
Showcasing NICTA's achievements

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This article discusses the work of National ICT Australia (NICTA) as highlighted at a technology showcase in Sydney in October 2010. In particular, the article summarises key NICTA projects of relevance to the library and information industry.

INTRODUCTION

National ICT Australia (NICTA) was established seven years ago to try and ensure that more ICT (information and communications technology) research ideas were commercialised in Australia. It is funded by the Australian government through the Department of Broadband, Communications and the Digital Economy, and by the Australian Research Council through the ICT Centre of Excellence program. In addition, various State governments and universities contribute funding. NICTA has five laboratories in four cities: Melbourne, Sydney, Canberra and Brisbane.

According to the NICTA website (<http://www.nicta.com.au/about>):

The end goal of many research projects at NICTA is commercialisation. This could take the form of spinning out a company, the licensing of usage rights, selling the technology, entering into joint ventures, pursuing high-end consulting or adopting a combination of these structures appropriate to their market opportunities.¹

NICTA TECHNOLOGY SHOWCASE

At a NICTA technology showcase in October 2010 at New South Wales Parliament House, NICTA discussed and provided demonstrations of a selection of current projects. The venue made a great setting for the showcase. After passing security, attendees were free to roam the building and admire the artworks, architecture and view. It was a handy venue for the NSW Treasurer, Eric Roozendaal, who launched the event and announced additional funding for NICTA.² Mr Roozendaal is also a minister for the NSW government agency Industry & Investment NSW.

The showcase included a forum with six speakers to address the question: "How do you define success in a research community?" The session was moderated by Mark Jones from "The Scoop" and is available as a podcast on the *MIS: Financial Review* website.³ The presentation included a short video about the work of NICTA.

Most of the attendees were men in suits. The organiser of the panel discussion commented that he would aim for a better gender balance next year (the panellists were all male), and pondered how ICT would be different if the other 50% of the population was better included.

One feature of successful entrepreneurs is their single-minded focus. This was evident in stories of the nominees for the NSW Pearcey Entrepreneur of the Year Award, including the winners, brothers

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All webpages referred to in this article were viewed 24 November 2010.

¹ At one point in the showcase, someone noted that NICTA had launched some spin-outs, and that *some* were still alive, prompting audience laughter. They also noted that the absence of technology billionaires in Australia suggests we haven't gone global enough. Others noted that it takes time to develop a commercialisation ecosystem, and that the global financial crisis slowed progress.

² "NICTA Welcomes Funding Boost from NSW Government" (20 October 2010), http://www.nicta.com.au/news/previous_releases3/2010_media_releases/nicta_welcomes_funding_boost_from_nsw_government.

³ "The Scoop – The Innovator's Dilemma" (26 October 2010), <http://www.tv.misaustralia.com/#/video/84433>. A podcast by NICTA's then Chief Executive David Skellern on the problem of ICT trade deficit is at <http://www.tv.misaustralia.com/#/video/8816>.

Lars and Yens Rasmussen, who created Google Maps (based on their Where 2 Technologies) and then worked on Google Wave, which was recently shelved. Their mapping invention is credited with motivating Google to establish a research and development centre in Sydney. You can read their story and watch a video about it on the web.⁴ On 1 November 2010, it was announced that Lars had moved to Facebook.⁵

NICTA engages with many higher degree students through its research program, and also with school students through a robotics competition.⁶ The winner in 2010 was from Year 8, and he took home a vacuum cleaner as a prize – but it was a programmable, robotic vacuum cleaner!

ICT is considered a significant area of change, and has been identified as one of four “megatrend” areas in New South Wales (the others are demography, the developing economies of China and India, and the low carbon economy and the need to reduce use of fossil fuels). You can read about ICT in the *NSW Business Sector Growth Plan* – the speaker noted that the increasing reliance on ICT meant people should read it online.⁷

The NICTA showcase comprised live displays of a number of projects, a few of which will be highlighted below. Some NICTA projects that were not presented at the showcase (as they are based in other States) but which are relevant to the library and information industry will also be summarised.

NBN TRIAL AT PARKBRIDGE ESTATE, WESTERN SYDNEY

The New South Wales National Broadband Network (NBN) trial involves 40 to 50 households at Parkbridge Estate in Middleton Grange (near Liverpool in Western Sydney) using high-speed fibre optic cabling to access four applications. Houses in the estate come with fibre-to-the-home capacity, which will be a feature of the NBN. The four applications are:

- A smart metering system that will allow families and businesses to track their energy consumption in real time and adjust energy use accordingly.
- A simple touch screen communications system to help people unable to access more common ways to communicate.
- A virtual world learning environment for school students using web cameras, computers and live video interaction.
- High-definition internet TV [HDTV] to allow people to access and watch programs from the Internet on television at any time.⁸

The HDTV project will provide higher definition and better quality television than the catch-up shows currently available online. The content will be from ABC iView, free-to-air television, the internet and Facebook, and will later expand to include government information on demand. It will include a new NICTA-developed application that personalises television viewing and adapts to user preferences, and will also involve recommendations from people in the viewer's social networks. Social networking conversations and videos will be securely stored on set-top boxes in lounge rooms rather than on server farms. NICTA is also researching content recommendation and distribution technologies.

The testers have a large-screen television on which they can browse or search for shows. They can also select shows from categories, including one for television shows that will not be available

⁴ Ryan P, “Google’s Lars Rasmussen on the Google Maps Story” (10 August 2009), <http://www.anthillonline.com/googles-lars-rasmussen-on-the-google-maps-story>.

⁵ Hutcheon S, “Why I Quit Google to Join Facebook” (1 November 2010), <http://www.smh.com.au/technology/biz-tech/why-i-quit-google-to-join-facebook-lars-rasmussen-20101101-1799q.html>.

⁶ The annual Creative Embedded Programming Challenge for high school students is part of the National Computer Science School Embedded Challenge run by the University of Sydney and NICTA and supported by Altium Pty Ltd, Industry & Investment NSW and CargoWise Pty Ltd.

⁷ NSW Government, *NSW Business Sector Growth Plan* (September 2010), http://www.business.nsw.gov.au/NR/rdonlyres/A81FE008-43B7-4514-B43F-67ABA0B13F53/0/NSWBusinessSectorGrowthPlan_FinalReport_100927.pdf.

⁸ “Broadband Trial Gives Glimpse into Home of the Future” (25 June 2010), <http://www.broadband.nsw.gov.au/news-events/newsroom/broadband-trial-gives-glimpse-home-future>; *NICTA Takes Part in NSW NBN Testbed Launch* (25 June 2010), http://www.nicta.com.au/news/current/nicta_takes_part_in_nsw_nbn_testbed_launch.

much longer (due to licensing restrictions). The HDTV trial is being managed by NICTA in collaboration with OptiComm, the company providing the broadband communications network at Parkbridge Estate, with the Australian Academic Research Network (AARNet) providing high-speed links between the partners.

VOCABULARY MANAGER

NICTA has been involved with LIXI (Lending Industry XML Initiative, <http://www.lixi.org.au>) in the development of a vocabulary manager for defining and managing terms used by various organisations in the lending industry. *NICTA News* noted that NICTA had helped speed up valuations by LIXI members from two days to two hours.⁹ The vocabulary manager is similar to a thesaurus that allows mapping to other thesauruses, as two companies with variant terminology are able to maintain their own language, and map to synonymous terms used by other companies. The system also allows a “near match” relationship.

According to the NICTA Vocabulary Manager website (<http://www.vocab.ext.nicta.com.au/vocab>):

The Vocabulary Management (VM) technology is a web-based system and method for business users to define and manage collections of business vocabularies and vocabulary inter-relationships. Semantic technologies are used in the design of the system, to formally define vocabularies and vocabulary relationships, and to automatically check their logical consistency. Vocabularies and their inter-relationships can be a reference for business people, and can inform the development of technical integration mechanisms.

More detail is available in the document “A Proposal for a New Standards Management Framework for LIXI” on the web.¹⁰

EPASA

ePasa (e-Government Performance Assessment for Service Architectures, <http://www.nicta.com.au/epasa>) is a modelling and simulation technology that addresses complexities in business and government ICT by providing a platform on which the performance of a system can be tested at different levels of demand. Alternative system designs can be explored and performance problems averted before system implementation. For example, it can be used to test the performance of a taxation website with the load expected the day before taxes are due. SOPM (Server Oriented Performance Modelling)/ePASA technology is being used to examine the performance of an emissions trading system (ETS).

Another project involves the use of SOPM/ePASA to run simulations to predict the behaviour of in-house and cloud-hosted implementations and to identify risks. This helps organisations decide how much (if any) of their work should be done in the cloud. Working in the cloud means using a pool of virtualised computing resources with a pay-per-use model and has the advantages of cheaper and more flexible access to computing capacity, allowing business to scale up their activity when the demand arises. Cloud providers include Amazon Web Services (AWS), Google App Engine and Microsoft Windows Azure.¹¹

SERVICES SCOPING AND ESTIMATION FRAMEWORK

NICTA has designed a Services Scoping and Estimation Framework to provide organisations with a systematic approach to determining the scope, cost and effort associated with Service Oriented Architecture (SOA) initiatives for e-government projects. SOA is “a collection of loosely-coupled,

⁹ “NICTA Helps Speed Up Valuations From 2 days to 2 Hours”, *NICTA News* (May 2007) p 6, http://www.nicta.com.au/data/assets/pdf_file/0019/8722/NICTA_NEWS_Iss10_final.pdf.

¹⁰ Thomas B and Sampson J, “A Proposal for a New Standards Management Framework for LIXI” (March 2008), <http://www.tinyurl.com/NICTALIXI>.

¹¹ Zhao L, Liu A and Keung J, “Evaluation Cloud Platform Architecture With the CARE Framework” (December 2010), <http://www.tinyurl.com/CloudePasa>.

distributed services which communicate and interoperate via agreed standards".¹² SOA features include cost-efficiency, agility and the ability to integrate legacy (pre-existing) systems.

CALL CENTRE RECRUITMENT

BrainGauge (<http://www.braingauge.com.au>) cognitive load monitoring technology is a technological approach to telephone monitoring. BrainGauge Recruitment helps call centres recruit the most appropriate employees through a 10-minute assessment. Voice and other behavioural signals are monitored to assess communication skills, memory and problem-solving capability as applicants perform activities selected from a battery of tests. The advantage for the employer of selecting employees who do well in this test is reduced turnover. There may also be an advantage for job applicants who are not selected, if it stops them entering a working environment which would be highly stressful for them.

A related program, BrainGauge Monitoring, allows managers "the ability to define, measure and manage the mental workload of their call centre agents in real time". This can include agents working from home. The software can identify calls that may require manual overview, and triggers alerts when an agent is overloaded.

MOBILE PHONE SOFTWARE

NICTA has reported¹³ that its Open Kernel Labs (OK Labs) spin-off has notched up the billionth deployment of its embedded virtualisation software on a mobile device. The company's micro-kernel-based OKL4 Microvisor virtualisation software allows other suppliers to incorporate features into new mobile designs more quickly and for lower cost.

A modern smart phone runs a complete operating system such as Linux, Windows or Android. This complexity means security features are required to avoid phones getting hijacked, being used as jammers, or encountering distributed denial of service attacks caused by Bluetooth viruses. The suggested solution is formal verification, so you can guarantee that critical parts of the system are isolated under all circumstances, including a mathematical proof that the kernel code is free of bugs.¹⁴

BioTALA

Although it wasn't presented at the showcase (as the project is based in Melbourne), the work of the BioTALA group (BioMedical Text and Language Applications, <http://www.nicta.com.au/research/projects/BioTALA>) will be of interest to *Online Currents* readers.

The BioTALA team is developing text-mining techniques to improve access to information in the bibliome.¹⁵ They are working with biomedical research partners based in hospitals and institutes in Melbourne. Collaborators include the Global Evidence Mapping Initiative (which creates "evidence maps" of research regarding clinical practice in the neurotrauma community, <http://www.evidencemap.org>) and the Human Variome Project (which curates information about variants of the human genome affecting human health, <http://www.humanvariomeproject.org>), both of which look like interesting projects in themselves.

The team is focusing on:

- fact extraction – eg finding relationships between biological entities in the biomedical literature and maintaining databases of the relationships;
- information visualisation and analysis – using topic mapping techniques¹⁶ to provide high-level views of large volumes of text; and

¹² University of Oxford, *Information and Communications Technology Plan, 2005-06 to 2009-10* (March 2007) Appendix F, <http://www.ict.ox.ac.uk/strategy/plan/plan.xml.ID=appF>.

¹³ "OK Labs' Virtualisation Deployed in One Billion Devices", *Computerworld* (posted 4 November 2010), http://www.computerworld.com.au/article/366866/ok_labs_virtualisation_deployed_one_billion_devices.

¹⁴ UNSW Computing, *Open Kernel Labs* (2010), <http://www.computing.unsw.edu.au/oklabs.php>.

¹⁵ The bibliome is the totality of the biological text corpus. Similar terms that, thankfully, have been less frequently used are literaturome and textome. See <http://www.en.wikipedia.org/wiki/Bibliome>.

¹⁶ Browne G, "Topic Maps" (April 2002) 17 OLC.

- information retrieval – document search, clustering and filtering.
These tools are designed to work with different search engines.

XML QUERY TECHNOLOGIES

Another project not presented at the showcase is the XML Query Technologies project (http://www.nicta.com.au/research/projects/in_memory_xml_query_processing), which develops tools for high performance XML query processing. The project has “implemented a search engine for XML data which is memory efficient and supports ultra fast querying (it answers XPath queries faster than any system we have seen so far)”.

CONCLUSION

Many of the projects currently being researched by NICTA have the potential to change the way we work and live. It will be interesting to see which ones become established.