



BU PhD STUDENTSHIPS 2018

PROJECT DESCRIPTION

PROJECT DETAILS
Project Title
Artificial intelligence assisted virtual reality system for blockchain network
Project Summary
<p>Visualisation is an effective way of gaining insights into different types of data. In many cases, users still have to derive insights by interpreting the data visual clues presented by a visualisation system.</p> <p>The interest in mutual distributed technology, such as Blockchain network, has been rapidly increasing. According to a European Parliament's report, the technology has an immense potential and could change the lives of many. Such network generates a large amount of data with unique characteristics. This is an example of Big Data and normally a straightforward visualisation is not very effective.</p> <p>With sequences of transactions and associations, graph visualisation is suitable for this type of data. However, due to the large size of the full transaction graphs, any visualisation effort has to compromise between which subset of data to visualise and how to suppress unnecessary details. Therefore, in this project we propose a new visualisation system to address those drawbacks.</p> <p>At present, virtual reality has been widely used. Head mounted displays (HMDs) produce the feeling of actually being immersed in the virtual world. It allows users to effectively explore complicated blockchain network graphs, etc., without having to project them into 2D display. In summary, the aims and objectives of the project are:</p> <p>The overall aim of the project is to develop a novel machine learning assisted immersive visualisation system for mutually distributed ledger network</p>
Academic Impact
This research project and its underlying publications will lead to a REF case study. This research falls under the REF UoA11 area and will help develop a practical system. The work done as part of this PhD can lead to a prototype visualisation system to be used and further developed in the industry. We foresee that this PhD project will open a new research direction and increase Bournemouth University's presence in this emerging research area. With the novelty of the approach, it is expected that a number of high quality (3* or 4*) journal articles will be published, and the objective of the project is in line with Bournemouth University's vision on fusion. The results from this research can also be applied to other applications.
Societal Impact
Blockchain's decentralised transaction and data management move some control over daily interaction with technology away from central control by elites. The technology redistributes the control to users in general making systems more transparent and more democratic. According to (European Parliament Research Service 2017), this will not probably not result in a revolution. The visualisation system proposed in this project is expected to have a great impact on blockchain network. The results from this project can be commercialisation. The era of Big Data has been rapidly promoting the data visualisation market. According to Mordor Intelligence the market will increase at a compound annual growth rate (CAGR) of 9.21 % from \$4.12 billions in 2014 to \$6.40 billions by the end of 2019. Judging from this and the existing mining methods available, it is predicted that there is a high demand for such system for both business and government applications.
Training Opportunities
Supervisor Responsibility: Dr S Prakoonwit (First Supervisor, FST): all computational and technical aspects of the project; Dr J Sit (Faculty of

Management): all business/consumer related aspects of the project; Dr W Khan (Caspia Research UK): Blockchain, data management and software development aspects of the project. The student will have an opportunity to work closely with Caspia, which has intensive experience in software/app development and Blockchain, and gain more real-world experience. The student will also be part of an active research student community in the Department and Faculty and will be integrated into our research team. Generalist and specialist development needs of individual student will be identified and delivered. The personal, professional, career learning and development will be provided. The student will have access to, and are encouraged, by peer to peer learning and support. There are mechanisms for supervision and monitoring of both student and supervisor. Apart from training programs the Doctoral College offers, in the Faculty of Science & Technology (SciTech) runs a series of research presentations and seminars for PhD student and academic staff to discuss wider views and exposure to research methodology and strategy.

SUPERVISORY TEAM	
First Supervisor	Dr Simant Prakoonwit (Faculty of Science and Technology)
Additional Supervisors	Dr Jason Sit (Faculty of Management), Dr Wajid Khan (Sponsor supervisor)
Recent publications by supervisors relevant to this project	<ul style="list-style-type: none"> • Selamat, S., Prakoonwit, S., Sahandi, R., Khan, W., Ramachandran, M., 2017. Big Data Analytics: A Review of Data Mining Models for SMEs in the Transportation Sector. Journal WIREs Data Mining & Knowledge Discovery, Wiley. 2018 • Khan, W., Selamat, S., Ramachandran, M., 2017. Appraisal of Transactional Data through Visualisation for SMEs. Book chapter submitted to E-Manufacturing and E-Service Strategies in Contemporary Organizations publication of IGI Global. • M. Ramachandran, R. Sahandi, S. Prakoonwit, W. Khan, S.A. Mohd Selamat, "Mathematical Model of Safety Score Calculation for validation of coach operators in the UK", Proceedings Intelligent Transport Systems-2017, Finland • M. Ramachandran, R. Sahandi, S. Prakoonwit, W. Khan, S.A. Mohd Selamat, "A cloud based safety transport model for validation of UK coach operators for school journeys", Proceedings Intelligent Transport Systems-2017, Finland • Ramachandran, M., Sahandi, R., Prakoonwit, S., and Khan, W., Selamat, S., 2017. School Transport Safety Through Private Coach Hires in Great Britain: A Qualitative Survey, Submitted for 15th International Conference on Intelligent Transport Systems (ITS) Telecommunications, Warsaw, Poland, May 29-31, 2017 • S. Garcia Cardona, F Tian, S. Prakoonwit, "Tenochtitlan-An Interactive Virtual Reality Environment That Encourages Museum Exhibit Engagement, Proceedings 11th Edutainment 2017, UK • D. Savosin, S. Prakoonwit, F. Tian, "Representation of interactable objects and action sequences in Virtual Reality using hand gesture recognition", Proceedings 11th Edutainment 2017, UK • M. Ramachandran, R. Sahandi, S. Prakoonwit, W. Khan, "Intelligent Safety Transport Framework for Schools: a Review of Route Planning and Tracking Systems", 2016 5th International Conference on Transportation and Traffic Engineering (ICTTE 2016), Lucerne Switzerland, 6-10 July, 2016. • N. Boonsim, S. Prakoonwit, "Car make and model recognition under limited lighting conditions at night", Pattern Analysis and Applications, Springer, (Open Access) May 2016. DOI: 10.1007/s10044-016-0559-6 • N. Boonsim, S. Prakoonwit, "An Algorithm for Accurate Taillight Detection at Night", International Journal of Computer Applications, Volume 100, Number 2, August 2014 • A. Kanamgotov, L. Koshy, M. Conrad, S. Prakoonwit, "User Avatar Association in the Virtual Worlds", Cyberworlds 2014, Santander, Spain. • N. Boonsim, S. Prakoonwit, "License Plate Localization based on Statistical Measures of License Plate Features", International Journal on Recent Trends in Engineering and Technology, Volume 10, Number 1, Jan 2014 • S. Prakoonwit, R. Benjamin, "3D surface reconstruction from multiview photogrammetric images using 2D edge contours", 3D Research, Volume 3, Number 4, 2012 • Kanamgotov, A. Christopoulos, M. Conrad, S. Prakoonwit, Immersion in Virtual Worlds – but

INFORMAL ENQUIRIES

To discuss this opportunity further, please contact Dr Simant Prakoonwit via email:

sprakoonwit@bournemouth.ac.uk

ELIGIBILITY CRITERIA

The PhD Studentships are open to UK, EU and International students. Candidates for a PhD Studentship should demonstrate outstanding qualities and be motivated to complete a PhD in 4 years and must demonstrate:

- outstanding academic potential as measured by either a 1st class honours degree or a Master's degree with distinction or equivalent Grade Point Average (GPA)
- an IELTS (Academic) score of 6.5 minimum (with a minimum 6.0 in each component) for candidates for whom English is not their first language

In addition to satisfying minimum entry criteria, BU will look closely at the qualities, skills and background of each candidate and what they can bring to their chosen research project in order to ensure successful completion.

Applicants will be asked to submit an online application form and a proposal (c. 1500 words) outlining their understanding of the project for which they are applying, the approach they would envisage taking and what qualities they will bring to the research community.

Please note:

- Current BU Doctoral students are not eligible to apply for a Studentship
- Current MRes/MPhil students can apply, subject to satisfactory completion of their Research Degree prior to being able to take up the award
- PhD Studentships cannot be used to support BU staff to complete doctoral programmes

Additional Eligibility

- The ideal candidate should have either a 1st class honours degree or a Master's degree with distinction or equivalent in computer science, engineering or related disciplines.

- Essential: computer programming knowledge and skills.

- Desirable: willingness to learn new different software tools, digital marketing, PHP, Symfony, Codegnitor or any other PHP framework.

HOW TO APPLY

Please complete the online application form by **Thursday 31 January 2019**. Further information on the application process can be found at: www.bournemouth.ac.uk/studentships