Robot scientist becomes first machine to discover new scientific knowledge

Scientists in the Department of Computer Science have created a Robot Scientist which the researchers believe is the first machine to have independently discovered new scientific knowledge. The robot, called Adam, is a computer system that fully automates the scientific process.

The work, which has been funded by the Biotechnology and Biological Sciences Research Council (BBSRC) and the Higher Education Funding Council for Wales amongst others, was published in April 2009 in the prestigious journal, Science.

“Because biological organisms are so complex it is important that the details of biological experiments are recorded in great detail. This is difficult and irksome for human scientists, but easy for Robot Scientists.”

Using artificial intelligence, Adam hypothesised that certain genes in baker’s yeast code for specific enzymes which catalyse biochemical reactions in yeast. The robot then devised experiments to test these predictions, ran the experiments using laboratory robotics, interpreted the results and repeated the cycle.

Adam is still a prototype, but Prof King’s team believe that their next robot, Eve, holds great promise for scientists searching for new drugs to combat diseases such as malaria and schistosomiasis, an infection caused by a type of parasitic worm in the tropics.

Prof King continued: “If science was more efficient it would be better placed to help solve society’s problems. One way to make science more efficient is through automation. Automation was the driving force behind much of the 19th and 20th century progress, and this is likely to continue.”

Record student intake 2009

The 2009 intake for courses in Computer Science is a record high, with over 200 students starting degrees in the department this year. This follows on from a successful 2008, and continues a trend of increased applications well above the national average in the area, and above the university’s average. This has enabled us to maintain our high standards of admission, thereby helping to ensure the continuing quality of our graduates.

Effective marketing is no doubt partly responsible, but current students, graduates and employers of our graduates are also to be thanked for spreading the news of the quality of our degrees.

Visit Days 2010

- Wednesday 17th February 2010
- Saturday 20th February 2010
- Wednesday 3rd March 2010
- Saturday 6th March 2010
- Saturday 10th April 2010

For more information call Meinir Davies on 01970 622439 or e-mail Meinir at met@aber.ac.uk or visit our website at http://www.aber.ac.uk/compsci/public

A warm welcome extended to you all...
Welsh ‘phrase book’ launched for iPhone

A new Welsh phrase book, Learn Welsh, which has been designed for use on Apple’s latest iPhone, the 3GS, was launched at the National Eisteddfod in August.

Developed by Professor Chris Price, Head of Computer Science and a Welsh learner, the app is available from the iTunes App Store for 59p.

Based on Chris’s own experience of learning Welsh, the phrase book is divided into twelve themed sections that include greetings, common phrases, food and drink, and travelling. Welsh learners visiting this year’s Eisteddfod were no doubt relieved to know that it also includes a section on the weather!

As well as seeing the written word, Chris has recorded each phrase, a feature he hopes will help with pronunciation. Another innovative feature is a ‘practice mode’ which offers learners the opportunity of testing themselves as they learn.

Chris said “there are many apps for learning other languages available to iPhone users, amongst them 27 for French, 23 for Italian and even ones for Irish, and Tagalog which is spoken in the Philippines. I felt it was high time that help of this kind was made available for those learning Welsh”.

Learn Welsh was launched by Chris and Dr Adrian Shaw, a Senior Teaching Fellow at the Department of Computer Science. As part of the presentation, Adrian, who is originally from Wiltshire and who started learning Welsh by listening to Catchphrase on BBC Radio Wales, gave a presentation in Welsh on how to build apps for the iPhone.

Our successful Mobile and Wearable Computing degree programme is very popular and offers students the opportunity of developing apps for the iPhone. The department is also a recognised provider of training on mobile software development for industrial developers.

Not one to rest on his laurels, Chris is keen to develop Learn Welsh further and invites people to send suggestions to chrisinaber@googlemail.com

PhD Students Win IEEE CIS Outstanding Student - Paper Awards

Miss Xin Fu (3rd Year) and Mr Longzhi Yang (2nd Year) have been awarded Institute of Electrical and Electronics Engineers (IEEE) Computational Intelligence Society (CIS) 2009 Outstanding Student - Paper Travel Grants.

IEEE CIS considers these scholarships a very important investment in future scientists in its research field. To receive one of these awards the recipient must have fulfilled a number of requirements, including:

• carrying at least 50% of a normal full-time academic program as a registered student
• having contributed to at least 50% of the research presented at an IEEE CIS sponsored international conference
• the paper presented by the student having been ranked highest amongst all papers submitted by students as chief authors, by both the Conference Program Committee and the IEEE CIS Student Activities Subcommittee, based on review reports of three independent referees.

Partly supported by these grants, Miss Fu and Mr Yang have presented their work at the 2009 IEEE International Conference on Fuzzy Systems (which is the most prestigious international event in their subject area), held in August, in Jeju, Korea. Miss Fu’s paper was entitled “A novel framework of fuzzy complex numbers and its application to compositional modelling”, and Mr Yang’s “Towards adaptive interpolative reasoning”. Both papers were co-authored by their supervisor, Professor Qiang Shen.

Facebook Survey By Claire Q

My PhD is “Understanding the Beauty of Music by Machine Learning”. The eventual aim is to have a piece of software that “appreciates” music. The first step towards this is to work out what people actually mean when they call music ‘beautiful’. For this, I have created a Facebook survey where people can compare short extracts of music, and choose which is more beautiful.

It is similar in idea to Galaxy Zoo (http://www.galaxyzoo.org/), a project that asks people all over the world to categorise galaxies by shape and aggregates the results for later analysis. After my survey collects enough data, I will select the pairs of extracts where an overwhelming majority has agreed on the answer. These pairs form the training set for the machine learning part of the project, which will automatically rate musical beauty. The survey is currently available to take at http://apps.facebook.com/comparemusic, with a non-Facebook version coming out in the future.

All responses are useful, so if you have a little spare time, have a go!
Fuzzy systems award

Professor Qiang Shen, of the Department of Computer Science has been awarded the Computational Intelligence Society Outstanding Paper Award in the IEEE Transactions on Fuzzy Systems by the Institute of Electrical and Electronics Engineers (IEEE).

The award, the most prestigious international publication award in the field of Computational Intelligence, was presented to Professor Shen at the International Conference on Fuzzy Systems which was held on the South Korean island of Jeju at the end of August.

The paper “Fuzzy interpolative reasoning via scale and move transformations was published in the Transactions on Fuzzy Systems”, 14(2):340-359, in April 2006, and was co-authored with Zhiheng Huang, a former PhD student of Professor Shen at the University of Edinburgh.

Professor Shen’s work focuses on developing computer systems that imitate human judgement, enabling them to deal with information that is described in vague terms, such as the physical dimensions of an individual – tall, short, fat, thin etc.

These systems are designed to assist law enforcement agencies to tackle serious organised crime such as drug smuggling and human trafficking.

In the paper Professor Shen and Zhiheng Huang present a ground-breaking theory for fuzzy interpolative reasoning. The work helps to reduce the complexity of fuzzy models and makes it possible to perform inference in sparse fuzzy rule-based systems. The approach is generally applicable to many real-world problems, ranging from control to classification. The term ‘fuzzy’ reflects the imprecise nature of the information.

A special session will be dedicated to the theory proposed in the paper at the 2010 World Congress on Computational Intelligence, which is being held in Barcelona.

Land’s End to John O’Groats
new unicycle record by Sam Wakeling

Sam graduated in Computer Science in July 2009; here is his account of his record breaking adventure in September:

It’s been two years since I set the 24 hour unicycling distance record at Aberystwyth University (453.8km), so it was about time to have a go at another big challenge which had been on my mind for a few years.

The whole length of the UK from corner to corner is one of the oldest cycle challenges around, and since the 1880s has been completed by Penny Farthing, bicycle, barstool, wheelchair and also by a handful of unicyclists.

The previous unicycle record for the journey of around 900 miles (depending on the route chosen) was over 12 days. With fellow unicyclist Roger Davies I planned a schedule of six night stops with daily distances averaging over 120 miles. We were supported by another unicyclist friend Paul Royle who drove a van full of high-calorie food and spares. He met us at lay-bys every hour or two, allowing us 10-15 minutes to guzzle some coffee, Ibuprofen (for swollen Achilles tendons and aching knees), pasta, chocolate, salted nuts and cake. We were burning an estimated 6-10000 kcals per day, and one big challenge was to eat enough, as our stomachs didn’t quite know what was going on.

We were blessed with great weather, without a spot of rain all week, although there was a significant head-wind for all but the last two days. The prevailing wind for the UK should have meant that our route had a tail-wind, but sometimes ‘normal’ conditions don’t always occur.

Eventually we reached John O’Groats – the far corner of the Scottish east coast – after a total time, and new record, of 6 days, 8 hours and 43 minutes.

Even after a stunning final day (starting at 4am) of pedalling along beautiful sunny coastal roads we hadn’t forgotten just what it had felt like to drag ourselves out onto the road by 5 or 6am every morning for a week, only to pedal and eat and pedal and eat for up to 18 hours. We could happily conclude that there wasn’t much more we could have given this record – so it should be a long while before anyone else attempts to better this by being even more silly on one wheel.
Sam, who comes from Pontypridd, is studying on Bursary to final year student Sam Thomas.

The company now boasts an impressive client list that includes The Body Shop, The Royal Mail, Long Tall Sally, Premier Farnell, Sony and Vodafone, and has offices in London, California and Mumbai.

On Thursday 1 October Paul Tough returned to his alma mater to present the first Portaltech Student Bursary to final year student Sam Thomas.

Sam, who comes from Pontypridd, is studying on the MEng Software Engineering. As part of his final year work he is preparing a dissertation on medical image processing.

Sam said “I spent my industrial year at Microsoft working in their developer support team. It was a great experience. I made some really good friends and received some great on-the-job training. Spending a year away from Aberystwyth was in itself quite refreshing and it was nice to be earning a bit of money! I returned to Aberystwyth motivated and eager to do well in my final years.

I had never heard of this bursary before so it came as a complete surprise when I heard the news. I am very grateful to PortalTech for this recognition. The prize will go a long way towards funding my final year and with a bit of luck there’ll be some left over to go travelling in the summer!”

The Portaltech Student Bursary builds on the excellent working relationship that has developed between the company and the department. For the past 4 years Portaltech have employed undergraduate students from the Department of Computer Science as part of their industrial placement programme.

The quality of the industrial experience provided by Portaltech was recognised in 2008 when the company received the highly commended award for Best Work Experience Provider: New Placement Schemes at the National Council for Work Experience Awards 2008.

Commenting on the bursary Dr Fred Long, Director of Learning and Teaching at the Department of Computer Science said;

“The Department of Computer Science is very grateful to Portaltech for their support over the years. It is particularly rewarding when Aberystwyth graduates go on to build successful careers and retain their links with the department.”

“Andrew and Paul have taken this a step further. By funding the Portaltech Student Bursary they are investing in the next generation of graduates, giving them an opportunity to develop the skills that should stand them in good stead for their careers,” he added.

The bursary is worth £1000 and is awarded to the best student on the MEng Software Engineering course, as assessed by performance in the penultimate year.

Portaltech supports next generation of software engineers at Aberystwyth University

Portaltech, a leading UK e-Commerce company, is funding a new bursary for computer science students at Aberystwyth University.

Portaltech was founded in 1999 by two Aberystwyth computer science graduates, Andrew Walker and Paul Tough.

The company now boasts an impressive client list that includes The Body Shop, The Royal Mail, Long Tall Sally, Premier Farnell, Sony and Vodafone, and has offices in London, California and Mumbai.

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Gone to New Zealand! By Fred Labrosse

The Aberystwyth Intelligent Robotics group has just sent one of its vehicles to New Zealand to be used for 8 months by colleagues from the Institute of Geography and Earth Sciences (IGES) to build accurate 3D models of river beds before and after flood events. The vehicle is a 6 wheel drive amphibious ARGO equipped with various sensors controlled by a central computer and several small, dedicated computers, all on-board the vehicle. The main sensor is a 3D laser scanner Leica 6100 that can create very accurate and high resolution 3D point clouds of its surroundings and is used to build the 3D models. The other sensors are there to allow the fusion of all the 3D point clouds captured from different locations. They include an omni-directional camera that can give us bearing and pitch and roll information, a high-precision Leica GPS as well as an inclinometer (to verify the pitch and roll information extracted from the camera images). This version of the vehicle will be driven by a human operator but we are currently developing techniques that will allow the vehicle (which would then be a robot) to learn a route being driven by the operator and then re-trace that route autonomously, therefore helping the scanning process.

Comp Sci Student Elected Aber Rag (Raise & Give) President

By Kabir Kenth

In freshers week 2006 I signed up to the student fundraising society Aber Rag. Aber Rag raises money for charity in and around Aber as well as further afield. In the 2nd year I was elected as the Events Officer and in the 3rd year, during my industrial year in Information Services, I was elected as president! I have been re-elected this year for that role. So as well as studying hard in my final year you may see me around, shaking a charity tin asking for any spare change! With Rag I have made tons of new mates, done some crazy things (a 24 hour relay for life, a trip to Dublin and Cardiff, a road toll in the uni, dressing up as “baby spice” and having my legs waxed.. all in the name of charity!). This year, among other things, we’re aiming to raise £1000 to build a memorial garden for Beacon of Hope provide support locally for terminally ill people in their own homes. If you want any more information about Rag and the madness we do just drop me an email (ksk6@aber.ac.uk)