Research and Higher Degree NEWS

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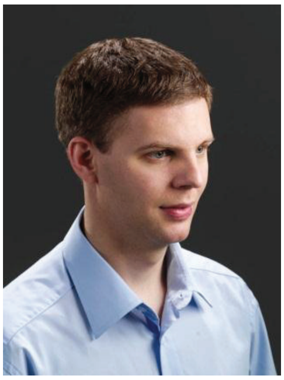
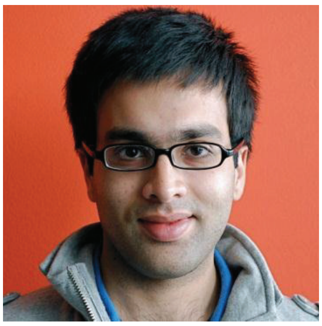
SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICS E-NEWSLETTER



One of the exciting research ventures that are ongoing at the School of Computing, Engineering and Mathematics is the ROILA project. ROILA stands for Robot Interaction Language and is an attempt to create a completely new artificial language that humans can use to talk to robots. The ROILA project was initiated on the backdrop of problems faced by natural language speech recognition. Speech Recognition technology has been trying to advance for several years yet we are unable to use it in our daily life without errors and consequently repetitions. ROILA solves the problem of natural language speech recognition by the way it has been designed. Words in ROILA sound acoustically different from each other so there is less likelihood of words being confused by a machine or robot. In addition the grammar of ROILA has been designed to be regular, thereby reducing the learning curve for humans. ROILA is an artificial language that is potentially easy for humans to learn and at the same time easy for a machine to recognise. During research on ROILA two main conclusions were drawn. Firstly, ROILA was shown to outperform English in terms of recognition accuracy and secondly, it was deduced that a long term investment is necessary in using ROILA before the learning effort pays off.

Currently, Omar Mubin (pictured left) has been working on the ROILA project at UWS in collaboration with Christoph Bartneck (pictured above) (senior lecturer at University of Canterbury, New Zealand), a first step of which was the visit to UWS by Christoph Bartneck in early July. Current research investigations are looking into how ROILA can be integrated into different robots in a platform independent manner.



Recently, ROILA also appeared on national news New Zealand: http://www.youtube.com/watch?v=wxhEnLEdWEA

Use of composite columns in large scale infrastructure

Professor Brian Uy, Foundation Director of the Institute for Infrastructure Engineering (IIE) and an international team of researchers will be investigating the design and behaviour of columns composed of high strength structural steel coupled with high strength concrete. This ARC Discovery Project will enable sustainable column systems to be developed for major civil engineering infrastructure. The research team consists of Associate Professor Zhong Tao (IIE) **and Dr Fidelis Mashiri, School of Computing, Engineering & Mathematics,** UWS; Professor Richard Liew of the National University of Singapore; and Professor Lin-Hai Han of Tsinghua University, Beijing

'The construction industry makes a significant impact on the environment, consuming enormous energy and resources and accounting for a significant amount of waste to landfill', says Professor Uy. 'Methods that attempt to reduce the effects on the environment by reducing material used are of great value in the industry. The two most widely used construction materials, concrete and steel, can make a major contribution to sustainability in buildings by adopting two simple measures: the use of higher strength steels and a more sustainable concrete which has reduced amounts of ordinary Portland cement and uses high volume fly ash. This project will focus on concrete filled steel columns of varying strengths to provide the construction industry with a number of different column solutions.'

Experiments will be carried out on high strength box, tubular and very high strength steel polygonal sections using the newly commissioned universal testing facility at UWS. These tests will allow the effects of local buckling and concrete confinement to be defined. The project will also involve analytical and numerical modelling on a recently commissioned supercomputer.

Existing strength equations in current Australian and some overseas countries' Standards will be evaluated and compared with the experimental and analytical study and suggested recommendations will be made.

The benefits of this project will be an improved understanding of the complex behaviour of tubular steel and composite steel-concrete assemblages in bridges, buildings and offshore structures. These models will result in increased savings in the