



# IT tuning Aussies into emotions

■ TREVOR CLARKE

Australians have never really been an emotional bunch. But if some of our researchers get their way, we might just be showing our feelings at work with a little help from some innovative IT.

Aimed at incorporating emotional characteristics into our interaction with computers, La Trobe University associate professor information systems, Rhajiv Khosla, has devised what he calls an emotionally intelligent information and communication technology (ICT).

"We are trying to make computers more human-like in their design and how they kind of personalise information and assist in decision making," Khosla said. "When the PC came it started isolating people in terms of the environment in which they work. That's where my work started in the mid-1990s – I wanted to work on a human-centred approach to the design of systems."

Working in conjunction with NEC and universities in India, Japan and Singapore, Khosla's system measures emotional state changes through a video and image processing system that captures facial expressions and body language via a tiny camera built into the monitor. The camera is sensitive enough to capture fluttering eyelids. The captured images are then processed, compiled into an emotional profile and compared against a cognitive profile generated when users answer a set of behavioural questions. All of this happens in real time.

For movie buffs it sounds remarkably like the eye analysis machine Harrison Ford's character, Decker, uses on suspected replicants in the cult classic, *Blade Runner*.

"We don't focus on any particular emotion, whether the person is happy, sad or angry or whatever," Khosla said. "What we have done is focus on the changes in emotional states as the users are interacting with these devices. What we are more concerned about is whether they have a positive emotional state or a negative emotional state."

The professor identified human resource management and other sectors including healthcare, police enforcement (interrogations), driving instruction, tourism and emergency services as possible users of the technology.

In particular, Khosla pointed to recruitment as one industry the university has already targeted. One example involved

a recruitment firm or HR department interviewing a sales candidate and evaluating them on different areas related to the job through direct questions related to the industry.

"As they are providing cognitive responses to these questions, and there are 76 of them, there is a small dot in the upper half of the monitor, maybe 2mm in diameter, which is also taking the video stream," Khosla said.

"Even though people know there is a camera looking at them, as they start to answer and get involved in the interaction they just forget about it."

The system would then measure the emotional responses compared to their cognitive responses by evaluating body language and facial expressions and provide feedback to recruiters.

"You need to factor in this very important non-verbal information. People

are made up of emotions and values," Khosla said.

In addition, you could also integrate the system with a regular desktop to check your mood and your state of mind when you start work, Khosla noted. This then could be monitored by management or the machine itself to potentially automate responses. But that's not all.

"It can watch your weight in an emotionally intelligent manner and give you advice," Khosla offered.

## Monitoring traffic emotionally

Meanwhile, researchers at the Sydney-based NICTA labs have been working on a similar concept for the NSW Traffic Management Centre called STaR UI. Research group manager and senior principal researcher, Fang Chen, said its aim was to create a more user-friendly interface for traffic operators taking care of the state's traffic.

"At the same time we try to understand their mental effort or so called 'cognitive load' involved in their ongoing daily basis work; how they can cope with that, if there are any other strategies to help them do their work more efficiently or effectively," Chen said.

Currently at the prototype stage, the technology utilises speech recognition and video and image processors to evaluate and combine different modalities – like speech, hand movement, body movements and some typical mouse/ keyboard movements – and then pro-

vide a meaningful response.

"The information can be captured by a hand movement," Chen said. "For example, there are a lot of police cameras

in different places but if an accident happens and you really want to locate a camera to look at you can point to that one and it will switch to that camera's view."

Other than pioneering technological utility, the system also aims to help manage stress loads. "Because we capture all these modalities' information we actually use this information to get an estimation on a user's mental load," Chen said. "Like when you are suffering some stress or high mental load your speech actually gets changed [sic]. So we try to measure all this and make an adaptive interface based on these measurements."

In future, Chen hopes the technology will help the vision and hearing impaired and also be used in industries that have a centralised control room with a complex system and information flow, like bushfire management, air traffic control, mining, power plants and defence.

"In future you will be able to use your natural modality to deal with machines in your everyday normal life," she claimed.

## The challenges

Due to the enormous variety in human behaviour and idiosyncrasies, one of the biggest challenges both Khosla and Chen face is setting parameters for evaluation.

"That's a huge challenge, you have to set some sort of benchmark," Chen said. "Let the computer know what kind of changes that means, if it is a significant change for a human or just a little bit of a change."

While not specifically challenging the work of Khosla and Chen, other researchers caution that evaluating emotions or mental states through technology can be misleading.

University of Technology Sydney researcher, Toni Robertson, who supervises several technology-based Phd projects and worked on a system called Bystander that exhibited crime photos at the Museum of Justice in NSW, questioned our ability to accurately formalise parameters and evaluate social reactions.

"We know if it is something that can be measured it can be misused," Robertson said. "To me the way you would humanise technology is actually make it easier for people to use it. To me this means making

