti

Abstract.

The project is about the development of Medical Transport (Non Emergency). manage input data (stored and retrieve from the database) about patients, clients, drivers and staff. The clients can book, confirm and cancel trips. The driver will be able to start and close trips assigned. When trips are assigned, email notification is sent to clients and the driver for confirmation of trips. Staff can assign trips to drivers and allocate booking on behalf of

clients. Staff can also cancel trip for client and generate reports. The medical transport application effectively manages the schedule of trips and all the associated resources to complete a trip successfully. Administration is easy and can be handled on the move, and in real time from anywhere in the world. Using a responsive framework, the application renders very well on mobile devices, making administration, assignment and update of status of trips easy. LAB 1 (CSEE LAB112)

Age of Sail Ship Combat Game

Name: Daniel Beddingfield
Degree course: Computer Games (3 Yr)
Supervisor: Diego Perez Liebana

Abstract.

Come to Lab 1 to experience the finest in nautical, historical yet cartoonish combat games. Be prepared to command your very own sailing ship, armed to the teeth with 14 highly dangerous cannons that can turn your enemies into Swiss cheese at a moment's notice, and a set of sails that capture the power of the ever-changing power of the wind and would make a fighter pilot feel jealous. Watch out, however, as your enemies are in the same boat! These ruffians are some of the most dangerous pirates to ever roam the seven seas. Their cannons are just as deadly as yours, and fleeing is not an option thanks to their continuing persistence and the heavy storm raging around you. These ships can match you in a fight, or at least to begin with. Marvel as your continued experience grants you outlandish yet powerful new skills including the ability to drop flaming barrels of destruction, or to travel faster than your enemies can even process. This does not make you untouchable, however, as continued attacks against any ship weaken their ability to deal out damage, with the destruction of your cannons allowing you less firepower, and attacks against your sails weakening your movement speed. The same applies to the pirates, however, with strategic attacks dwindling their ability to fight back, and allowing you an easier victory. Want to experience this for yourself? Head on down to lab 1 for a playable demo of "Age of Sail Ship Combat Game" (working title)!

AI Enhanced E-Commerce Sales Channel Management System

Name: Simas Kairys
Degree course: Computer Science (3 Yr)
Supervisor: Professor John Gan

Abstract.

E-commerce is a booming industry which has been growing steadily. With growth comes variety - there are many different marketplaces available and each has its own strengths and weaknesses. This application has been developed to allow businesses to propagate their

product catalogue over multiple marketplaces with minimal effort. Automatized inventory management increases efficiency while analysation of statistical data gives valuable insights on the market tendencies. In addition, analysing the data gathered from the different sales channels, a tailored recommendation can be rendered and used for displaying specific, customer orientated suggestions. The main purpose of this product is to reduce an administrative burden caused by the increase of sales channels. By having centralized control in one application, the sales data can be evaluated more efficiently and more accurate observations could be made. For example, the products could be prioritized differently according to their performance. The whole system is built using Spring which is the most popular Java framework. By using this tool, a modular and easily changeable code base has been produced. The fault tolerance and scaling is an important aspect of the system as well. To distribute the workload evenly and redirect request from unresponsive servers, HA proxy load balancer is used and the database cluster is managed by Galera replication.

ICT for Electronic Health Records

Name:	Charlie Medina-Smith
Degree course:	Inform & Com Tech (3 Yr)
Supervisor:	Sam Steel

Abstract.

An Electronic Health Record (EHR) is a digitalized version of a patient health record or paper chart. This project will allow patient information to be available directly and securely to any patient or physician user that has authorized access to the data stored on the system. EHRs have been employed by several hospitals around the world including the USA, United Kingdom and Denmark. The main aim of this project is for this EHR system to be used as an online filing system to store patient health records. This will make it easier for both physicians and patients to keep track of medical information as it will be stored in a more organised fashion. The information is stored in a secure database which is then be displayed along with specific features as web pages. Physicians use this system to access, update and record all patient information in one area. This allows physicians to gain better insight into what is wrong with their patient and what they can do to help. Patients use this system at home or at work to keep track of their progress with regards to health as well as follow any instructions sent to them by their physician.

Security and Reliability Issues on the Internet of Things

Name: Tobenna Ozim
Degree course: Computer Science (3 Yr)
Supervisor: Prof. Stuart Walker

Abstract.

The Internet of Things (IoT) provides an infrastructure to interconnect devices/things of all kinds e.g cars, animals, tv's, doors etc. With this ability to be connected, these devices/things can be made to interact in numerous ways thereby giving room for different application opportunities. The proliferation and integration of the IoT into daily life and business has brought a lot of attention to it, both good and bad. This raises the question, "how secure and reliable is the Internet of Things?". Asking this question redirects the attention to the pertinent issues surrounding the security and reliability of the Internet of Things. In the light of the above, this project was embarked upon with the intention to explore and discuss these issues and also show scenarios where they are at play. Also, solutions to address these issues are also discussed in the report. In the course of this project, several network simulators were explored. The IoT simulation tool we found most suitable for this project work is the COOJA simulator due to its wide support for Internet of Things technologies, protocols, its graphical user interface and its ease of use. Cooja simulator ships with the CONTIKI open source Internet of Things operating system. The CONTIKI operating system was run on the VMWARE virtual machine in order to work with the simulator. IoT networks were simulated and we were able to show and study these issues. The results of these simulation were stored in log files that show every event in the lifetime of the networks simulated. In conclusion, more needs to be done as regards securing the Internet of Things. International standards must be created and complied to in order to ensure that IoT networks are highly secured and not easily attacked like they currently are. Also, security should not be taken as a last resort. It should be integrated in the development process of IoT artifacts.

Cloud Performance and Cost

Name: Khalifa Alhasan
Degree course: Comms Engineering (3 Yr)
Supervisor: Dr. Martin Reed

Abstract.

The core objective of this project was not only to throw light on the economic advantages of cloud over traditional systems but also to develop a business cloud model. In addition, it lends a helping hand to companies who are looking forward to either replace their existing systems or establish cloud computing and fully reap its benefits. First, a flow chart was developed, which represents decision-making when it comes to choosing the right cloud.

Further, the three types of cloud were distinguished, and in IAAS (Infrastructure as a Service) cloud, Private and Public Clouds were distinguished. The advantages and disadvantages of each cloud have been shown. As a result, this showed that one type of cloud is not better than the other rather it entirely depends on factors such as the company's size, spending power, and nature of business. Furthermore, even upon choosing the right type of cloud, there arises the utmost important factor, which is how cost savings can be achieved with the cloud. Several factors were identified and calculated, which affected the cost and performance of a cloud. In addition, equations have been developed to show the interplay among the variables and to mathematically conceptualize physical factors. Later, a graph was plotted with a feasible region, which can be used to calculate and find whether a cloud is feasible or not based on its location on the graph. In order to measure two unknown factors, installation time in private cloud and latency in public cloud, separate experiments for each were conducted. OpenStack was installed and configured to calculate the average time taken for this process. The OpenStack installation shall be replicated across 4 computers and by connecting them together, cloud interconnectivity is achieved. After that, the private cloud shall be then compared with Amazon public cloud in terms of cost and performance. Likewise, a basic PHP cloud storage application as well as a measuring method was developed to approximate latency. The results of these experiments achieved an important objective, which was to show the benefits of cloud over existing systems. The fact that a student could install OpenStack in just a matter of days shows the huge potential of cloud computing in business as not only does it save expenses but it also saves time. Cloud computing has revolutionized many facets of technology in the world, however there are still many businesses that are not fully confident about it. Finally, this project aims to educate not only the common man but also the businessman to make an informed decision of switching to the cloud.

Catalyst: A Task Management System

Name:	Harry Diep
Degree course:	Computer Science (3 Yr)
Supervisor:	Sam Steel

Abstract.

Task management is an idea which involves the management of an item that requires work to be undertaken in order to complete it. In the information age, software based task and project management systems have quickly become popular amongst those who wish to have a more structured approach to their work or even daily life.

The aim of this project was initially to produce a workflow system, however was later revised to be a task management system due to it being a more practical approach for the mainstream.

As a task management system, Catalyst aims to emulate and provide the main features of the leading task management systems available, providing a pleasing and satisfying user experience with management of standard tasks and projects. Users are able to intricately define their own tasks and projects, with the system then automatically tracking and updating the progress of the task as subtasks and milestones are completed.

Other main features of Catalyst includes a multi-user mode allowing multiple users to work together on the same project with tasks automatically allocated to each user, similar to a traditional workflow system. There is also password protection and encryption for greater security of data stored.

Capture of Digital Material from Mobile Devices

Name: Yasin Gonen
Degree course: Computer Science (3 Yr)
Supervisor: David Bebbington

Abstract.

Through the last few centuries digital media has been steadily on the rise as well as crimes committed through e-devices such as mobile phones, laptops, tablets and desktops. Granted this field of study is entirely new and systems are being developed everyday to tackle the problems of keeping data intact, this project aims to rectify these problems through simple means of creating a mobile application that both meets the demands of the legal requirements of data manipulation and the integrity of data being extrapolated. Cyperscope will be a forensic tool that will certainly achieve the results of keeping data intact and swiftly transferring data files from the targeted device to a secure desktop application where the evidence can be viewed. Modern applications like this product are becoming more appealing particularly due to the fact that the swift transference of material between one device to another can be done by the click of a button. to put it differently, this product aims to be a fast cheap alternative to different methods of data manipulation through forensic investigations in the 21st century.

Age of Sail Ship Combat Game

Name: Yiding Xu
Degree course: Computer Games (3 Yr)
Supervisor: Richard Bartle

Abstract.

this is a 2d turn base strategy ship combat game with the elements of the age of sail era. the code is written in java with the standard java8 class library, the GUI is created using java swing. the gameplay is fairly simple, player control a fleet with three ships move them

accordingly and fire the cannon from each side of the ship. all the valid action is indicated on the map, for instance, the green number shows the location you can move to with the cost of it. the basic sailing rule is applied to each ship, the ship cannot move backwards and will take some time to turn it around as the wind is the only power source. cannon shot fired from each side of your ship damaging a wild area according to its range, so be aware of your own ships within the range of fire. destroying opponent's fleet or reaching 15 rounds with most ships alive is the winning condition. the game engine is a coordinated hexagon grid. each hexagon will hold most of the game information for that location including the game objects, the coordination and the rendering. game objects for instance ship which contain the attribute of itself such as health, range, damage and most importantly the position and direction. direction plays a crucial part in this game as the player needs to be aware of ship's direction to maximise their movement, with better movement means better angle to shot without being shot at.

Network Coding, A Secure Approach

Name:	Bradley Young
Degree course:	Computer Science (3 Yr)
Supervisor:	Nikoloas Thomos

Abstract.

The project aim is to investigate ways of making conventional data networks more secure and efficient. This has involved investigating networking protocols, while also creating and maintaining an environment that we can test these protocols in. One such area that we have investigated is Network Coding. Network Coding utilises nodes in the network that linearly combine the source packets in a Galois field to improve throughput, enhance resiliency and decrease delay. The same concept has also been found useful when used for security purposes. One of the biggest benefits of Network Coding is that it has the potential to be almost unbreakable in many real-world situations, while applying very little overhead to the normal operation of the network. It uses a random function to encode the data, while the decoding is done on another part of the network without having to exchange the keys or passwords. This allows us to never send the keys to decode over our network. Key management of this kind is one of the biggest security problems of the current age. The environment we have created is a server-client environment that can be modified by ourselves. The intermediary connection between the client and server is also created by us using simulation programs to emulate nodes in the network. Having our own test network has allowed a depth of investigation otherwise not possible as we can adjust the conditions to how we see fit. This has enabled us to test forms of advanced network encryption and protocols. The potential for this technique to be applicable to real world networking is yet to be fully determined. We have verified that this technique has very real advantages over normal networking due to the improvements we have already specified. We have also

verified that this new method of encryption is compatible with current IP networking protocols, such as IPv4 and IPv6.

Fpga Based Microphone Phased Array

Name: Jakub Stano
Degree course: Electronic Eng (3 Yr)
Supervisor: Dr John Woods

Abstract.

Sound source localisation is a powerful addition to the sensory capabilities of devices, allowing for a "smarter" interaction with the user. For example, by tracking the origin of a query, a smart-assistant could send a response only in the source direction, instead of the whole room. Multiple microphones are spread out, so that the incoming sound will arrive at the individual microphones at different times. By leveraging the parallel nature of an FPGA along with high performance Analog to Digital converters, the delays between the microphones can be resolved in fine enough steps to allow direction identification. The result of the work is a compact, portable device, which performs all the necessary processing for direction detection and additionally renders the results in a user-friendly format. Integration with host systems is also possible, giving the ability to use the direction data in practical applications.

CYOA Tool and Game

Name: Bo Yang
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Diego Perez

Abstract.

Choose Your Own Adventure (CYOA) beings as a series of children's gamebooks where each story is written from a second person point of view, with the reader assuming the role of the protagonist and making choices that determine the main character's actions and the plot's outcome. The series was based upon a concept created by Edward Packard and originally published by Constance Cappel's and R.A. Montgomery's Vermont Crossroads press as the as the "Adventures of You" series, starting with Packard's Sugarcane Island in 1976. In comparison to ordinary stories, choose your own adventure contains different branching and a non-linear approach to story telling in which the player can arrive at an ending tailored specifically to them. The decisions made along the way plays an important role in arriving to the conclusion that produces an unique experience to all the players participating. The project goal includes a highly interactive and user-friendly choose-your-own-adventure game authoring tool in which nodes can be created with ease using the GUI provided and text can later be added as part of the story. The game file will be created

containing the story and can be played immediately. The key here is ease of use in which when reflected in the tool, does not require any programming skill to make use of the features available. Advanced features include guards (Preventing the nodes to be navigated backwards), save and loading operations and an alternative mode in which the created game can be tested. To add to the immersion when playing the game, the CYOA tool make use of the implementation of player interactivity in which a set of command can be used to interact with the world. These commands allows the player to pick up and store items as well as navigate to different directions within the game world.

Sphoxel

Name: Cristiana Andrade Pacheco
Degree course: Computer Games (3 Yr)
Supervisor: Richard Bartle

Abstract.

Sphoxel is a Unity game that consists of a built spherical voxel sandbox, meaning a voxel-based world where its voxels are displayed as spheres instead of the typical cubes. The application outputs a world made of spheres whose meshes are created through scripts instead of using Unity's own primitive spheres. These meshes are vertices and multiple triangle arrays that make up a large part of 3D worlds in game engines and, for this project, the game outputs spheres by creating octahedrons meshes, dividing each face into smaller triangles and finally apply a radius to each vertex. A group of spheres make up a 'chunk' which is a game object positioned by the application that holds information on all its spheres locations and rendering techniques. To create a 'natural' looking world the positions are defined using Simplex Noise which is an adaptation of Perlin Noise for over two dimensions. This is a powerful algorithm usually used for procedural generation in games.

Collaborative White Board Web Application

Name: Alexandru Pinca
Degree course: Computer Science (3 Yr)
Supervisor: David Bebbington

Abstract.

In this project, I have set out to research and identify the current consumer market implementations of collaborative whiteboard solutions and to identify their problems. From this information, I have developed a web application attempting to fix the current issues. The main goals were to produce a better alternative to the current implementation of collaborative whiteboards in the consumer market.

Create Your Own Video Game

Name: Laurynas Pupsta
Degree course: Computer Games (3 Yr)
Supervisor: Edward Tsang

Abstract.

:Games are becoming more popular and their influence on people have risen over the years so I chose to create a game for my Final Year Project. My focus was to create a 2D game with the Unity Game Engine where a player controls a procedurally generated asteroid that is falling to a planet to destroy it. This game is a top-down scroll game where a player controls an asteroid and the goal is to destroy planets with alien life and forces, earn rewards and spend the money on purchasing even additional content such as, special birds, pickups with different effects and defence missiles. The challenge is that the player has to tackle the planet's defence force. To add a little more challenge 'birds' with special properties have been created that give the player additional points but distract the player from dodging other harmful objects. To keep the audience attracted even more, a fully destructible asteroid object has been created. Objects that hit the player's asteroid leave a mark on its surface making it look like a battle-scarred object at the end of the level. Another feature is that the asteroid shape will be different at each start of the game and the player will be able to choose between different asteroid textures. Every asteroid will have a different feeling to it. To conclude, this game is about grinding short levels and progressing towards more bizarre and chaotic content of the game to make it more fun, enjoyable and more long-lasting.

Text Mining from Commentary Threads and Other Forms of Social Media

Name: Hassan Khan
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Michael Gardner

Abstract.

This project focusses on web scraping and the manipulation of the data that is scraped from the documents, specifically containing comments from news articles, and turning data into something which is a lot more useful. Within the last 20 years, tools which use web scraping have advanced, due to developments in areas such as Natural Language Processing (NLP). Since the advent of Social Media, people have a platform from which they can voice their own opinions, which gives greater diversity and number to the amount of data that can be used. From an organisations point of view, it allows them to see what the public think about an entity. Sentiment analysis is one way that data scraped from the web can be manipulated. Put simply it is the detection of opinion from text. This is powerful because it

can take mere seconds to find out what a public opinion towards a certain entity is, directly from the public themselves. These developments have been spurred on by the fact that it allows organisations to harness information that could have once taken days to collect; into a matter of seconds. In this project, a classifier is built which allows the system to determine whether a comment is of positive or negative sentiment. It also allows the user to see the compound sentiment, or how much of the comment is determined by sentiment. In addition to this it generates a map to see whether geographical location can determine sentiment towards a certain entity.

Computer Modelling of Long-haul Optical Fibre Telecommunication Networks

Name:	Hao Nie
Degree course:	Electronic Eng (3 Yr)
Supervisor:	Nick Zakhleniuk

Abstract.

This project is devoted to investigation of the performance of a long-haul optical-fibre system and its optimisation taking into account various impairment factors. For numerical simulations we use commercial software called VPI(Virtual Photonics Incorporated) which is widely used in the telecommunication R&D nowadays. The key system performance parameters such as BER (bit error rate), eye diagram opening, maximum transmission distances, and transmission bit rate are evaluated by the simulation results in the fibres due to attenuation and group velocity dispersion. We also investigate how these impairments can be mitigated using DCFs (Dispersion Compensating Fibres) and EDFA (Erbium-Doped Optical Fibre Amplifiers). The main objectives of the project include: 1. Investigation of the impact caused by a fibre dispersion and attenuation for a single-channel point to point (PTP) optical link with external laser modulation. 2. Investigation of the impact caused by a fibre dispersion and attenuation for a multi-channel WDM(Wavelength Division Multiplexing) systems and analyse the characteristics of optical amplifier and DCF. 3. Set up a WDM system in HuBei province in China based on the geographical location of each city and perform relevant simulations in order to evaluate the results. At this stage we have carried out simulation of the PTP link and its performance at different transmission bit rate. It is shown that at a lower bit rates (below 5 Gbps) the main limiting factor is the fibre attenuation which limits the maximum transmission distance to about 100 km for a BER = 10^{-12} . With an increase of the bit rate to 10 and 20 Gbps we observe remarkable change in the system performance. At 10 Gbps both factors, the attenuation and the dispersion, play approximately equal roles and limit the maximum transmission distance by about 70 km and 90 km. At 20 Gbps the main limiting factor is dispersion with maximum distance of less than 20 km. The transmission performance of the system is dramatically improved when DCFs and EDFAs are used.

Material Classification Using Convolutional Neural Networks

Name: Anca Sticlaru
Degree course: Computers W Elect (3 Yr)
Supervisor: Klaus Mcdonald-Maier/Shoaib Eshan

Abstract.

The recognition and classification of the diversity of materials that exist in the environment around us are a key visual competence that computer vision systems focus on in recent years. Understanding the identification of materials in distinct images involves a deep process that has made use of the recent progress in neural networks which has brought the potential to train architectures to extract features for this challenging task. This project uses state-of-the-art Convolutional Neural Network techniques and Support Vector Machine classifiers in order to classify materials and analyse the results. Building on various widely used material databases collected, a selection of CNN architectures are evaluated to understand which is the best approach to extract features in order to achieve outstanding results for the task. The results gathered over four material datasets and ten CNNs outline that the best overall performance of a CNN using a linear SVM can achieve up to ~92.5% mean average precision, while applying a new relevant direction in computer vision, transfer learning. By limiting the amount of information extracted from the layer before the last fully connected layer, transfer layer aims at analysing the contribution of shading information and reflectance to identify which main characteristics decide the material category the image belongs to. In addition to the main topic of my project, the evaluation of the 10 different CNN architectures, it is questioned if, by using the transfer learning instead of extracting the information from the last convolutional layer, the overall accuracy of the system created improves. The results produced from the comparison emphasize the fact that the accuracy and performance of the system improves, especially in the datasets which consist of a large number of images.

An Automatic Sprite Generator

Name: Lewis Horsley
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Diego Perez Liebana

Abstract.

Could Artificial Intelligence (AI) be utilized in order to generate professional standard sprites? This project aims to explore the possibility of using AI and Deep Learning for automatic sprite creation. Recent research into Generative Adversarial Networks (GAN) has been the key topic of interest throughout this project, more specifically Deep Convolutional Generative Adversarial Networks (DCGAN). A DCGAN introduces the capability of producing image samples based on unlabelled datasets. By utilizing two neural networks

simultaneously, a DCGAN generates representations of training data by continuously creating samples and attempting to distinguish those samples against the training data. Therefore, throughout the training process the DCGAN evolves its understanding of the training data. This has led to some very interesting, exciting and thought-provoking set of results. The results of this project support the argument of utilizing AI for sprite generation. Due to the consistent improvement of representations during training, the DCGAN learns the edgy, bold and pixelated style of sprites. Thus, the system uses this knowledge along with its degree of freedom to produce a variety of diverse, polished and professional standard sprites.

Assessing Blood Samples for Malaria Using Computer Vision and Genetic Programming

Name:	Julian Forrester
Degree course:	Computer Science (4 Yr)
Supervisor:	Dr. Adrian Clark

Abstract.

Malaria is a life-threatening parasitic disease caused by one of four species of the genus *Plasmodium* spp. It is particularly widespread in many poorer parts of the world, causing the deaths of nearly half a million people in 2015, with a particularly large proportion of cases occurring in Africa. Malaria can be seen to occur more frequently in less economically developed countries; this is a direct result of these countries not having the resources required to adequately diagnose and treat the disease – the most reliable and frequently used method of diagnosis is microscopy, which requires trained analysts and expensive equipment. The goal of this project is to create a proof-of-concept tool which can be used to rapidly diagnose Malaria in images of thin blood smears, thereby doing the job of the microscopists at a vastly reduced investment of time and money. To do this, image analysis and processing techniques will be used on a sample set of thin blood smears, each of which contains many red blood cells which may be infected with a malarial parasite. The cells are coloured using a Giemsa stain, so any malarial DNA becomes dark purple, while the surrounding cell remains light purple. The project will comprise two algorithms. The first will be a handcrafted algorithm, which uses image enhancement and processing techniques to detect infected red blood cells in the image; this is done by searching for the dark purple regions of the cells. The second algorithm will use genetic programming – a type of machine learning technique which evolves computer programs to solve high-level problems. This technique will produce an algorithm that has the potential to outperform the handcrafted algorithm.

Mood Game for Mobile Phones

Name: Mohammed Salih
Degree course: Computer Science (4Yr)(Iya)
Supervisor: Stuart Walker

Abstract.

Mood Game for Mobile Phones is an Android application that has been developed to provide players with a game based on their current mood. If the player is ever unsure about what kind of game they want to play, they can go through the process of allowing the application to guess your mood and then provide you with a game best suited for you. The player goes through a questioning system and the answers to these questions are used to determine their mood. They are then given a Riddle Guessing game or a Music Guessing game. Within the Music Guessing game the player is to guess the artist, or band, of the song playing within a time limit. The application also provides the genre of music, to be guessed, based on the results from the questioning system.

Counting Cars

Name: Ashir Chima
Degree course: Computer Science (3 Yr)
Supervisor: Adrian Clark

Abstract.

Counting cars is a software that aims to detect vehicles on the road as they drive past. The video will either be a live recording or a pre recorded video; the system will work the same with either. The software will read the input and detect the moving vehicles. The background of the video will be removed. The benefit of creating a system like this is that vehicles can be counted by a system instead of having a human counting – this in theory should be more accurate and reliable, as well as saving the need of a human to spend their time counting. This system can be used to measure traffic – you could find out which roads are busier than others, or what time of day most cars are out on the road. An optional extra could be measuring the speed of cars driving past. The test videos were recorded using an iPhone and a gorilla pod. The system works by removing the background of the video, and any moving pixels will be shown. The first frame of the video should show an empty road, so this first frame will be initialized and then the current frame will be compared with this to distinguish objects. The object will then have a bounding box around it once it appears on the video. It is important that the video camera is still so that the background will remain as background. The next step is to have the objects added to a count once they have been detected. This was not ready upon completion of the poster but it is currently being worked on.

Android Ford Applink Mobile Application

Name: Wei Chua
Degree course: Computer Science (3 Yr)
Supervisor: Professor Hani Hagra

Abstract.

Drive Easy is a mobile application powered by Ford AppLink. Users of Drive Easy are able to capitalise on the streamlined connectivity between mobile phones and SYNC technology enabled Ford Vehicles. While many mobile applications are now designed to be compatible with in-vehicle infotainment systems, Drive Easy seeks to go a step further. Handsfree access to media and navigation are easily enabled at the touch of a button located on the steering wheel that activates SYNC voice-recognition technology. Drive Easy thus unifies the driver, app and vehicle in a manner that eliminates driver distraction. Drive Easy will not only help navigate and control music, but provide drivers with precise and detailed data about their vehicle- in an engaging manner! Drive Easy gamifies data; fuel level, mileage and GPS positions, transforming these typically boring vehicle details into a world of fun. Tapping on social media, users of Drive Easy are able to not only compete by unlocking achievements as they drive, they'll be able to connect with friends too.

Uav Path Planning Through Simulated Virtual Environments

Name: William Davis
Degree course: Computer Science (3 Yr)
Supervisor: Dongbing Gu

Abstract.

In mobile robotics, the problem of path planning is regularly faced where an algorithm must be selected that provides a safe route for the robot being used. In the case of simple robots operating in two dimensional space, this is often an easy problem to resolve with an optimal algorithm usually found quickly. However, with more complex robots and the addition of a third dimension, this problem becomes much more complex. With the further addition of the action of flight to a robot, such as in the case of Unmanned Aerial Vehicles (UAVs), producing a suitable path can become significantly more problematic. With algorithms for producing these paths being difficult to compare directly. As such, this has become the focus of this project; the intention being to develop a set of tools that can be utilized for evaluating the effectiveness of three dimensional path planning algorithms in a virtual environment. The first tool developed is a map generator that is used to produce complex and challenging virtual environments as needed. Adding simulated structures to terrain as it is produced. The second tool is the path planner which imports maps produced by the terrain generator and produces paths as directed by a user between waypoints before

exporting the generated paths. The third tool is an analyser that loads the exported paths and outputs a number of graphs of different metrics about the path to allow a user to quickly determine each algorithms effectiveness in a given environment.

Extending the Functionality of a Clifford Algebra Toolbox in Matlab

Name:	Harold Elman
Degree course:	Computer Science (3 Yr)
Supervisor:	Stephen Sangwine

Abstract.

My project is mainly concerned with adding functions to a pre-existing Clifford Algebra toolbox. Clifford Algebra is a rapidly-growing subject of study and is used in Mathematical Physics and Engineering. Any geometric object conceivable can be represented using Clifford Algebra. I have added two functions to the Clifford Algebra toolbox: one is an exponential function and the other is a way of writing elements of Clifford Algebras as matrices of real numbers. The exponential function I originally added worked but after consideration, I decided I needed to make it more time efficient. I used a mathematical technique called Horner's Method which achieved this. However, arguably more important was the second function I added. This allows me to represent elements of certain Clifford Algebras as matrices. Matrices are a well-known mathematical structure, and so Matlab has a huge amount of support for the matrices. Therefore, I am able to use Matlab's matrix support on the Clifford Algebra elements. I made this function by getting functions I had made and a few basic functions my supervisor had made before I undertook the project work in synergy, to allow me to travel between certain algebras. A good example of a use of Clifford Algebras is if you think about the difference between rotating a 2-Dimensional object (say, a triangle), and rotating a 3-Dimensional object (say, a sphere). A good way of rotating 2-Dimensional objects is the use of polar coordinates (a 2-Dimensional number system), but in order to rotate 3-Dimensional objects, you need to use a 4-Dimensional number system. Both of these can be written in the same way and the same equations can be applied to each with the use of Clifford Algebras, even though they are completely different things!

Yu Fitness

Name:	Geoffrey Henderson
Degree course:	Computer Science (3 Yr)
Supervisor:	Michael Gardner

Abstract.

The Yu Fitness application aims to become the first thought for those getting started or those already active in a health and fitness orientated lifestyle. The wide and varying

collection of features the application offers, makes it a versatile and powerful companion for a wide coverage of users. Utilising Google's firebase for the storage and authentication for the application ensures a high standard of stability and scalability. It has allowed for the implementation of a social aspect to the application, where users can add friends and join the community in a forum like environment. The premise is like that of Facebook's model where users have control over their privacy options, meaning they can control accessibility of their posts to those outside of their friends list. This application is also linked to Gravatar which allows for profile pictures to be imported automatically if the user has an account, further improving convenience. Using Google Maps and location services, a distance tracker has been developed, allowing users to track their walking or running information including their average speed, total distance travelled per day and the calories burned per session. Furthermore, once a user sets up their gym location, the application will notify the user suggesting a workout for that day, as soon as they enter the gym's area. This allows for easy and quick access. Firebase also provides the storage capabilities the workout and exercise libraries demand. Users can view existing or create new workouts and exercises. Due to the nature of the infrastructure, workouts and exercises will be accessible, based on the users set preferences, to all users enabling the community to interact together and help the growth of the app. In addition to this, updates to the libraries of the application can be completed without the need to update the application itself making it more convenient to its users. Using Google's YouTube API has allowed the application to utilise the wide collection of videos on YouTube to provide exercise tutorials, further aiding the user. Finally, all workouts and exercises completed are stored in a history, allowing the user to view and reflect on all the workout information for each session completed.

A Children's Game

Name:	Dale Carr
Degree course:	Computer Games (3 Yr)
Supervisor:	Dr Nigel Newton

Abstract.

This game is designed as a fantasy dungeon-delving game with a focus on increasing typing competence and reading comprehension. The aim of the game is to reach the end of the dungeon while avoiding procedurally generated dangers. These dangers can include rolling barrels, minor enemies and falling rocks among other thematically appropriate hazards. Rather than direct control, the player avoids hazards by completing a typing challenge, of which, both the word and challenge are generated according to the hazard faced. The game features hand crafted 2D textures, engaging gameplay, customisable difficulty and scalability for children of different ages and reading comprehension levels.

Recreate a Classic Arcade Game - Pacman

Name: Samuel Todd
Degree course: Computer Science (3 Yr)
Supervisor: Dr Michael Fairbank

Abstract.

The outcome of this project was to recreate a classic arcade game. Due to its recognisability and popularity, PacMan was chosen as the target for this project. For those unfamiliar with the game; PacMan was an arcade game first released in May 1980 in Japan before reaching western shores in October 1980 and prompting multiple versions and spin-offs of the game to be developed. It focuses upon traversing a 2D maze as the titular "PacMan" with the aim of collecting all the dots in the maze. Four ghost enemies also traverse the maze which must also be avoided by PacMan. It was decided at the start of the project to code the game entirely by hand without the use of a third-party game engine. In order to allow the game to run in both Linux and Windows the decision was made to code the project using Java due to its cross-platform framework. As such, the game has been coded entirely in Java 1.8 using only the standard Java classes. This recreation of PacMan is largely faithful to the original, containing the same maze lay-out and gameplay style but featuring new Ghost AI behavior in order to add a unique feel to this version of the game and provide a fresh challenge to those already familiar with the original version of the game.

Email on the Go

Name: Ajuub Adan
Degree course: Computer Science (3 Yr)
Supervisor: Hani Hagras

Abstract.

Driving and Smartphone use when combined has become one of the major causes of accidents around the world. With smartphones becoming increasingly useful and essential to daily life, the urge to use a smartphone while driving has become nearly irresistible to some. Due to recent changes in the law, which saw a doubling of the penalty of being caught using your phone, drivers are looking for alternative ways of accessing the apps on their devices. Email On the Go is an Android app the allows drivers to read and write emails safely while driving. Email On the Go focuses on the safety of the driver by taking certain precautions such as displaying a static image on the drivers phone while driving and using voice recognition to navigate through the app. With commands such as "Open Inbox" the user email inbox will be automatically downloaded, "Reply" which allows the user to reply to an email using predefined messages and "Read Inbox" which uses Text-to-Speech technology to read out a users email. The app itself runs on Ford's HMI system which gives

access to a range of data through its API. Email On the Go strives to reduce the number of casualties caused by mobile phone use by allowing drivers to complete tasks while driving but in a safe way.

Countering Drones

Name: Yan Zhang
Degree course: Computers W Elect (3 Yr)
Supervisor: John Woods

Abstract.

The Countering Drones technology is an emerging field that needs to be developed because of the rapid revolution of drone's technology. Today, WIFI and GPS technology are commonly utilized to control and manage flight of drones. Due to the GPS system precision and WIFI's long distance wireless transition, the drones can be easily controlled by anyone and used for any propose. Therefore, this may cause a wide range of issues for today's life. This project aim to counter the Civil and Commercial drones by build a personal usable system, which utilize the vulnerability of their flying control unit. The prototype of the project use an Airsoft rifle as its frame. Two multi-unit Yagi Uda antennas has been equipped to ensure the long influence distance and limited beam angle. A single frequency generator has been used to produce GPS disturbing signal. In the meantime, a multi-band RF signal generator has also been used to produce the different signal frequency signals to sweep cross all the WIFI channels. The system is powered by a 12V lithium battery. Through this prototype, users can engage this system function and disturb the flights of drones by pulling the trigger onboard.

Immersive Shopping

Name: Xutong Zhao
Degree course: Inform & Com Tech (3 Yr)
Supervisor: Dr Michael Gardner

Abstract.

The Immersive technology is an instantiation of the Virtual Reality technology (VR). It concretizes the spatial exploration by providing a platform for the client to interact with a computer-simulated environment through real-time control. In contrast to the prevailing 2D retailing model, 3D model enables the all-around representation of the product which caters to the uniqueness requirements of the client.

This project is implemented to emphasize the significance from different levels by utilizing the depth of space. There are three mainly domains, the searching panel from the left domain allows the client to search the product by indexing the key words. The Menu

beneath the searching panel is the main menu, shopping basket and product wish list can be navigated from there. The middle panel is the core technology of the project. On the top panel, client can just swipe the icons for selecting categories. After picking a specific icon, the corresponding subcategories will be generated below. The right domain is mainly focusing on the demonstration of the product simulation.

In terms of the database, as the footstone of the project, the data are divided by the layer of categories. A structured database is the significant basis of executing the project. Apart from that, all those nested data can be retrieved by system automatically after importing the relative class to C#.

Computer Board-Game Program

Name:	Bo Zhang
Degree course:	Computer Games (3 Yr)
Supervisor:	Nigel Newton

Abstract.

Chess is the choice of this project, because it is the board-game that most people are familiar with. For a better game experience, the UNITY(a famous game engine) has been implemented to create the game, and the game is designed to satisfy the player with great enjoyment through playing Chess against the computer player. The most significant part of the Chess game is the AI part. This is because the intelligent level of the AI influences the Chess gaming progress directly, so the AI part took a plenty of time to develop for this project. The AI computer player uses Monte Carlo Tree Search as the main algorithym which has increased the intelligent level into a whole new level to deal with any situation during the game progress. The computer player can handle fierce confrontation against the player, so the player needs to consider each move carefully in order to defeat the computer player. The well-designed AI of the computer player will bring challenge to the human player if the person wants to defeat the computer. Background pieces of music of the game were selected carefully, each piece fits the theme of the game and the atmosphere of competition. The key criteria for selecting is light music with a relaxing and calming effect to the listener, which will give the player a pleasurable feeling but will not distract the player during the game. I hope that the combination of challenging AI and the light background music can deliver a wonderful game experience to the player. It should also enable the player to gain an excellent sense of satisfaction from the game. Enjoy the Chess game!!

Internet of Things

Name: Aaron Milne
Degree course: Computer Networks (3 Yr)
Supervisor: Dr Nikolaos Thomos

Abstract.

This project is based on the Internet of Things where embedded devices require connectivity with other services or other network enabled devices to function properly. The School of Computer Science and Electronic Engineering have provided three Raspberry Pi 1 model B units each with camera modules to design and program. The revised project goals planned to capture video from the camera module using the h2.64 codec and stream it wirelessly over a local area network. The activation of the camera and the network stream would be dependent on a connection being made to the server. The Raspberry Pi units will be sending video simultaneously and will be competing for the same wireless bandwidth. Which will result in packet loss as there is no error checking packets when using the UDP protocol. It is up to the server to deal with these losses reasonably. When the video packets arrive on the server there will be some calculations on current frames per second and packet loss. Should the frames per second drop substantially or the server detects too much packet loss, a message will be sent to the sending Raspberry Pi to restart the stream using a lower bit-rate in an attempt to make the stream as optimum as possible.

Identifying Deception in Online Reviews Using Text Classification.

Name: Callum Bird
Degree course: Inform & Com Tech (3 Yr)
Supervisor: Vishwanathan Mohan

Abstract.

This project consists of a program that identifies fake reviews online on such sites like 'Amazon'. Due to a dramatic increase in online shopping sales there is more fake reviews being written. This is an attempt by sellers to increase their sales. Statistically, it is unknown the percentage of fake to real reviews on the internet. Potentially, this program could solve this. The program has been written in a programming language called 'Python' which is excellent for general purpose programming and data extraction. The program extracts the review data from the 'Amazon' webpage that has been entered into the program and then uses an algorithm called 'Naive Bayes' which is fed data from the webpage to output a probability. This project aims to filter out these 'fake' reviews in an attempt to give consumers a better chance at finding a legitimate product.

Cadaverous Reef

Name: Charlie Hammond
Degree course: Computer Games (3 Yr)
Supervisor: Perez Liebana, Diego

Abstract.

This project is about the design and development of a single-player non-combat virtual board game based on the Necronomicon: The Best Weird Tales of Howard Philips Lovecraft. The Necronomicon is a well-known out-of-copyright fictional grimoire, this makes for some interesting gameplay features. Cadaverous Reef was developed in Unity 5.5 with Unity's version of C# which is good for quickly creating prototypes and manipulation variables with its user-friendly interface. It was important to follow the Agile development methodology to quickly produce results. One of the key objectives of this project was to replicate the feel of the book within the game. This was achieved by taking inspiration from characters and locations found in the Necronomicon, as well as some extra research taken into virtual worlds, Arkum Horror board games and pulp fiction. Acknowledgments: H.P. Lovecraft - <http://www.hplovecraft.com/Necronomicon> - <https://en.wikipedia.org/wiki/Necronomicon> Unity - <https://unity3d.com/>

Linking Social Media and Mainstream Media

Name: Anton Kravchenko
Degree course: Computer Science (3 Yr)
Supervisor: Annie Louis

Abstract.

The goal of this project is to create a software system that given a written news article can find relevant Twitter statuses, also known as tweets. The system comprises of the back-end web server with a database and a set of routines which process incoming social media data. The software constantly scans for news updates and as soon as a new article appears it will start searching Twitter for related tweets. The system also has a web page interface as a front-end component which allows an end user to operate the system with no highly technical knowledge required. Gathered information will be presented in a form of an interactive report which will provide visual representation of various article's audience characteristics. The system is an example of a full stack system i.e. it has custom developed both front-end and back-end which ensures tighter integration to increase efficiency and end user's satisfaction. From the very start the system was intended to be a tool that can be used in similar software systems or be expanded upon. For that reason the system is highly modular and easily modifiable.

Implementing a CoAP Handler for the Point ICN Project

Name: George Coe
Degree course: Computer Science (4Yr)(I)
Supervisor: Nikolaos Thomos

Abstract.

Technology is always evolving and being replaced by something better, so what will replace the widely used Internet Protocol? Well, a strong contender is Information Centric Networking. The POINT ICN framework being used for this project, uses a named-information publish and subscribe paradigm to send and receive data between endpoints. Another technology that is starting to take off quite rapidly is the Internet of Things (IoT) and these devices are expected to become a largest portion of the devices that are connected to the internet withing a few years. There have been a few protocols designed for constrained IoT devices, however one of the most popular ones is the Constrained Application Protocol (CoAP). This project looks at implementing a handler for CoAP into the POINT ICN framework. Features of both the CoAP protocol and the POINT ICN implementation have been explored to find ways in which data can be efficiently delivered with minimal load on the network, reduced latency and reduced resource requirements of IoT devices. Specifically, this project looks at CoAP caching and multicast of CoAP messages.

Raspberry Pi: Image Detecting Security System

Name: Daniel Adepoju
Degree course: Computers W Elect (3 Yr)
Supervisor: Professor David Bebbington

Abstract.

In today's society, CCTV(closed circuit television) is the most commonly used security system but can be very expensive to setup and run. However with the emergence of Raspberry Pi, individuals like myself and others can purchase it for an inexpensive fee and use it to control major components such as camera, motion sensor, hall switch, which were all used in the project and run it using an open source programming language such as Python, C, C++,Java and many more.This project involves the design and implementation of image detecting home security system using Raspberry Pi 3. The proposed security system captures information image recognition, compares it with images already stored on its database and responds accordingly to the image being detected. By using Raspberry Pi to control the components, it consumes only a small amount of power, runs Linux, which allows access to open source packages and its inexpensive when compared to dedicated circuit closed television. Python is used to program the Raspberry Pi hardware due to the standard libraries available and its ease of executing complex functionalities. In conclusion,

by implementing this method of security system, it hopes to encourage individuals to think out the box when investing on a new security system and consider a Do-It-Yourself approach that is significantly cheaper when compared with the commercially sold security system in the market.

Using Excel as a Low Cost “Sharepoint”

Name: Daniel Long
Degree course: Inform & Com Tech (3 Yr)
Supervisor: Edward Tsang

Abstract.

According to research, over 81% of businesses worldwide use Microsoft Excel in some shape or form, and with almost ALL office jobs requiring some knowledge of spread sheeting and using Excel, it's a program which has unprecedented use in work environments. However, with most business managers admitting that they fail to understand basic spreadsheets, hours upon hours can be spent trying to find the right data to display and, as Excel can be extremely difficult to use in its vanilla state, this is where the Dashboard comes into place. Developed using C# and the Visual Studio Tools for Office library, Using Excel to Create a Low Cost Sharepoint is aimed at simplifying and increasing productivity for those using Microsoft Excel from a business point of view. Want to know more? You've come to the right place! Creating a brand-new user experience, the Dashboard allows for the user to seamlessly integrate with the Excel in Business Gallery of files, and the rest is done behind the scenes saving countless hours, and effectively money, at the click of a button. This product is ideal for the board, allowing for spreadsheets to be selected, compiled and viewed much quicker than what a basic Excel experience will give you – So, if you're a business which relies on Microsoft Excel in some way, this could be the ideal tool to move your experience on to the next level!

Ford Vehicle Driving Buddy

Name: Luke Worger
Degree course: Computer Science (4Yr)(I)
Supervisor: Hani Hagra

Abstract.

The desired outcome of the Driving Buddy project is to build an innovative Android application that can successfully communicate with Ford's Sync infotainment system via their AppLink API and provide the user with a useful piece of functionality. Driving Buddy takes the approach of retrieving vehicle data over bluetooth whilst the user is driving and then relaying back that information in the form of a clear simplistic live dashboard making

all the data visible in one place. Furthermore the data is also analysed by a fuzzy logic rule engine which produces tailored advice for that trip taken by the driver on how they can improve fuel consumption. Whilst not connected to the vehicle the users of the application can login to review data from their previous trips and unlike most other applications compare how their trips have been different. The project makes use of a SQLite database, JSON data transfers and the Sync3 emulator for testing purposes .I would like to thank Mr. Paul Elliot for his help and advice whilst carrying out this project and The Ford Motor Company for giving me the opportunity to work on a project which utilises their API.

Re: Start - A Non-Combat Game Based on a Book

Name:	Yan Wu
Degree course:	Computer Games (3 Yr)
Supervisor:	Richard Bartle

Abstract.

The current games industry is very focused on putting out games where the main concept is the gameplay. Most games in today's world use violence as medium for their gameplay which is partly why a large amount of the AAA titles in the game's industry are First Person Shooters. Re: Start is a non-combat game based on a Japanese light novel called Re: Zero - Starting Life in Another World - that attempts to focus on the story rather than the gameplay by removing violence and focusing on character interactions to progress the story and deliver a enthralling plot so as to immerse the player in the world of Re: Start whilst keeping true to the story by author Tappei Nagatsuki and the common tropes of Japanese Role Playing Games (JRPGs for short). The game does take a first person perspective for several reasons. For one it allows the player to step into the shoes of the actual protagonist to get a more realistic view of the world around them. Secondly, it is to add a unique twist on the JRPG genre that generally uses third person perspective. Even though this is the approach used for this particular game, aspects such as dialogue are very reminiscent of classic JRPGs such as Chrono Trigger and Final Fantasy where the dialogue occurs in a box on the lower section of the player's HUD (Head-up display). This is the only thing to be displayed in the HUD as a minimalistic approach is used to allow the player to explore the world more realistically. Other features such as puzzles, background music, inventory system and character and structure visuals, all add something to Re: Start to make it an enticing game to play.

A Study On IEEE 802.11 Mac

Name:	Ho Chan
Degree course:	Computer Science (3 Yr)
Supervisor:	Dr. Nikolaos, Thomos

Abstract.

This project provides an in depth study on IEEE 802.11 MAC Protocol channel access method. The program is a ns-2 simulation nam (network animator) output file which simulate the behaviour of CSMA/CA in a wireless network. NS-2 simulator is implemented in the Ubuntu environment, which involves writing Tcl shell scripts for the simulation. In the project, the latest ns 2.35 version along with TclCl 1.20 package is used. It is focused on the basic access method Distributed Coordination Function (DCF). DCF employs binary exponential backoff algorithm for CSMA/CA. It requires a backoff interval for devices to detect the channel and wait for transmissions. Different algorithms using on-line or non-online methods such as LILD, PBF, are compared with the ACW algorithm, to show that ACW algorithm perform well in a number of scenarios. For example, ACW algorithm wells work in huge network load, which does not affect the throughput, delays when the network saturated. However, throughput, delay depends on the number of contending stations. As the number of stations increase, there might still be significant affect on the network load. The project outcomes simulate ACW, LILD and PBA algorithms, the process compare these algorithms by simulating the mentioned scenarios as above. We test the different number of contending stations, nodes, adjust the packet-size, queue-size, to observe any changes in the behaviour. The results is that ACW algorithm achieved the best performance. Upon analysis the user statistical input, the graph is generated for performance evaluation. It is a scattered graph with different colors line to represent the data. The poster provide a description on the program outcomes, however due to the implementation status, the screenshot does not necessary reflect the actual program. The actual program is demonstrated along with the poster for more attraction if needed at the open day.

Online Gamified Learning

Name:	Samuel Miller
Degree course:	Computer Science (4Yr)(I)
Supervisor:	Prof. Anthony Vickers

Abstract.

Gamification is the process of utilising game derived elements in other applications to encourage motivation and engagement. My project is a web based Virtual Learning Environment that features a teaching course with gamified features that have been created with the help of the Octalysis framework of gamification. The teaching topic presented is that of databases and SQL at an introductory undergraduate level. The site allows users to

login as a student, read teaching material, complete scored quizzes and interactive activities such as SQL database interaction. Gamified features include leader boards, achievements for completing sections of the course and progress bars. The site can also be accessed by a teacher account, which allows the viewing of student scores for the course. The project has been implemented using PHP alongside HTML and CSS, with a MySQL backend database – all running in WAMPServer, a PHP and SQL development environment.

Matching Harry Potter Spells to their Definitions

Name:	James Brill
Degree course:	Computer Science (4Yr)(Iya)
Supervisor:	Spyros Samothrakis

Abstract.

Vector Space Models have been a recent development in the field of natural language processing and machine learning. They allow accurate models to be built based on large unannotated corpora, this project analysis how effective two popular models are at a creative task, in this case, matching Harry Potter spells to their definition. Harry Potter spells are created by picking a word(s) that describe what the spell does, and translating it into another language, quite often Latin. For each Harry Potter spell that exists in the Harry Potter universe, several different aspects have been recorded, this includes the spell, a one word definition, a more descriptive multi-word definition, and the etymology of the spell. Each multi-word definition is summed up into a single resultant vector from which the new spell word is generated. The one word definition is mainly used. There are several different metrics used to analyse Word2Vec and GloVe, such as whether the new spell is featured in the original multi-word definition. This is a critical one, since if a model has a high amount of words being generated which feature in the definition, one might as well be picked at random from said definition. On top of this, the cosine similarity of the new spell word and the one word definition is calculated and recorded for each spell, creating an average for that individual experiment. The cosine similarity measures the angle between each the two word vectors indicating how similar they are. On top of the cosine similarity, a score is produced for each experiment for how many of the new words are a synonym of the one word definition. Lastly, is an error metric which is used to show how many “words” are generated from the definition, which are in fact not a word at all. For this project, a word is defined as all alpha characters. A combination of these metrics allows for a holistic analysis of both vector space models and their suitability for creating “novel” ideas.

Roman Empire Trading Strategy Game

Name: Joshua Beresford-Davis
Degree course: Computer Science (3 Yr)
Supervisor: Edward Tsang

Abstract.

A difficult game for a niche market, this game attempts to integrate real financial techniques into a game environment. Set in the era of the Roman Empire, this game challenges the player with the goal of the accumulation of wealth in an economic model representative of a real supply and demand-driven economy. The player must attempt to control the most wealth as possible at the end of the game, in competition with several computer-controlled rivals who are seeking the same objective. The computerised competitors implement stock trading algorithms in an attempt to contend against the human player. The pressure for the player emphasised by the tight time limit given to each turn of trading, with restrictions in place on the markets available to each player to trade in. Each market is represented by a city which has five available goods to be bought and sold. The demand and supply of these goods varies from market to market and is affected by the previous state of the market and the goods available.

Capture and Secure Storage of Digital Evidence for Prosecution

Name: Joshua Coyle
Degree course: Computer Networks (3 Yr)
Supervisor: David Bebbington

Abstract.

Digital evidence; evidence that can be used in the criminal prosecution process, is becoming increasingly important in the present world. As the hardware that constitutes mobile computing devices becomes even more affordable, portable, and computationally capable, it is possible for people to have access to digital devices everywhere in the world. Almost harmoniously with the increase of production and ownership of mobile devices, evidence- in a digital format – captures and stored on these devices is increasing. Evidence management systems are of paramount importance to allow the easy capture, indexing, integrity checking and storage of evidence from mobile devices. With this project I have created, my aim is to rectify the need for developing an easy-to-use digital evidence management system by doing so myself. Complimentary to this, the report examines, explains and documents in detail technologies that have assisted in the development of this project. It further explains all research, at length, conducted towards this subject, and will give a complete and entire representation of all necessary detail towards the development of the project.

Error Control Coding

Name: Esther Udoh
Degree course: Computer Networks (3 Yr)
Supervisor: Nigel Newton

Abstract.

Error control coding is the process of adding parity bits to data bits that are being transmitted across a channel, to reduce the occurrence of errors. It is useful for ensuring secure data transmission across channels which have noise/errors that can corrupt data bits. These errors are unpredictable as they result from random malfunctions on the channel. There are several error control codes including Hamming code, Low Density Parity code, and Turbo code. However, Hamming code is different because it can detect only two errors and correct one error. Researching the Hamming code (7,4) is essential as it shows how basic mathematics is the foundation block for complex error control codes. This research is being carried out to understand different approaches to error control coding, the principles that they are based on, and how these principles can be applied. Furthermore, this research project aims to show important aspects of Hamming code, Low density Parity Check code, and Turbo code; as well as program the Hamming encoder/decoder, implement simulated channels, and build a communication system with the Hamming code and simulated channels. Hamming code uses two matrices for encoding and decoding namely generator matrix and parity check matrix. These matrices determine where the parity bits will be within the codeword. The imperfect channels in this project are Binary Symmetric Channel and Binary Erasure Channel, and they are being implemented using random number generators, to model an error occurring at random, when the data bit is being transmitted. The Hamming code communication system is being simulated on the MATLAB programming language with inbuilt functions which output the number of errors that occur and the number of times the data is compared. The output of the programmed Hamming code communication system is two counters. The counters count the number of times an error occurs and the number of times the error is corrected by the Hamming code. This research effort will culminate the recommendations for how to program the Hamming code including channels, without using the inbuilt MATLAB functions.

Monitoring Crop Health Using Drones

Name: Cameron Kyle-Davidson
Degree course: Computer Science (4Yr)(I)
Supervisor: Adrian Clark

Abstract.

This project explores the plausibility of monitoring cereal crop health from aerial images captured from autonomous drones. We have shown that using a combination of modern machine learning and computer vision techniques it is possible to generate various 'crop health maps' that are capable of describing the state of a cereal crop. There exists equations known as 'vegetation indices' that can indicate the state of photosynthesis in plant matter. This system is capable of building and displaying a false colour image of an arbitrary vegetation index in real time. The output image is a composite that is created by analysing two input images of the same field; one image captured in visible light, and one in near-infrared. Two vegetation indices are offered by default, as examples. A common cereal crop weed is 'black grass' - a plant that is difficult to spot from the ground. We have shown that it is possible to train a convolutional neural network to automatically identify the black grass weed from aerial images with reasonable accuracy. Given a sufficiently detailed orthographic map of a field, an output image with areas containing suspected black grass highlighted can be generated. Two trained networks (one suited to 4K orthographic images, and one suited to 8K orthographic images) are provided. Additionally, a support-vector machine classifier is provided for comparison. Finally, the system offers a customisable method of generating a metric of how healthy it predicts a cereal crop to be based upon the results of the previous two features. This allows for truly autonomous evaluation of agricultural fields with minimal human involvement.

Augmented Reality Learning Experiences in the Wild.

Name: Enoch Offiah
Degree course: Computer Science (3 Yr)
Supervisor: Micheal Gardner

Abstract.

Much focus has been placed on improving overall student satisfaction for higher education institutions in recent years and the unobstructed access to learning resources for students plays a big part in how they perform academically throughout their degree scheme. University of Essex currently sits in 9th place in the student satisfaction rankings, so to further their progression in terms of student satisfaction and to ensure that they continue to attract prospective students, learning resources within every department will need to remain obtainable. CSEE labs are known to be one of the busiest labs on campus with students either participating in their scheduled labs or just making use of the labs to

complete various activities and course assignments. As a result, acquiring a computer to complete work on can prove challenging for students who unwittingly arrive during the labs' peak times or those who arrive when the labs are congested. A solution to this problem comes in the shape of a mobile Augmented Reality application that utilises the camera and GPS sensor on the users' device in order to determine their location in and around the CSEE department building. When a user is located outside the building, Latitude and Longitude data is found by the application. Users are then informed on whether they are in close proximity of a usable CSEE lab and how much distance they have covered. Once they arrive within the department building, the same geo-location data is used in pin-pointing and making a record of their last visited location.

Find the Ant Game

Name:	Yang Sun
Degree course:	Electronic Eng (3 Yr)
Supervisor:	Riccardo Poli

Abstract.

This project is aiming at developing a PC game by using Python language and wxPython GUI toolkit. In this game, there is an 'ant' living in the world of 15*15 tiles which are generated by the software. This game contains a given movement mode for the ant to move randomly in the 225 tiles. The player need to use the mouse to click a tile each time, and see what happened. Generally if the ant moves and has visited some places, there will be a number on that clicked tile to indicate that how much time did this ant move away. For example, the player has tried to clicked a tile and got a number of '10', which means that the ant just visited here 10 times earlier than you explored this place. It is obviously that if the player could get the number of '1' and the ant will be found. In order to make sure the game a little bit tricky, the movement pattern for this ant is constantly changing followed by each time the player has clicked a tile. It can move forward or backward between 1 by 1 and 2 by 2 steps. If the ant reaches to an edge of the world, it might also re-enter from its opposite side just like the famous Arcade Game: PAC-MAN. Last but not least, the ant will never appear in the tiles which have been already searched by the player.

Acknowledgements Supervisor: Riccardo Poli has supervised me with this project at a early game development stage, offering a great assistance of understanding the structure of this game.

Wireless Sensor Networks for Medical and Healthcare Monitoring Applications: Applying Dynamic Tdma

Name: Ka Wong
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Nick Zakhleniuk

Abstract.

Internet of Things (IoT) has become a hot topic in both the industry R&D and academic research. Wireless Sensor Networks (WSN) being part of the IoT are made up of sensors that collect data from their environments and transmit the data to a central server through wireless channel for further processing and applications. Medical and Healthcare Monitoring (MHM) is one of the promising potential applications of the IoT. High successful rate (for precise current health status), low latency (for life-critical data) and low energy consumption (for implanted sensors) are the key requirements for WSN in the MHM applications. In this project, we investigate how to meet these requirements in the MAC Layer. Time Division Multiple Access (TDMA) is chosen to be the backbone, because it has an advantage in higher successful rate when comparing to the standard Carrier Sense Multiple Access (CSMA) based protocols. However, high latency and high energy consumption are the drawbacks of typical TDMA. The investigation focused on the effectiveness of Dynamic Scheduling and other techniques aimed at improving the TDMA performance and compensate its drawbacks. Positive results have been obtained using simulation software, OMNeT++ with Castalia.

Viability of Consumer Risc Single Board Computers for Cluster Computing in Education

Name: Thomas Powell
Degree course: Inform & Com Tech (3 Yr)
Supervisor: Vishwanathan Mohan

Abstract.

Today's business computing requirements are constantly progressing toward high parallelisation - a workload, instead of being processed one component at a time, on a single computer, would have its components processed simultaneously using multiple computers working together (a cluster). This has the effect of allowing a great deal of data (big data) to be processed quickly for tasks such as data analysis. As a result of this rapid evolution in computing, educational tools relevant to high performance computing (HPC) are sparse. My project targets this problem; I am creating a usable and affordable compact cluster with reasonable performance by solely using consumer hardware (based on a cluster using five of the ODroid C2 - a quad core credit card sized computer), to analyse the feasibility of small hardware clusters for educational benefit to university level students.

Unlike the vast majority of clusters, which are either cloud hosted or require a huge amount of space, power and hardware (impossible for many institutions), this cluster can fit in a shoebox, each node costs £40 and can even be powered by a battery pack. Within education, the ability to work hands-on using a physical system cannot be understated. The cluster would be a unique platform for students to get a feel of what it's like working on HPC tasks and working with big data, combined with being required to optimise for maximal efficiency (low per-core performance) which is vital in such real-world computation. Optimising such a cluster requires precise setup and implementation, along with navigating the features of data sets and algorithms that are specifically written to be well parallelised. Performance and feature analysis for multiple HPC software applications will be carried out using the cluster to find the most efficient and usable setup for the system with relevant benchmarks and testing.

Pictr Guessr - The Picture Guessing Game for Android Smartphones

Name: Jamie Blue
Degree course: Computer Science (4Yr)(Iya)
Supervisor: Michael Sanderson

Abstract.

Pictr Guessr is a game for Android smartphones which sets out to give a fun and addictive experience alone or with a group of friends. The aim is simple, you pick either movies or landmarks, you're given a set of images and from them you have to solve the name of the movie or landmark! For example - the Leaning Tower of Pisa shows an image of a man leaning, a skyscraper and a pizza. Pictr Guessr is both challenging and forgiving, making for a much more rewarding experience. Smartphones and social media are like a lock and its key - a perfect fit, which is why Pictr Guessr has social media interactions integrated to allow players to either share their score, or a puzzle they're stuck on, meaning help from friends, family and anyone else who happens to see the player's struggle. The creation of this project was extremely challenging yet very rewarding, from designing the UI to programming the animations and functionality for something as simple as a button - every step was a trek, however at the end of the journey was a great learning experience.

Android Connected Car Through OBD Connections

Name: Mohammed Matin
Degree course: Computer Science (3 Yr)
Supervisor: Prof. Stuart Walker

Abstract.

With recent rises to inflation in the UK, partly due to increased fuel prices, it is now becoming increasingly important for motorists to save costs. There has also been a

significant increase in the number of cars on the road, leading to higher traffic levels, increased fuel consumption and more dangerous driving. Finding ways to aid motorists, whilst keeping initial costs to the minimum for the motorist, can be rather challenging. Information such as Engine RPM, speed, estimated fuel usage per trip, can help motorists monitor and improve their fuel consumption. An Android application connecting via Bluetooth to an on-board diagnostic system would be able to provide such information and warn motorists of poor driving by monitoring specifics such as harsh braking, rapid acceleration and sudden changes in direction. Feedback can be provided by highlighting key safety concerns, giving tips on how to become more economical. A key goal is to provide the motorist with an application that can display diagnostic codes when faults arise in the car, helping to identify the problem such as engine misfires, excessive fuel consumption, lack of power and the like. This then leads to reduced costs to the motorist as they do not need to pay extra when visiting a mechanic to find an unknown fault. Although the motorist will need to pay for a Bluetooth adapter to connect to the OBD port, the costs can be recouped through safer and economical driving, which will prolong engine parts as well as reducing the chance of accidents. Acknowledgement: Tantalum Corporation

Forming Social Interaction Through Convenience

Name:	Andrew Richardson
Degree course:	Computer Science (4Yr)(Iya)
Supervisor:	Nigel Newton

Abstract.

A social network designed to make meeting friends simple; this project uses the latest technology to create a scalable, testable and distributable web application. At its core, the application allows for users to advertise their availability, and in turn, effectively arrange meetings with friends.

Among others, the key technologies used within this project are:

- Graphing database technology (Neo4j) to effectively store user information and their relationships to other users.
- A RESTless API to provide a functional, stateless interface for support across all platforms.
- React.js for an app-like experience within the browser and also to provide a component-based framework for clean client side development.
- Git and Travis CI to handle versioning and automate testing of any changes to the repository.
- Docker for contained, development and distribution with reliability in mind.

MOYO - A Partner-Finding Web Application

Name: Seyed Kashan
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Sam Steel

Abstract.

Finding a partner online has grown into a thriving industry, which is a huge contrast to the stigma that surrounded it no more than a decade ago. MOYO is a partner-finding web application which offers a simple, easy, and effective path for meeting potential partners online. The site has been designed to be easy to use, has hybrid layout design, and offers cross-browser compatibility to maximise convenience when using it. The system allows for up to 20 different characteristics and preferences to be specified, so searches and match suggestions can be tailored as closely to the user's preferences as possible. Members may use the search feature to filter through as many or as few profiles as they'd like, or they can use the match suggestion feature which uses an algorithm based on the stable marriage problem to provide users with the most suitable match. The system allows users to view any member's profile that they have not been blocked by. Each member's profile page displays their general details, preferences, characteristics, and an album of their upload images which also has a slideshow feature. MOYO has been specifically developed to be secure against common security flaws, using techniques such as prepared statements, one-way encryption on passwords, and using session data rather than cookies. The system has been developed using the WAMP stack (Windows, Apache, MySQL, PHP), along with JavaScript, HTML5, and CSS3. The entire project has been closely managed using long term tools such as Gantt charts, and short term tools such as logbooks and work breakdown structure diagrams.

Assessing Blood Samples for Malaria

Name: Elliot Dines
Degree course: Computer Science (3 Yr)
Supervisor: Adrian Clark

Abstract.

Malaria is a serious disease that is widespread throughout tropical parts of the world. The World Health Organisation estimated that there were 214 million cases of malaria in 2015 with 438,000 of those being fatal. It is spread via mosquitoes and a single bite is all it takes to become infected, as mosquitoes thrive most in tropical regions it has caused a blight in these parts of the world. The current method for diagnosis of malaria is as follows, a patient is suspected to have the symptoms related to the disease, a blood sample from the patient is taken, and then analysed by a doctor or trained professional in the area - only then it is confirmed whether or not the patient is infected with malaria. This process is expensive,

time consuming and not widely available in the areas the disease affects most. This has created a need for a computerised system that can work between the blood sample and analysis stage. A system that takes a blood smear image and determines whether any of the red blood cells featured in the image are infected with the parasite that causes malaria. This would allow someone that is trained to take blood samples from patients to carry out the first stage of diagnosing the disease, reducing the need for a doctor at this early stage. It would not serve as a definitive diagnosis tool but as a preliminary test, as misdiagnosis is common with this disease and to tell the patient quickly whether they need to seek further medical attention.

Procedurally Generated Cities

Name:	Diego Cisneros Vitor
Degree course:	Computer Science (3 Yr)
Supervisor:	Adrian Clark

Abstract.

This project involves work in computer graphics and procedural content generation. Computer graphics is a field that refers to computer generated image data that is displayed in an effective and meaningful way to the user, while procedural content generation is the practice of creating content using algorithms and sets of rules that lead to pseudo random results rather than manually specifying it's characteristics. I decided to take on this project because it appealed to my interest in computer graphics, the project briefing made it seem very engaging and I was excited to learn new skills in a topic that had not been addressed at all until that point of my degree. The main objective of this project over production has been to build a program that renders city models in 3D with different detailed building patterns determined by a set of rules which will ensure for each iteration to be procedurally generated i.e pseudo randomly. The biggest challenges encountered in development of this project so far have been the installation of the required python modules and learning of OpenGL , the software used to interface with the graphics hardware. So far the production and display of a grid of 'buildings' of random height has been achieved and by the time of the open day full procedural generation of the cities will be implemented. However as specified in the requirements this program should also allow for a fly through navigation to be demonstrated in the whole-wall display facilities located in one of the research labs in the CSEE department and this feature will probably not be implemented until.

Monitoring a Vehicle Data Through an Android Application

Name: Joe Osborne
Degree course: Computer Science (3 Yr)
Supervisor: Professor Stuart Walker

Abstract.

As the price of fuel constantly seems to be on the rise, it has become more apparent that a way of monitoring fuel consumption and driving styles is needed. By giving an estimate to the cost of a trip based on accurate fuel prices as well as the amount of fuel consumed, motorists and companies alike will be able to monitor how much money each journey is costing them. They can then use this information to accurately estimate how much money they will be spending per week or month. In terms of driving styles, by monitoring acceleration, speed, and harsh braking, improvements in driving styles can be recommended to help them drive more economically and potentially increase the life expectancy of certain car parts such as brake pads. A solution to both challenges, is with the use of the cars On Board Diagnostics (OBD) port. Usually only garages could access this information by using certain software packages. It is now possible to connect to portable Bluetooth device that plugs into the OBD port which will then retrieve the same data and pass it to be read with an Android application. Apart from retrieving data based on fuel and engine parameters it also possible to get information on features such as current speed, RPM, CO2 values and many others. This information is then simply, displayed to the user for them to read. One of the goals of this project is to offer the user feedback on how to improve their driving style based on their driving habits. The 2nd aim is to display to the user the price of their journey based on current fuel prices and their average fuel consumption. Joe Osborne

Posterus - A Dungeon Crawler Game

Name: Sean Traynor
Degree course: Computer Games (3 Yr)
Supervisor: Dongbing Gu

Abstract.

"The year 2069, The Earth is damaged beyond repair. Our only hope lies in the cryogenics company Posterus and their promising new technology. Two years later all cryo-tubes are finished, and recruitment for 'Project: New Hope' is initiated. Fast forward 300 years; a malfunction causes the cryo-tubes to malfunction, all but one."Posterus is a single-player 3D Dungeon Crawler game. It utilises procedural content generation in creating levels and adjusting items to create an endless game experience. When your character dies it is gone forever, the main goal of the game is to master it enough to beat your own high-score. The score is increased by killing enemies, gathering shards and progressing through levels. The

procedural generation algorithm uses a set of ranges it when generating the levels. An average number of rooms to be spawned, their average width and height and corridor lengths. The generator iteratively places rooms, decides which direction the corridor should be placed at, then places another room at the end of the corridor until all rooms have been placed. Items and enemies are scaled to empower and challenge the player's current progress.

Gonote: Android Notebook Application Compatible With Ford Applink.

Name: Vasileios Toumpelis
Degree course: Computer Science (3 Yr)
Supervisor: Hani Hagra

Abstract.

GoNote is an Android note-keeping application developed using Java and Android SDK. GoNote provides users the ability to create, edit, delete and customise notes in order to plan and organise their daily tasks and activities. GoNote implements Ford's AppLink technology in order to achieve wireless Bluetooth connectivity with SYNC integrated Ford and Lincoln vehicles. This allows the users to use GoNote's features safely while driving. This is achieved by shifting the control of the application from the smartphone's interface to the vehicle human machine interface, mainly focusing on voice recognition commands. This feature focuses on eliminating driver distraction without reducing the application's functionality. This project is developed in association with Ford Motor Company.

Secure Online Banking Transactions Using Mobile Phones

Name: Anuragh Seri
Degree course: Electronic Eng (3 Yr)
Supervisor: Prof. John Gan

Abstract.

In the past five years, accessing the bank services through mobile phones has increased at an astonishing rate and changed the whole banking experience. Nowadays, Commercial banks all over the world are also thinking more efficient and productive in providing additional financial services through mobile banking. Simultaneously, security issues are becoming more crucial while performing day to day banking activities. This project is building an Android application for online banking which conducts traditional banking activities thoroughly. Designing a server which keeps the day to day record of the customer's banking activities and keeps the transaction traces of their account information confidentially. The aim is also to establish a secure channel between the client and the server, all the individual connections are interlinked and processed instantaneously. The

customer will be able to transfer the money anytime or anywhere from the application.
Using additional security attributes such as:

- DES encryption and decryption. (to encrypt Customer information)
- Voice biometric. (Customer Identity)
- Location information of the application. (notifying the Customer)
- Security code generation. (additional authentication)
- QR code. (Wireless Payments)

Collaborative Whiteboard Website

Name: Oyinpreye Onita
Degree course: Computer Sys Eng (3 Yr)
Supervisor: Riccardo Poli

Abstract.

The Collaborative Whiteboard website Penboard exists as a need to support remote collaboration tools. With characteristics of a whiteboard in a web environment, the technology is designed for creating visual ideas, while working alongside an online community. With the internet of things transforming the way we work, the technology supports collaboration in hand with teleworking to increase productivity. Research from earlier stages of the project using effective learning as a benchmark revealed that methods influencing a yield in productivity were aided by visual tools, group work and feedback. Within its framework, the website makes use of graphical and textual instruments with the option of working solo as opposed to with other users. The technology of the framework involves different instances of the same sketch connecting a number of clients in different locations, accessing the host through different browsers and operating systems. With this, events are monitored on the client-side of the website and when changes are made messages are sent from a single client to the server where it is broadcasted to other clients on the host. The changes are implemented on all other clients thereby multiple users are able to work on the same document. The product supports customization of the canvas design tools, including technology to access user design illustrating an architecture satisfying the demand for collaborative innovation.

Gamification as a Tool Towards Energy Awareness

Name: Sopreye Thompson
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Arsenia Chorti

Abstract.

Energy misuse and consumption is one of the biggest global challenges being faced today.

As energy supplies are finite, to easily sustain a good standard of living, energy needs to be used wisely. Research has shown that over the past few years, there has been an upsurge in the amount of energy consumed in households and communities as a result of technological advancement and evolution and also lack of awareness on how this could negatively affect the environment in the long run. The purpose of this project is to build a “gamified” web application that informs users about energy consumption and its effects on the economy, sustainable development and the future. The term Gamification simply means the process of using gaming mechanics and tools, aesthetics and techniques to boost user engagement, motivate positive behavioural changes, improve education, and derive solutions to challenges. (Kapp 2012). With the aid of quizzes, a space to log activities, a points based reward system and social media integration, this user friendly app with interactivity at its core aims to give users a breakdown of their energy usage. It also provides detailed information on how to improve their lifestyle and habits in order to save more energy in the long run. Once implemented, the data gathered will be evaluated using standard signal processing methods and the users will receive feedback based on this. The project is developed using Meteor.js - a platform built on Node.js; an open-source JavaScript runtime environment for developing tools and applications. Using JavaScript for both client and server side scripting and Mongo DB as the back end database to store and retrieve collections.

Ice Cube – 3D Unity Game

Name:	Dylan Sharp
Degree course:	Computer Games (3 Yr)
Supervisor:	Diego Perez

Abstract.

This project follows the development of a 3D game in Unity 5.5. It is being programmed with C# using Unity's Monodevelop client, and utilises an agile development methodology.

Put concisely, the main objective of the game is to carefully control an ice cube through a burning building in order to make it outside to safety without melting.

Many games on the market right now allow players to carry out a plethora of actions which hold virtually no repercussions - meaning the player's interactions can start to feel pointless very quickly. This game aims to combat that, by making the player always feel like they are in the drivers seat when controlling the fate of their character. The intention for this game is to force players to make decisions at a fast pace while also using executive thinking in order to reach the goals.

The game takes inspiration from the fast-paced nature of Mario, the inquisitive nature of Portal, and zany nature of I Am Bread.

Application Using Wind/Solar Farm Output to Determine Weather Patterns

Name: Jason Jones
Degree course: Computing (3 Yr)
Supervisor: Stuart Walker

Abstract.

Checking the weather nowadays is easy, you can go on the internet or perhaps on your smartphone. Websites or apps tend to display similar information; you get the standard temperature, wind speed & rainfall measurements. But what if you wanted to look at the weather in more detail?

What my application aims to do is provide a user with more options and more detail than they might typically find when looking at current weather apps.

My application displays weather maps, which are produced from wind and solar farm data. The user will be able to choose what data they wish to see; whether that be wind, temperature or both. They will be able to see which sites the data comes from, and click on the site to find out more information. Users will also have the option to view specific countries, if they so wish. Another feature which the application offers, is interval maps; which displaying a moving weather pattern over a short period of time.

Data used for the construction of my weather maps is from the Met Office.

Fighting Video Game Project for PC Platform

Name: Nikolaos Charatsidis
Degree course: Computer Science (3 Yr)
Supervisor: Stephen Sangwine

Abstract.

This project's aim is to create a video game using the Unity game engine, which is fun and also challenging for the player. The game is a 3rd person action/adventure that gives the player the role of the hero. He must save his own kind from the villains that invaded his village and imprisoned them.

The fun part is in the game's gameplay system, which allows the player to move around the world freely, jumping on platforms while having a few varieties of weapons to use while fighting. The design of the environment in each level gives a different feeling, thus hinting what kind of a villain to expect.

The challenging part comes with the game's AI. After a lot of experimenting and analyzing different famous AI techniques, it was possible to create enemies that are unexpected and

act accordingly to what is happening in the world and consequently coming up with interesting strategies.

Recreate a Classic Arcade Game

Name: Jack So
Degree course: Computer Science (3 Yr)
Supervisor: Michael Fairbank

Abstract.

The objective of this project is to recreate a classic arcade game. In particular, NES Bomberman was chosen to be cloned. The game is designed to be executed on PC with Java 1.8 installed. It inherited features from the original game which included the graphics, gameplay rules...etc. Players are required to find the way out of the maze by eliminating the obstacles with the bombs. The goal of the game is to obtain the highest score through eliminating enemies. For the map design, the game implemented as a tile based game map which a game object occupied exact one tile. However, Bomberman and monsters are exclusive for this. This game focused on simple control and leisure gameplay. In terms of the gameplay, it followed the original Bomberman. To be specific, the player controls the main character "Bomberman" who is able to deploy bombs. The bomb will denote itself after being deployed few seconds, it will destroy the objects except the unbreakable tile. Players should be mindful that the bomb could also hurt himself. Once player run out of lives, the game is over. In the context of game content, Procedural Content Generation (PCG) is introduced in the game which allowed the game object to be generated automatically for every game. In addition, the game embedded fascinating animation and sound which from an original sprite sheet and soundtrack. Player is able to customise the game such as difficulty, abilities, and items in the options menu. In addition, there is level system which player may encounter complex monsters in higher levels. The game is implemented with Java 1.8 which no other external libraries are used. Java is an Object-oriented programming language which is suitable for simple graphics game. It is coded with IntelliJ IDEA Java IDE and will be encapsulated in a Jar file so as to be executed on multiple platforms such as Linux and Windows.

Creating a Doom Engine from Scratch

Name: Harrison Mcdonough
Degree course: Computer Science (3 Yr)
Supervisor: Michael Fairbank

Abstract.

Game engines are great! They give developers tools to build games quickly and efficiently while hiding the hard parts involved in building games for the various platforms. The

motivation behind the idea of developing a 3D game engine is the ability to create flawless and precise games, with no bugs or glitches. As Powerful engines like the Unreal Engine, Source Engine and indie-darling Unity3D are examples of great tools built by people who want to make games bigger and better. The idea of creating an engine from scratch would enable hands on experience with rendering, scene graphics, collision detection (and response), physics engine, scripting, animation, and artificial intelligence key areas within any game development. The waterfall methodology was followed and all stages were implemented. Diagrams such as sequence, type, and use case were implemented and drawn upon. Due to the use of the waterfall method designing was slow as each stage had to be completed beforehand. As this is a fairly lengthy tasks, time was not on my side, the engine was completed but building a game upon the engine was tricky as new mechanics had to be built upon. Leaving some gaps within the program and some glitches. To conclude the task of the project has been fulfilled yet further improvements have been halted due to lack of time. For future reference the idea of switching from waterfall methodology to Agile would be more beneficial as testing and development would be ongoing throughout the project.

Signal Processing of Electromyographic Signals for the Control of Hand Prostheses

Name: Adam Kinsmore-Ward
Degree course: Computer Science (3 Yr)
Supervisor: Dr Luca Citi

Abstract.

The purpose of this project is to create a complete system that can record, filter process and learn from Surface Electromyographic signals to accurately predict a user's desired movement and carry out the movement on a robot prosthetic arm. This system has several distinct stages necessary for the adequate completion of this task. The data is recorded at 16 KHz using the BioSemi ActiveTwo high speed system. This results in 137 channels of information, each channel consisting of approximately 3.1 million samples. The samples are averaged across channels in close proximity to one another resulting in 24 channels carrying the data. The data is downsampled from 16 KHz to 2 KHz, to reduce the time that the following steps will take whilst maintaining the correct Nyquist threshold. The downsampled signal is band pass filtered by an IIR Butterworth filter to leave only those frequency components in the range 100-500 Hz unaffected. This is the main area of muscular activity. A notch filter at 50 Hz is applied to remove powerline noise. A range of informative features are extracted from the resulting signal; including the Trapezoidal integral, number of zero crossings, and root mean square. These features are extracted for every 200ms window in the signal. These feature values are collected into a single data structure ready to be passed to the machine learning algorithm for training and testing. The system makes use of ScitKit Learn's SVM regression algorithm to predict the angle of each finger during a movement

that is initiated by the contraction of the user's forearm muscles. Acknowledgements: Dr Ana Matran-Fernandez for her help in setting up the experiment and signal recording.

AI Agent for General Video Games

Name: Charles Lee Reynolds
Degree course: Computer Science (3 Yr)
Supervisor: Stuart Walker

Abstract.

Using Raspberry Pi to Control Lego Robots

Name: Kuncheng Li
Degree course: Computer Science (3 Yr)
Supervisor: Prof. Dongbing Gu

Abstract.

Recently, education robots become more popular. But either the education robot is powerful but expensive, normal people cannot afford it, such as Pioneer or the education robot is cheap but it has many limitations and user can only implement some simple tasks on it. The representative one is Lego NXT and Lego EV3. As a result, there is a huge market vacancy between this two kinds of robot. It is necessary to build an education robot which is as powerful as Pioneer but most developers even students can afford it. The purpose of this project is replacing the Lego EV3 original brick to Raspberry Pi and using Raspberry Pi to control the Lego robot. Because there are many limitations on Lego brick, such as memory space, processing speed and etc. In this project, more powerful sensor, for example camera, has been attached on Raspberry Pi. This will make the robot be more extendible, but the difficulty of programming is still suitable for beginners. There are three main features of this robot, the first one is remote control by Android phone and display real time information on Android phone. This is implemented by Android and Python socket technology. The robot connects and communications with Android phone via Wi-Fi. They last two functions all about computer vision. One is called colour-based object detection. the robot can detect and track object with specific colour. The other one is called template-matching object detection, user select an object on screen and the robot can track the appointed object. This two parts are both implemented by Python with OpenCV The software part, I used Android Studio with Android SDK 7.0, Python with OpenCV, MJPG-streamer and etc. The hardware part, I used Raspberry Pi and BrickPI, attached with Logitech C310 webcam and Lego EV3 large servo motors.

Assessing the Compression Efficiency of Lossless Data Compression Algorithms

Name: Sakariye Mahdi
Degree course: Computer Science (3 Yr)
Supervisor: Professor Edward Tsang

Abstract.

The aim of this project was to measure the compression efficiency of different lossless data compression algorithms. This was done by implementing 4 widely used compression algorithms - Run-length Encoding (RLE), Huffman Compression, Arithmetic Compression, and Lempel–Ziv–Welch Compression (LZW). To determine the efficiency of an algorithm, the compression ratio across multiple file formats was measured. In addition to this, the theoretical compression limit was calculated for a number of files. This compression limit, known as Shannon Entropy, was used to determine which algorithm generally performed better. To aid in this project, a data compression tool was created using C++. Graphs were created using the Qt GUI library.

Web Based Multiple Choice Test Engine for Students

Name: Kyriacos Michael
Degree course: Computer Science (3 Yr)
Supervisor: Mr Keith Primrose

Abstract.

The program that I have built is a multiple choice centre that allows the students to take a multiple choice test. Students have the opportunity to learn the lectures more easily and force them to study on a daily basis. On the other hand, admins, which are lectures or teachers, have access to the results on each student. So admins will know approximately for each student their difficulties. Also, the program will not only face students that the teacher or lectures put them quiz but also other people from different range of ages can register and do general quiz just for their own knowledge. The program is built in a Google Web Toolkit (GWT) that compiles Java to JavaScript. The program also includes HTML and CSS for the design of the web application. For the database that the program uses is MySQL. In the database, all the registered students are saved in the database, also in the database tests are saved for both students and guest.

Med-Transport Web Application

Name: Kyriakos Nikolaidis
Degree course: Computer Science (3 Yr)
Supervisor: Mrs. Arsenia Chorti

Abstract.

This model is designed as a hospital assistant to manage the daily schedule of a small clinic. At the current phase, the application can store patient's and doctor's personal data and information through VB.NET on a MongoDB server for further use. The graphical user interface of the model is designed through Visual Studio 2015, where also the connection with the MongoDB community server is established. The application manages to create a database on the NoSQL database sever where further data will be stored. Each section – patients and doctors - are represented by a collection stored on the server. The entities stored in the above collections are described as BSON documents and are used in situations such as arranging appointment's based on the availability time of the doctors and the importance of the patient's appointment. At last, the user can print the above queries on the screen or export the above BSON documents using PDF format. The project at its final phase, as a Med-transport web application, will handle also drivers for emergency transport services of the patient, according to the importance of its appointment.

Children's Game

Name: Patrick Smith
Degree course: Computer Science (3 Yr)
Supervisor: Sam Steel

Abstract.

When I was given the Children's Game project, I was very excited especially to develop it within Unity, I chose to create a puzzle / time-trial focused game whereby the player would have to complete a levels challenges, avoid losing by dodging water, empty space or enemies all while also trying to complete the level in as quick a time as possible. Should they be able to complete the levels in quick time, they will also unlock new skins (appearances) for their player to be used across play-throughs. This was a functionality that was not considered in the initial design but along with the time-mechanic has served to work well and provide an enjoyable game-type. Sphere Star has been made both using my own skill in programming and creative level construction, but also with provided free cost assets from the Unity Store such as materials and textures that give the levels a design theme, sounds provided by FunSounds.com and Incomptech.com as well as Low Poly Models and Tele-porters also provided by the Unity Store. If you're interested in Children's Games, Video Games, Unity Design or a non-technical consumer turned developer's project progression; then please come and find my stall and poster for more.

Reusable Learning Objects in Html5 and Javascript

Name: Enyinna Ogwe
Degree course: Computer Science (3 Yr)
Supervisor: Keith Primrose

Abstract.

Until recently Reusable Learning Objects available on the web have tended to use Adobe Flash to implement the content. This has obvious disadvantages. The goal of this project is to develop one, or more, reusable learning objects using HTML5 and JavaScript. The subject matter for the RLO(s) is introduction to computer programming for first-year Computer Science Students. HTML5 is an open standard that is increasingly being adopted by multiple platforms on the internet, while Adobe Flash is slowly dying out.

Lucky: A Computer Vision-Based Indoor Navigation System with Optical Character Recognition

Name: Deborah Dike
Degree course: Computer Science (4Yr)(I)
Supervisor: John Gan

Abstract.

'Lucky' is an Android application that aims to provide a visually-impaired user with a way to navigate within their homes with more ease than without the application, to provide the added assistance of OCR for instances where a user otherwise would not be able to read a piece of text for themselves, and to provide audio and visual feedback from the application to ease their use of it. The main components of the application are: the OCR recognition component to facilitate the text reader, the step detection, dead reckoning, and map generation components, and an internal SQLite database component used to store information about user-defined routes in an indoor environment. The technically challenging aspect of this project lies in the indoor navigation which is why two external libraries, tess-two and OpenCV, have been used for the OCR aspect so that more time could be spent on implementing the navigation feature. To tackle this challenge, a combination of step detection, dead reckoning, and the generation of a map representation of a user's route(s) have been used as a way of indoor positioning. This application is intended solely for people who are visually-impaired and does not aim to cater for the blind due to the fact that this application would need more extensive testing and be able to guarantee safety.

Web-Based Programmed Learning

Name: Nicole Du Preez
Degree course: Computer Science (3 Yr)
Supervisor: Dr. Sam Steel

Abstract.

"Computer Science for Beginners" is an online resource that offers students a tailored-learning experience, by allowing students to register with the website and create an online account. This enables students to monitor and track their progress throughout their learning journey. Students are able to undertake introductory modules of their choosing in the field of Computer Science. Each module incorporates the principles of programmed learning, aiming to embed knowledge and understanding of complex concepts, by implementing sequential teaching and testing strategies. In order to monitor the progress of the students, the website interacts with a MySQL database, which is regularly updated with the results of each module completed by the student. This allows administrators to query the database and generate reports, based on the query data that is returned. The interaction between the website and database is made possible through the implementation of PHP server-side scripting, allowing communication with the database to take place over a WAMP server in real-time.

Event Detection in News Media

Name: Jabir Musa
Degree course: Computer Science (3 Yr)
Supervisor: Annie P Louis

Abstract.

News sources produce thousands of news articles every day, reporting on local and global real-world events. This large amount of data can help the readers to make better sense of the world in which they live in. But new information from today quickly replaces the old reports from yesterday, and understanding the story development can become a challenging task. In this project I have developed a visual exploration system that helps the reader in getting a better insight into news story development and its content. The system provides user-specific temporal overviews with different levels of detail with highly customizable filtering and sorting options. News articles, which are collected from a large number of media portals, news agencies and government institution websites, are grouped into coherent topics using automated algorithms for document clustering. The topics are presented to the user with an incremental interactive visualization method that can display and process new information without recalculating the past data and changing the visual layout.

Self-balancing Two Wheeled Lego Robot

Name: Sai Hanmaiahgari
Degree course: Electronics (3 Yr)
Supervisor: Francisco Sepulveda

Abstract.

Remember the days when we were young and tried to balance something on the palm of our hand? You had to adjust the position of your hand every time the object tilt to one side. The inverted pendulum does the same thing. It is one of the most common problems in control engineering. The self-balancing robot is a system similar to the regime of an inverted pendulum on a cart. The aim of the project was to construct a two-wheeled self-balancing robot using the Lego Mindstorms NXT and use Simulink and Mat-lab to tune and simulate it accordingly. The main functionality is to detect obstacles using ultrasonic sensor and use Gyro sensor to maintain the balance and implement a PID controller to generate control signals to the servo motors to keep the balance. The robot is tested by first running its controller in simulation and then use the simulated hardware to confirm the accurate performance. Then ratify it by running it on the actual device. The parameters can be changed accordingly to behavior. The current state of the project is, the robot can detect obstacles and can partially balance itself on two wheels. The complete working model should be ready within few weeks.

Procedurally Generated Archipelago City

Name: Lewis Veryard
Degree course: Computer Science (3 Yr)
Supervisor: Adrian Clark

Abstract.

Cities are comparable to a complex living organism as they are an amalgamation of smaller individual parts working together. They consist of a diverse range of structures and systems coming together to work in unison. This means that the perfect city could in theory be created through a set of rules if they are dependent on each other, but this is far more difficult in practice. People have tried to create modern cities that are based around the use of cars as the main transportation method; some examples include Milton Keynes, Los Angeles or New York. However it is very difficult to create a city with a high quality of life and to be effective for the use of cars. This project is about dynamically creating the visuals of a city using a set of rules. This city will reside on a set of islands that will be interconnected by causeways or bridges. The city can be broken down into four main sections; islands, roads, plots and buildings. Each section of the city that is generated from the previous part, the amalgamation of these parts creates the city as a whole. The idea is that every time that the program is run a different set of islands will be created and thus an

entirely different city. This project is achieved through the use of C++ and the OpenGL Library.

Collaborative Whiteboard Website

Name:	Tomas Janulevicius
Degree course:	Inform & Com Tech (3 Yr)
Supervisor:	Prof. Riccardo Poli

Abstract.

Collaborative whiteboard website - will allow users to collaborate in a different, entertaining and non-usual way. The main goal of the project is to make team work a lot more efficient and time saving. Currently the website allows users have their own drawing boards on which they can draw. There are a few colours to choose from, to satisfy different user needs. The website is still in development process, but in the final product users should be able to write on the board itself, also they should be able to put yellow stickers allowing users to make notes. What is more users will have the ability to post links to other websites, post pictures and videos as well. Picture and videos will be uploaded directly to the board and they will be in the same quality as the original file. All uploads will be made from the machine on which the user is logged in. All the content in the board will be saved in MySQL database which means users will not lose the content of the board between sessions or when the browser is closed. Users will be able to invite and share their boards with other registered users. Users will be able to register and login to the website.

Chatbots: The Answer!

Name:	Sian Dobrin
Degree course:	Computer Science (3 Yr)
Supervisor:	John Woods

Abstract.

This project involves the creation of a chatbot, using Python and ALICE AIML, which can answer general questions about the University of Essex. A chatbot is an intelligent system that can answer questions that a user asks using natural language. This project saves you time! Students and staff will no longer have to sift through monotonous webpages to find their answer, this system allows the user to ask a question about the university of Essex and receive an answer back fast. What makes this system fun is that you can either type your question into the chatbot or you can use the speech recognition feature, allowing you to speak to the chatbot. The chatbot will then reply using text or its speech synthesis feature to generate a real reply spoken out loud. You can ask the chatbot questions such as 'Where is the library on campus'? and many more. The chatbot even can answer some general

knowledge questions. On top of this, the chatbot's own unique personality provides an even more human-like simulated conversation with the user.

Photodetector Design, Fabrication, Test Suite

Name: Matthew Evans
Degree course: Electronic Eng (4Yr)(I)
Supervisor: Professor Anthony J. Vickers

Abstract.

What brings fast fibre internet to your home? Optical communications are becoming increasingly important in today's society for the rapid transmission of information for both businesses as well as individual consumers. The two most common wavelengths for this transmission are around $1.3\mu\text{m}$ and $1.5\mu\text{m}$. This project focusses on some of the fundamental electronics behind receiving optical communications - photodetectors. In particular, photodetectors operating in the region of $1.3\mu\text{m}$ (near-infrared). Offering a complete suite for the design, fabrication and testing of photodetectors utilising molecularly thin interference mirrors. With the ultimate goal being to offer greater efficiency to improve said communications.

Designed Solar Cell Test System

Name: Joao Fernandes
Degree course: Electronic Eng (3 Yr)
Supervisor: Anthony Vickers

Abstract.

Global warming is a key subject for future generations, and renewable energy sources offer the best solution for the problem. This project offers a solar cell testing platform. The platform simulates sunlight excitation to the solar cell and records its electrical behaviour. The product uses National Instruments graphic programming development platform called LabVIEW to compute the behaviour of the cell and implement the product specifications. The product outputs current and power behaviour at certain voltage range (specified by the user) of the cell, and the cell's performance and power parameters. Within the parameters described include voltages, currents, resistances and powers of the solar cell, as well as calculations for the effectiveness of the solar cell.

Create a Doom Engine from Scratch

Name: Sean Brackenborough
Degree course: Computer Science (3 Yr)
Supervisor: Michael Fairbank

Abstract.

My project involves implementing as much of a basic game engine as possible from scratch, meaning no use of frameworks such as Unity. One of the key elements of the project is rendering - what parts of the world should be seen, and which parts should not. This is done through hidden surface removal, for things such as walls, that are behind another wall, which should therefore not be seen. This is done through clipping to portals. The game engine uses 2D co-ordinates of a birds-eye view styled map, and transforms these vertexes into a first person 3D perspective styled world, similar to the original DOOM game. It does this through the use of various math. For example, clipping is used for deciding which part of a wall to render, and which part not to for instances where the part of the wall isn't on the screen, or in the player's field of view. Another use of math that will be implemented is cross product, for determining how a player should move if colliding with a wall - the player should slide along the wall, rather than just stopping, the cross product gives this kind of motion. Included in the game engine is simple controls for moving in the forward and back directions, as well as rotating left and right. Another goal of the project and game engine is to include collision detection, which simply stops the player from moving through things it should not be able to. For example, walls and floors.

Interfacing Android with Quadrotor

Name: Roch Sherriff
Degree course: Electronic Eng (3 Yr)
Supervisor: Dongbing Gu

Abstract.

Unmanned aerial vehicles (UAVs) were once nothing more than dreams of inventors. As technology advanced these dream soon became a reality with UAVs being created for military use. As technology continued to advance and the cost of production fell these machines one built for armed forces were being designed for civilian use, and ever since the popularity of these machines has been rapidly increasing. The majority of use for civilian UAVs is recreational, being used for hobbies. Although these UAVs are created for recreational use and designed for those who have not had any training, they often come with complex and often bulky controllers. The aim of this project is to develop a programme to control a UAV from a mobile device. This has been achieved by developing an android application, called MOBI-DRONE, which can control the flight of a UAV while also displaying the footage from the onboard camera. The MOBI-DRONE application is simple and easy to

understand and use while also able to control the UAV accurately so it is able to navigate relatively complicated paths. Design of the product was done with the general public being regarded as the target audience as it should be appealing and intuitive to use. The app has been developed to control a quadrotor made by Parrot, called the Bebop Drone, in an indoor environment.

Searching News Using The Knowledge Graph

Name: Mathew Tunwashe
Degree course: Inform & Com Tech (3 Yr)
Supervisor: Dr. Annie Louis

Abstract.

My product is able to extract named entities such as PERSON, LOCATION, GENRE, ORGANIZATION, YEAR and RATINGS of a document, specified by the user which in this case is a movie review dataset (unstructured HTML dataset). This system extracts the named entities, including the Part of Speech tags of each entities and then store the data in a Comma Separated Value file (CSV). What will attract you to my poster is the brief insight as to what my product is about by stating the project proposal, simplified proposal, the current product state and a design of how the product can be improved. Furthermore, I included the screenshots which gives readers a good idea of what my project is about. The screenshots depict the system output and screenshots of the extracted and stored named entities in the CSV file.

A Ghost Train Predator-Prey Game

Name: Yuk Tsang
Degree course: Computer Games (3 Yr)
Supervisor: Diego Perez Liebana

Abstract.

This ghost train predator-prey game is a descendant from Pac-Man. Player need to control a train to travel through the maze-like tracks while being hunted by the ghost trains. Player need to collect a key in the maze to unlock the door, which allows the player to progress into the next level. Items and boosters will randomly appear to aid the player to complete the mission. The goal is the game is to progress through the stages, getting the highest along the leaderboard with limited resource and increasing difficulty. The game features a procedural content generation algorithm to produce infinite number of level. Each time player enters a new stage a new random maze is created from blocks of different tracks. This increase the replay-ability comparing to Pac-Man which has the same maze every time. The game will only end when player lost all the lives and the score will be recorded, this is also the reason why lives cannot be increased or regenerated throughout the gameplay

otherwise a game will be too long. There will be more than one ghost trains in the game to chase after the player, increase the number of ghost trains while player progress into higher levels, up to a maximum of 3 ghosts. They will also have different personality (chase pattern), like Pac-Man. They use an A* pathfinding algorithm to move in the maze. Items in the games such as speed boost or power boost can help the player escape from the ghost trains or even counter attack them. As the gameplay in each stage is much more fast-paced than Pac-Man (only collect the key and reach the door comparing to collect all the dots), ghost will not be respawn until the next level when they are killed by the player using items.

Incognito

Name:	Matthew Dovey
Degree course:	Computer Science (3 Yr)
Supervisor:	Ian Daley And Jianyong Sun

Abstract.

Incognito is a security analysing tool used to discover vulnerabilities and flaws in a machines security by utilising a custom built host discovery service and port scanner. Its aim is to provide the knowledge needed to reduce the risk of malicious actions performed against the average home computer user to the avid computer user. Incognito has been primarily written in Java and is used through the JavaFX GUI created. The GUI includes a custom built console providing most of the functionality and the ability to manually run all commands and services. The application is run on a machine within a target network allowing it to discover all other live machines. Host discovery uses both ICMP packets when using the basic scan option and TCP connections with the advanced scan to determine whether a host is running or not. Once these results have been collected they are saved into a SQLite database and individual machines can now be targeted. Using the data collected on live hosts within the network a dynamically generated network topology can be created and viewed showing a map of the network. Targeting individual machines allows for the use of the port scanner service retrieving and determining open ports based on specific scans. These results are also saved to the database and displayed on Incognito's GUI. Once all scans have been completed and the retrieved data is sufficient a report can be produced outlining all security flaws and all of the desired results produced by Incognito's services.

Web-Based Multiple Choice Test Engine

Name:	Cornel Constantin
Degree course:	Computer Science (3 Yr)
Supervisor:	Edward Tsang

Abstract.

A multiple choice test can be just as hard to create as it is to take it. Getting the format

right, the questions and answers, distributing, analysing it, and everything in between it can all be a pain. But not anymore! With the new Multiple Choice Test Engine all this work is about to become centralised in a flexible and intuitive environment ready for the user to take it to the next level. The project aims to deliver a fresh reimagination of a MCT editor in a web-based format, with all the tools necessary to build, edit, share, and analyse tests. The success of a web application of this kind is heavily dependant on both the strength of the platform itself and the user experience it provides, in accordance with contemporary design principles. With this in mind, I have attempted to combine modern technology with traditional development principles to create a robust piece of software, a product with a timeless functional design, both internally and externally.

Open Domain Question and Answer System

Name:	Osama Rahman
Degree course:	Computer Science (3 Yr)
Supervisor:	John Gan

Abstract.

The premise of an open domain question and answer system is quite simple. A user asks a question using natural language, and the system returns an answer in natural language. For a system to have an open domain it must be able to answer a multitude of questions varying from As artificial intelligence progresses and becomes more prominent in day to day life, interaction between a user and an AI must become more natural. There are two main aspects in an Open Domain QA System, natural language processing, and information retrieval. When a user asks a question, the systems must read this and formulate some sort of query using natural language processing. In terms of information retrieval, the two questions above will need to retrieve information from different sources. For example, the question about the weather will need to make an API call to a weather service called Dark Sky. The question about the exoplanet will make a call to the knowledgebase, DBpedia. Having multiple sources of relevant information allows the system to be have a higher precision, and to be more open. The natural language aspect of the system works by tagging words in a question, with part of speech tags. For example, a noun would be tagged NN and a verb VB. After the words are tagged, the system will use these tags to select key words which will be used to form a query. Using SPARQL the system will query DBpedia which uses an RDF framework to structure its information for easy retrieval. short answer on who Alan Turing is.

N-Th

Name: Stoyan Penchev
Degree course: Computer Science (3 Yr)
Supervisor: Dr Nigel Newton

Abstract.

The aim of the project is to use C++ to create a PC game sufficiently engaging to the average player. This presents both a technical and a creative challenge and is a great opportunity to showcase different skills and receive feedback. The game born of this project is "n-th", a point-and-click puzzle featuring, as the name might suggest, maths. In a lot of ways the game resembles the old Windows classic Minesweeper. For example, both games involve tiles which the player must reveal, they are associated with numbers, and some of them have unfortunate results. But while Minesweeper deals with mines and their proximity, n-th deals with multiplication and zeroes. Every tile has a certain chance of becoming a 0 which increases with its value so the game is ultimately about balancing risk and potential gain.

Web-Based Programmed Learning

Name: Charis Patsalidis
Degree course: Computer Science (3 Yr)
Supervisor: Sam Steel

Abstract.

This is a PHP based website created using a responsive design that allows learners to undertake courses developed in a programmed learning style. The homepage of the website gives the visitor information about what programmed learning is and how he can register and start undertaking courses. The website uses a login system that checks the database to see if the person credentials are correct and then categorizes him as an admin or user. This ensures that a simple user can only view and undertake courses while an admin can have access to extra pages that can add, delete or modify courses questions and can also view students feedback. If the person credentials do not match anything that is currently stored in the database, the system will ask the user that in order to proceed registration must be completed first. When taking a course, depending on the learners answer the system guides him to the appropriate page until the learner complete the course. The courses questions and answers are stored in MySQL databases and the tests are created by retrieving data from the databases using PHP and present it to the learner using HTML forms.

Web Based Multiple Choice Test Engine

Name: Agapios Paraskeva
Degree course: Computer Science (3 Yr)
Supervisor: Mr Keith Primrose

Abstract.

Multiple choice tests are used in a variety of areas, such as educational testing, market research, medical predictions and elections amongst others. Gaining more and more popularity through the years, this form of assessment is one of the most frequently used worldwide. Seeing the usefulness and effectiveness of multiple choice tests in everyday life, and using a number of different development tools, I developed a website which includes a multiple choice test. The website can be easily accessed by anyone regardless of computer knowledge as long as they sign up on the website with an academic email address. The test contains a number of possible answers for each question, out of which the users will select the preferable answer. An important factor is that the users can easily view the previous questions to verify or alter their answers. Additionally, the administrators can modify, delete and add questions and answers to the test, as well as modify the users' information and observe the test results as soon as the user presses the 'Finish' button.

Web Based Multiple Choice Test Engine for Companies

Name: Charalampos Papadopoulos
Degree course: Computer Science (3 Yr)
Supervisor: Keith Primrose

Abstract.

The project is a web based platform in which companies have the ability to assign quizzes on individuals. Thus, the engine could be used in order to evaluate the level of knowledge of the existing employees or potential ones. There will be two types of users, one for the simple user and one for each company. Company profiles will have the ability to create tests. Each test could be assigned on more than one users. Mass importation of questions for each company will be possible. Statistical results of each test will be available for each company profile. On the other hand, simple users will be able to create a profile and undertake a quiz. Key Features that will be included in the project: *Login system. *Profile creation. *Multiple Choice Test creation and assignment. *Import/Export questions in Aiken Format. *Statistical representation of each quiz result using charts.

Netpark – The Worlds First Digital Art Park

Name:	Segun Olaretan
Degree course:	Computer Science (4 Yr)
Supervisor:	John Gan

Abstract.

This project is an App created for people that's living with Dementia and school children, helping them to be transported through time and memory to experience Chalkwell Park in a new way. This project is GPS located in a number of 'chapters' across the park and is experienced through headphones using an iPad. Visitors can download this App called "Garden of Remembrance" or use the preloaded ones provided by Metal company themselves. The experience starts as soon as the user clicks on the app and the home page will appear with a map showing the points available to visit. The user has to move from one point to another with their earphones attached to the iPad in a progressive order. The best part of this app is the GPS located effect which triggers each chapter to come up on the device automatically when a user enters the radius covered by each coordinate on the map, user can then listen or read the story behind each location. This app will enable people that's living with dementia to experience a new world of support and to remember how they have used the park in the past. This work is a the result of a partnership with Metal, the Netpark wellbeing Project, Southend Borough Council and NHS England. A video demonstration will be available to show how this app will work during the open day.