4 Week Summer Internship Opportunities

School of Computing Science and Digital Media, Robert Gordon University

Project Title	Creation of a Graph Database to Analyse Academic Paper Referencing
Project Outline	When writing academic literature, it is important to reference previous work in the area. This allows readers to understand how current work fits into the context of what already exists. However, this type of referencing covers a very linear path and does not fully represent the breadth of knowledge that exists in an area. The purpose of this project is to create a graph database that would link together academic literature in a given subject area in order to identify key cited works. This can then be used to develop a more in depth understanding when performing literature searches.
Key Skills Required	Graph Database (neo4J or equivalent) Intermediate Coding Ability Excellent Writing Ability
Project Supervisor	Dr. Michael Crabb
Project Dates	Either: 23.5.16 -> 1.7.16 (6 weeks) 15.8.16 -> 23.9.16 (6 weeks)

Project Title	Collaborative m-Learning Framework to Facilitate Team Based Development
Project Outline	The m-learning framework will consist of an integrated development environment, which allows the creation of dynamic student teams that can work together to rapidly develop a mobile application. This project is inherently about harnessing current messaging, file transfer, discussion forum, video conferencing technologies and packaging them all together into one single system. One could make use of tools such as dropbox, google drive for file storage, integrate google hangouts for video conferencing, make use of an instant messaging service, for real-time discussions, discussion forums for larger queries, social media integration, project management tools, code sharing and version control facilities and so on.
Key Skills Required	Strong programming ability in web development, interest in working with forums, social media, version control, code sharing, real-time chat, video conferencing, client / server side web development, html5, css, javascript, http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6550559 http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7014563 http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6063166 http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6641593
Project Supervisor	Dr. Daniel C. Doolan
Project Dates	After Exams / June

Project Title	Prediction of relative weight from body shape in adults
Project Outline	The project aims at developing a predictive analytical tool/s to predict body weight and obesity from shape parameters extracted for 3D body scans. The work that will be carried out by students can be outlined as follows: • Pre-process, clean and label and existing of archived anonymised scans to provide a shape – weight continuum from existing RGU dataset • Carry out initial exploratory analysis to identify certain characteristics within the data (i.e. feature importance, correlations, etc…) • Apply a set of advanced machine learning algorithms to build a predictive models • Evaluate and compare results with extant data on relative weight and other relevant work. This will require searching and investigating literature related to similar problems • Technical documentation and possible dissemination of the results
Key Skills Required	• Ability and willingness to learn new skills and scripting languages • Strong programming and scripting skills preferably in R/ Python • Experience with machine learning and/ or data pre-processing, cleaning, etc… is highly desirable • Good verbal and written communication skills
Project Supervisor	Dr. Eyad Elyan / Dr. Arthur Stewart
Project Dates	1st of June (possible start date)

Project Title	A Taxonomy for Accessibility in Digital Board Gaming
Project Outline	The industries that surround and support the development of most entertainment products have developed broadly effective means of supporting individuals with physical and cognitive impairments. Gaming lags considerably behind other high-profile entertainment formats in this respect. As part of the preparatory work necessary to strengthen future grants on this topic, this research project would focus on developing a taxonomy of accessibility considerations and compensations that would apply to gaming products, particularly those related to the digitization of physical board games. Students selected for this project may be invited to present the work at an upcoming SICSA Video Game Accessibility Workshop.
Key Skills Required	• Self-directed and able to work with minimal direct oversight. • An understanding of the key deliverables associated with performing research in several inter-related areas. • A keen interest in digital gaming and related accessibility issues . • An interest in the accessibility issues that impact upon disabled players interacting with physical games. • Write and communicate clearly to a non-specialist audience. • Develop engaging web-sites for communication of findings. • Programming skills are not a high premium for this, although some element of web development will be required.
Project Supervisor	Dr. Michael Heron
Project Dates	To be negotiated

Project Title	Visualising the Referendum
Project Outline	Information on social networks spreads fast. You can monitor the uses of a particular keyword or mentions of a particular user. Simple counts, however, do not give the full picture. The network that forms around a particular tweet allows you to see the type of people who are interested in a particular tweet or topic. Currently a lot of research is undertaken after an event has taken place which shows the resulting spread of information. This project will look at a number of ways of visualising the spread of topics as they happen in real time during the EU referendum on June 5th.
Key Skills Required	Real Time Visualisation, social network analysis, web technology, data mining
Project Supervisor	Dr. John Isaacs
Project Dates	2nd May to 12th June

Project Title	BLE Location-Aware Framework for Mobile Devices
Project Outline	Information overload makes getting the right information at the right place difficult. BLE beacons provide one solution that reduces barriers to accessing location-specific information. We have developed successful, location-aware tourism apps for both Historic Scotland and the National Museum of Flight. However building iOS and Android applications is expensive and, with each requiring custom development, the cost for new apps is too high. The aim of this project is to design and build a cross-platform framework that simplifies new app development by providing a set of configurable content templates and beacon indexing to easily embed multi-media content.
Key Skills Required	JavaScript/JQuery Mobile, HTML5, CSS. Preferably AJAX, PHP and mobile/web application development
Project Supervisor	Dr. Stewart Massie, Prof. Susan Craw
Project Dates	Approx. 4weeks - any time May-August by arrangement

Project Title	Project Title Toward QoE-aware SDN-based Wireless Content Delivery
Project Outline	Quality of Experience (QoE) refers to the overall acceptability of an application or service, as perceived subjectively by an end user. With the availability of Internet of Things, various end-user devices (e.g., smart phones, tablets pc, mobile gaming terminals, ebook readers) exist, meaning that user requirements for wireless content delivery vary between different end users. This project will leverage SDN's centralized management to achieve global optimization on maximizing QoE degree for wireless content users while efficiently and adaptively managing network resources.
Key Skills Required	The candidate should have good knowledge in Computer Networks or Wireless Communications and is enthusiastic in carrying out research studies to obtain knowledge, understanding and results beyond the classroom learning. The candidate should be interested in searching and reading through major literature relating to this project. Programming skills (e.g., C++, Java, Python) are important for this research. Also, the candidate is expected to be a good team player, have good communication and writing skills, and to meet deadlines.
Project Supervisor	Dr. Wanqing Tu
Project Dates	Summer 2016

Project Title	Learning from Multiple Sensors for Human Activity Recognition
Project Outline	Single accelerometers have been widely used for human activity recognition with good results. The incorporation of multiple sensors e.g. Gyroscope, Heart-rate monitors and GPS is expected to lead to further improvements . In reality however, this has not always been true (Shoaib, Bosch, Incel, Scholten, & Havinga, 2014). This is because there is little understanding of the combinations of sensors and body locations that are complementary for improved recognition accuracy. The **aim** of this project is to investigate the use of multiple sensors (e.g. smart watch, mobile phone) placed at different body locations for activity recognition particularly looking at the best combination of sensors, features and aggregation strategies.
Key Skills Required	Machine Learning, Feature extraction, Programming (preferably Python)
Project Supervisor	SelfBack team (Dr. Sani, Dr. Massie and Dr. Wiratunga)
Project Dates	Any time after April

Project Title	Data Analysis
Project Outline	We are looking for two students to help analyse the data we collected from high schools in 2015, and to help us organise data collection for 2016 through Google Forms. The data will need to be analysed both quantitatively and qualitatively (depending on student skill and preference), and will form part of an upcoming paper publication.
Key Skills Required	Awareness of Scottish Highers/Advanced Highers SQA qualifications Data collection (through use of the Google suite e.g. Forms and Sheets) Data analysis (either using Excel or SPSS/R). A knowledge, or desire to learn methodologies such as thematic analysis or grounded theory.
Project Supervisor	Dr. Mark Zarb/Dr. Angela Siegel
Project Dates	1 Jun – 30 Jun