



Summer Internships (2010) in the Digital Economy

Deadline for applications: Friday April 30th 2010

Horizon Digital Economy Research, a £40m initiative funded by Research Councils UK, the University of Nottingham and over 40 academic and industrial partners, brings together an interdisciplinary team with expertise from a wide variety of backgrounds including computer science, geospatial science, engineering, psychology, sociology, business, and the arts. Horizon's website may be found at www.horizon.ac.uk

This summer, Horizon Digital Economy Research is seeking enthusiastic postgraduate student interns to undertake 10-week research projects at the University of Nottingham. Internships will attract a bursary of £300 per week, and interns will be given office and lab space within Horizon at the University of Nottingham, and access to the equipment required to undertake the projects. The intern will be responsible for using the bursary to cover their own travel, accommodation and subsistence costs – arranging accommodation will also be the intern's responsibility, however we will do what we can to seek out accommodation options for the intern.

To apply for any of the internships stated below, please email horizon@nottingham.ac.uk, for the attention of Dr. Sophie Dale, quoting the reference code(s) for the particular internship(s) you are interested in, including a CV and a brief description of why you should be considered for the internship. Candidates should already be studying at postgraduate level in the UK. The start date for each internship is negotiable, however it is anticipated that the internships will take place during the summer vacation months (i.e. any 10 weeks between Monday June 22nd and Friday September 17th).

The titles of the available internships are:

- **PsychoFIZZ - real time monitoring of physiological traits**
- **Functional programming for anonymity and services in the cloud**
- **Exploring the language of navigation**
- **Tourists' use of digital media/online tools in shaping the visitor experience**
- **Creating a user-controllable VR photo album of a theme park ride visit**
- **User-relevant geo-labelling**

Intern/2010/1: PsychoFIZZ – real-time monitoring of physiological traits

Supervised by: **Brendan Walker of Aerial and the University of Nottingham**

This internship will develop PsychoFIZZ - an open source software project, which allows real time monitoring of various physiological traits (e.g. heart rate, sweat response) from multiple subjects. It is based on gathering and analysing medical data from multiple devices distributed across Bluetooth and WiFi networks. The resulting aggregated data can be used in a variety of 3rd party creative applications e.g. live theatre and adaptive theme park rides. However, the driving force behind this internship is to develop PsychoFIZZ as the engine behind a new reality TV project.

This internship is available for postgraduate students currently studying in the UK who have the following skills: ability to work in python and experience of software development; experience of working with networked devices and common communication protocols; experience of applying data analysis techniques, particularly filters to analyse 'noisy' real-time and recorded data sets; an aptitude for data visualisation and building graphical user interfaces; an interest in physiological monitoring and human emotions; experience in software and hardware integration. The chosen intern should be confident and able to work on their own initiative to reach project goals set by a project steering group. It is desirable, though not necessary, for the intern to have skills in electronics and device prototyping, specifically using the Arduino development platform.

Intern/2010/2: Functional programming for anonymity and services in the cloud

Supervised by: **Dr. Richard Mortier, University of Nottingham**

Dr. Anil Madhavapeddy, University of Cambridge

The intern will work on one of the infrastructure technologies that Horizon is developing, selecting from: cloud-based scalable applications in OCaml for the Mirage system, such as XMPP, IMAP or BGP servers; cloud and mobile personal containers for controlling and monitoring exposure of private data; and lightweight virtual machines hosting Tor anonymous routing, with explicit control over the costs of achieving anonymity.

Depending on the area chosen, the intern should have the following skills set: functional programming (OCaml preferred) and networking; web development (Python, Javascript, AJAX, HTML, CSS); or networking, operating system development and javascript/scripting.

Intern/2010/3: Exploring the language of navigation

Supervised by: Dr. Svenja Adolphs, University of Nottingham

Jeremy Morley, University of Nottingham

Horizon and the Centre for Geospatial Science are looking ahead to different forms of interaction between a user and a mobile device. Currently voice interfaces to mobile devices are very limited. In part this is because of the problems in voice recognition in noisy environments. However a further problem is the understanding of spoken English. The School of English Studies has a large body of examples of spoken English (a corpus) and are interested in linguistic analysis. However we suspect that this corpus will not contain a wide variety of examples of language related to navigation.

The main approach to be explored in this internship is by direct survey, recording the language used by people on the university campus in describing directions e.g. around the University Park campus; from University Park to Jubilee campus; from a campus to a known location in central Nottingham. This will involve the intern in experimental design of the data capture; collecting directions; transcription of the data; and initial analysis of the resulting corpus of language.

The intern could also explore what is understood in different circumstances by a set of fixed phrases. For example, what is understood by "I'm going into town" or "I'm going to the shops" in different places by different people? We hope that some analysis of the results will be part of the project but this will depend on how quickly the research methodology can be developed, ethical & personal security issues considered, and data collected and transcribed. The first focus of the internship is gathering the body of data.

Applications are welcomed from interns with the following skills set: experience in survey and questionnaire design, audio transcription or linguistic analysis would be valuable. A background in geographic information systems or science, or navigation devices would alternatively be of interest.

Intern/2010/4: Tourists' use of digital media/online tools in shaping the visitor experience

Supervised by: Dr. Scott McCabe, University of Nottingham

This project seeks to understand which, and at what points, in the visitor experience and post-experience phases tourists use a range of digital media and online networking/information tools to shape their visit experiences. The project will focus specifically on short break visitors to cities in the UK during the summer of 2010. Working with Experience Nottinghamshire and potentially with other destination management partners in the East Midlands Tourism (EMT) region, the research will consist of an online survey of tourist consumer's use of online social networking sites, alongside a range of traditional media and information sources, to shape the experience within the destination as well as after their trip. Whilst previous studies have sought to understand the influence of social/digital media on trip planning behaviour, there is a gap in research on the extent to which, for example, mobile digital applications (location/positioning devices, online information sources on leisure visitor attractions etc) shape tourist experiences once in the destination, and also the extent to which the records of experience that are captured with mobile devices are used in the dissemination of post-visit experience (use of Twitter postings, upload of photos/videos etc) in the online environment.

This internship will require knowledge of tourism management and marketing as a subject background, and experience of survey design together with familiarity with e-survey tools and quantitative methods. The intern must be professional in approach and be an able communicator.

Intern/2010/5: Creating a user-controllable VR photo album of a theme park ride visit

Supervised by: Prof. Uwe Aickelin, University of Nottingham

In this project we aim to run a simulation of an individual's theme park ride visit based on the data trail they leave behind and create a virtual environment. We can make it more realistic by simulating others who were there or by simulating an artificial crowd. The final product would be a VR photo album which can change every time someone looks at it through changing the parameters for the VR simulation, e.g. the level of details (number of layers) displayed, the way in which the environment is represented, even creating a completely different environment (as used in virtual rides).

The intern should, ideally, have some prior experience of VR research.

Intern/2010/6: User-relevant geo-labelling

Supervised by: Dr. James Goulding, University of Nottingham

Dr. Jerry Swan, University of Nottingham

Dr. Richard Mortier, University of Nottingham

The project intends to build a webservice and associated tool to convert timestamp and geotagging information associated with photos taken on phones (and other capable devices) to tags that are more meaningful to users. For example, a sequence of photos taken during a European holiday might all be tagged "European trip", with some tagged "Spain", "France", and further overlapping subsets tagged "train from Paris to Barcelona", "Barcelona", "Las Ramblas", "the beach". By incorporating user feedback on the appropriateness of proposed tags, a corpus of location labels will also be crowd-sourced, with potential to improve tagging of future photos.

The intern should have the following skills set: programming ability (Java and Python preferred); experience with geo-spatial data manipulation, and Android and web-services development would be an advantage.