DATA TO DECISIONS CRC

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CEO Update

Once again, it has been a very busy and successful period for the D2D CRC. All three of our technical programs (Bushfire*, Beat the Nexus* and Integrated Law Enforcement) have delivered outstanding results and have made great progress towards their end-of-project goals. The Board and Executive Team have also performed the very hard work of projects focusing on specific business challenges such as identity assurance and information sharing. The Innovation Exchange program continues to deliver capabilities to the agriculture, health and manufacturing sectors and the Education and Training program has progressed the data science competency framework and will be piloting the framework with several commonwealth departments in 2017.

Brenton and I visited the USA during this period – this was a very successful trip with promising meetings with US agencies, industry partners and potential collaborations (Virginia Tech University and LabCIS). The meetings also verified that the capabilities we are developing are of relevance to multiple sectors on a global scale.

This quarter has also been a very busy period of reporting and governance matters, culminating in the Annual Report, the Annual Conference and the Annual Research Prize and Awards. Reading our long, long news, the annual conference and awards dinner. This conference provided a wonderful opportunity to showcase the research and development being conducted by the CRC and to hear first-hand about the needs of our national security end users. The conference dinner provided an opportunity to recognise the teams and individuals who make continuous contributions to the CRC. A DVD. Further details on the conference are in the eNews.

Finally, I'd like to take this opportunity to wish everyone the very best for the festive season and thank everyone who has contributed to the success of the D2D CRC. Next year will be an exciting year for the CRC as we focus on transitioning capabilities to our end users and the D2D CRC team looks forward to the challenges and opportunities this will provide.

Sanjay Maturndar, CEO

Research Update

As the year draws to a close, it is appropriate to reflect on the D2D CRC research and development achievements over the last 12 months:

Beat the Nexus*

- Established a large-scale data science platform for real-time collection, enrichment and modelling of cellular network data
- Event predictions running, live for nine months
- Variety of predictive models for social unrest and disease forecasting under development, including:
  - Volume based models (LinkX)
  - Gazetteer model and time series models (LinkSA)
  - disease prediction (LinkJ and
  - planned protest models.
- Improved generation of twitter data
- Improved geolocation and spatial distribution models for Indonesia
- First trials with law enforcement agencies underway
- Established relationship with Virginia Tech and ARPA
- Four integrated streams of R&D

Aprotio*

- Law enforcement, Intelligence and Counter Terrorism use cases developed
- Prototype system developed for internet fact-gathering and risk indicators
- Underpinning research capabilities developed
  - Information extraction from Twitter
  - Object classification from images (LinkS)
  - Image matching (LinkM)
  - Knowledge graph construction from social media (LINKNI)
  - Event detection from news feeds (LINKN), and
  - Sentiment analysis (LinkSentiment)
- Prototyped Patron protection activities underway
- Eight integrated streams of R&D

Big Data Reference Architecture

- Connected to Dataworks
- Utilised by APP for the Integrated Information Environment

Integrated Law Enforcement

- Case Wall prototype developed and evaluated by law enforcement investigators (ANZCTC, WA) and Crime Stoppers (Australian Capital Territory)
  - Based on an extensible name-age architecture
  - Initial data curation APIs delivered
- Prototype federated data search capability
- Developed initial system architecture for APP Integrated Information Environment
- Developed Data Governance Framework
- Commercial new project - narrative story telling for investigators and prosecutors
- Six integrated streams of R&D

Law and Policy

- Delivered initial project – an international comparative study of law & policy for big data analysis in national security
- New recruiting projects to establish an enabling framework for the regulation and governance of data analytics technologies. Initial projects are focused on
  - Data Governance Framework and
  - Information sharing within the national security environment

If you have any questions please do not hesitate to contact Brenton Cooper

Brenton Cooper, CTO

Annual Report

The 2016-16 Annual Report is now available and can be found here:
http://www.d2dcrc.com.au/wp-content/uploads/2015_16-Annual-Report.pdf

Annual Conference

The 2016 Data to Decisions CRC Annual Conference saw over 140 attendees gather at the Hotel Realm in Canberra on November 15th. D2D CRC's CEO Sanjay Maturndar opened the conference which Science Minister Karen Andrews addressed, and the CTO, Brenton Cooper, closed.

The day consisted of numerous presentations on topics including Big Data Management, Architecture & Knowledge Discovery, Intelligence Analytics & Forecasting, Data Curation, Narrative Visualisation, Law & Policy and Extracting Intelligence from Multimedia.

Presenters varied from D2D CRC software engineers and data scientists, university researchers, industry partners and end users from the Australian Criminal Intelligence Commission, University of Adelaide, Australian National University, University of Queensland and Monash University as well as various presenters from external national security agencies.

D2D CRC issued particularly like to acknowledge Dr Tom Dwyer from Monash University who presented on his work with Dr Kerrie Mengersen on the use of Bayesian Networks in a social science research engine which was recently implemented into the American intelligence community.

The event was concluded with an Annual Conference Dinner (pictured) MC'ed by Cath Ingram, Board Member of D2D CRC and included special guest speaker, CRC Association CEO Dr Tony Sheehan who presented awards to the winners of the Annual Research Prize. It was an opportunity to showcase exceptional teams and individuals within D2D CRC.

Congratulations to the following award winners:

Innovation Award – Beat the Nexus* Team

The Beat the Nexus* team is led by Rod Latham and consists of researchers, developers and PhD students from the University of South Australia and the University of Adelaide. The program seeks to develop integrated and innovative technology that will automatically and accurately predict the occurrence of disease, protest, crime and other events. The team has developed a variety of predictive and machine learning techniques for detecting emerging trends. In addition, the program is being coveted with customisable features that can be applied to any field.

Check out the interview with Rob Latham (Project Lead of the Beat the Nexus*) here:
https://www.facebook.com/d2dcrc/videos/1587051595189189/

National Security Impact Award – Integrated Law Enforcement Team

The Integrated Law Enforcement team is led by Matthew Hayden and consists of social scientists, developers and PhD students from University of South Australia, University of South Wales and Deakin University. This program aims to provide police forces and analysts with uniform access to integrated information located in diverse data sources. The program has developed a case wall prototype which has received significant positive feedback from the end-user. It instigates a new frontier in insight & agency.

Check out the interview with Rob Hayden (Project Lead of the Integrated Law Enforcement Team:
https://www.facebook.com/d2dcrc/videos/1588499767579179/

Collaboration Award – Law & Policy Team

Led by Professor Louis de Koker of Deakin University, the Law and Policy team firstly established a comprehensive framework for the regulation of data analytics technologies and secondly, undertook the University of South Wales. They have since collaborated with a wide range of stakeholders to the benefit of their projects including government agencies. The team also recognise the need to regulate technology and have their projects thereby providing better support for effective and practical policing and development and thus making them worthy winners of the Collaboration Award.

Check out the interview with Professor Louis de Koker, Program Lead of the Law & Policy Team:
https://www.facebook.com/d2dcrc/videos/1588515267579363/

Early Career R&D Award – Dr Wei Kang

Wei is a valuable member of the Predictive Approach for Civil Unrest Team at the University of South Australia. Wei has been part of the Beat the Nexus* project since November 2015. As a Research Fellow, Wei has contributed the time series forecasting model for predicting disease. Wei's contribution to the time series forecasting model designed for predicting disease has provided the predictive accuracy for civil unrest. Wei also demonstrates excellence in his research and work.

Check out the interview with Wei:
https://www.facebook.com/d2dcrc/videos/1587107264252/

CEO Award – Dean Sculley

Dean has worked with the CRC in its software dictionist career September 2014 and has been a key contributor to the Aprotio* program, the Big Data Reference Architecture and the D2D CRC developed infrastructure generally. Dean has developed many positive relationships with colleagues at D2D CRC and external partners, and is a well-respected member of the team who is always willing to help others. Dean always represents the D2D CRC in a professional manner, attending meetings and seminars and working at seminars and events, and demonstrates a passion for quality outcomes.

Check out the interview with Dean:
https://www.facebook.com/d2dcrc/videos/1588501767495232/

D2D CRC congratulation all nominees and award winners and thank everyone involved in this years' event. For further information on how to be involved at next year's **Annual Conference please contact Megan Fridman at megan.pridman@d2dcrc.com.au**

Innovation Exchange

Health Analytics

D2D CRC has recently established a Health Analytics program transferring knowledge and expertise developed in Big Data R&D for national security to the health industry.

The 18 month program, supported by the South Australian Government, is aimed at improving patient outcomes in the South Australian health system.

D2D CRC is partnering with numerous medical professionals, four proof of concepts have been developed. The four proof of concepts were selected from numerous candidate projects by the program's project advisory committee.

- **Linking Mental Health Data** – by linking data from several sources and analysing behavioural patterns over time, mental health readmissions can be predicted and interventions can be put in place to reduce them, potentially leading to huge savings for the health sector. This project is being conducted in collaboration with the University of Adelaide.
- **Pandemic Outbreak Modelling** – by combining national models, external data sources and social media predictions, outbreaks can be closely monitored and predictions can be made to aid in distributing vaccinations, preparing hospitals and deploying new strains of disease. This project is being conducted in collaboration with the University of Adelaide.
- **Reducing Complications in Cardiac Procedures** – with the application of machine learning to datasets from several cardiac procedures, risk factors can be identified leading to improved patient care. This project is being conducted in collaboration with Flinders and Queen Elizabeth Hospital.
- **Emergency Waiting Times Application** – an application designed to provide useful information in times of an emergency, for example, nearest hospital, current waiting times and alternative services that will ease pressure and potentially save lives in emergency department scenarios.

The D2D CRC Health Analytics program is a giant stepping stone for South Australia and its capabilities in applying Big Data solutions to health care.

The projects will be underwritten through the Wellbeing Platform API and have their special partners Flinders Medical Centre, the Inclusion of Biophysical and Machine Learning from Medical Imaging (IMLMI).

D2D CRC are also working to implement a standard data model for the consumption and provision of animal information in conjugation with Data61 and the first phase of this work will be delivered mid-Jan 2017.

The D2D Knowy DR has been progressing with the Automated Sheep Condition Scoring project and recently returned from a trip to Naracoorte and the SARDI Struan Research Centre where they collected the imaging of approximately 500 animals using three different types of cameras. The data will be used to train the data model and form part of a larger activity to integrate R&D activities.

The team have also started work on the Lamb Carcass Weight project and a commercial meeting will be taking place in Dowerin in early December.

Precision to Decision Agriculture

The Precision to Decision (P2D) project is now underway and the team have begun researching data use across the agricultural industries including exploring some possible cross-industry use cases. The team will be visiting the Australian Wool Innovation, producers and the wider industry to understand concerns and the resulting insights will be used to feed the use cases.

In late November and 2016 the team attended a workshop that was officially introduced to interested parties and it was well received with acknowledgement of the importance of Data Governance and Data Ethics in the agricultural sector. The team will be working with the industry and into planning a series of eight industry workshops, the first of which is to be held on the 5th of December in Gatton, Qld. The focus is on the Horticultural Industries. The others will take place in March next year and will encompass the other 14 representative industries.

Education & Training

Summer Interns

This summer the D2D CRC is hosting five interns from three Universities in SA - two through the Defence and STEM Internship Program run by the SA Government and three through the D2D CRC Summer Internship program. Working closely with the research teams, health and analytics programs, the internships are a great way for the D2D CRC to gain fresh perspectives, new ideas and contribute to research and "stuff". They also offer the students practical experience in a supportive and friendly environment.

National Security Data Workforce Program

Two key objectives of the D2D CRC are to connect industry and research and build a workforce for the future. Recently, the D2D CRC has been working with the Australian Government to develop a new partnership offering organisations and PhD students a number of ways to connect through the Big Data Future Workforce Program. The program currently offers two options, sponsoring National Security Big Data Scholarships and engaging in short projects.

For organisations, the options provide an opportunity to tap into a smart, highly motivated group of potential future employees while gaining new and innovative ideas. For PhD students, the options offer the opportunity to develop practical skills, build networks and gain a better understanding of the industry environment.

Data Science Competency Framework

After recruiting and incorporating some fantastic feedback from partner organisations, the Data Science Competency Framework is now being utilised to create an online Development Planning Tool. Enabling individuals to self-assess against the competencies in the framework, the Development Planning Tool will provide a report highlighting competency strengths and areas for development. This report will then be used to create a tailored development plan including recommended training and upcoming projects. The D2D CRC is working with a number of partners to pilot and test the Data Science Competency Framework and Development Planning Tool, ensuring it is robust and practical tool.

For more information on any Education and Training programs, please contact Megan Pridman, Education and Training Manager at megan.pridman@d2dcrc.com.au or 8302 8984.

In the news

Disrupting terrorism and crime.

Read more

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