CRCA Media Release 05/23

June 21, 2005

NETWORKS THAT WATCH OVER OUR SAFETY

Australian scientists have solved a problem that has had the world's safety and security industries tied up in knots – how to watch hundreds of security cameras at the same time, using them to spot trouble and track offenders.

A breakthrough in intelligent surveillance was achieved in the Cooperative Research Centre for Sensor Signal and Information Processing (CSSIP), and is now watching over Sydney's celebrated icons, the Harbour Bridge and ANZAC bridge.

Worldwide, millions of security cameras are being monitored by a comparative handful of human eyes and brains, explains the University of Adelaide's Professor Mike Brooks. If a suspicious act occurs, someone has to spot it on camera or else sort through vast reams of video or digital data to find it, and any other vision linked to it. And both spotting trouble and tracking offenders is very hard without automating the camera network, he says.

"In London, where there are over a million surveillance cameras, they say the average Londoner appears on video about 300 times a day. Sifting through all that to find an offender is a nightmare," Prof. Brooks explains.

CSSIP's Image Analysis Program develops automated techniques for analysing images in such varied fields as medicine, radar and security.

"In security we're using computer-based methods to watch an entire network of cameras simultaneously for things like people being where they shouldn't, suspicious objects left behind, items stolen or damaged, violent or erratic behaviour, illegal traffic activity, even graffitists at work.

"Watching a few cameras is possible for a human for a short time – but watching hundreds or thousands constantly is beyond our ability. We're training computers to look for suspicious changes in the scene they watch using some elegant mathematics."

A major challenge, says Prof Brooks, is to teach cameras to work co-operatively, for example tracking a suspect through crowds, traffic and other obstacles, with a series of wide-angle cameras handing the shot from one to another, meanwhile guiding telephoto cameras to zoom in for close-ups. At the moment, no commercial security system in the world can achieve this reliably.

To do it they use a graph-based system that 'knows' where the target is in relation to nearby cameras. To achieve this remarkable feat, the entire network

has to learn how to distinguish robotically between suspicious and non-suspicious behaviours and objects and then organise itself to track the suspect.

The first commercial use of the team's "suspicious object" technology is atop Sydney Harbour Bridge and the ANZAC bridge where numerous security cameras are now on the lookout. If the network sees anything suspicious, it immediately sounds an alarm to alert human security officers, and illuminates the activity on-screen.

The unique Australian approach has been the opposite of that being tried by most research groups worldwide, says Dr Rustom Kanga, CEO of Sydney-based iOmniscient Pty Ltd, who have commercialised the patented CSSIP technology.

"Most people were focussed on motion detection. The CSSIP approach has been to focus on non-motion. For example, you can spot a suspicious package in a crowded airport. As a result, Australia is now recognised worldwide as having the best technology."

The system has won best security awards on almost every continent and in places as diverse as Britain, America, Taiwan, Denmark and Australia itself.

"The technology is being very well received all round the world, and it will make a very good export product for Australia," Dr Kanga says. "The potential market is absolutely huge, when you consider how many security cameras are now in use."

The Ontario Art Museum and a major national telco are among its latest customers, with the prison system of a very large country showing strong interest.

CSSIP's image analysis expertise isn't just enhancing security – it will soon be saving lives. Another system is being tested to sort through millions of PAP smear images to help detect cancerous or pre-cancerous cells. If successful, the technology will be extended to screen patients for lung, bladder and oral cancers.

Another application is to help the Australian Defence Forces to screen the vast amount of data generated by optical, infra-red and radar systems as they keep watch over the nation's borders and skies. Under development, says Prof. Brooks, is technology to improve the visual intelligence of unmanned aerial vehicles (UAVs).

The research addresses National Research Priority four, safeguarding Australia.

More information:

Prof. Michael Brooks, CSSIP & University of Adelaide, 08 8303 5681
web: http://www.cs.adelaide.edu.au/~mjb
Dr Rustom Kanga, CEO, iOmniscient PL, 02 9411 7776
http://www.iomniscient.com
Dr Matthew Cuthbertson, CEO CSSIP, 08 8302 3477 or 0414 392 834
http://www.cssip.edu.au

Prof. Julian Cribb, CRCA media, 0418 639 245
More science stories: http://www.sciencealert.com.au

To discontinue receiving these media releases, please send an email to:
leave_crcamedia@starclass.com.au