



# Scientists play it by ear for ID tests

■ Michelle Wheeler

WA computer scientists have developed a way of identifying people from an image of their ear.

The technique, pioneered by University of WA researcher Syed Islam and his PhD supervisors, uses two and three-dimensional images of ears and matches them to a database.

Dr Islam said ears did not change significantly between the ages of about eight and 70 and were as unique as fingerprints, with even identical twins having different ears.

"The ear has all these features, the curves, ear pit, all that is different for everyone," he said.

The idea has the potential to be used to catch criminals and prevent immigration fraud.

Dr Islam said that using ears to identify people overcame the problems associated with fingerprints, which could be faked, and facial recognition systems, which were influenced by a person's expression.

The technique worked even if a person's ear was obscured by hair, earrings or headphones.

The technique is able to match a person's identity 95.4 per cent of the time using ear data only or 99.4 per cent of the time combining ear data with facial recognition techniques.



## Have you heard about the latest ID research?

By Lindy Brophy

**Stealing identities and falsifying security records are social problems of the 21st century that can result in crime, immigration fraud and more.**

But the answer to the problem may be very close – right on the side of your head.

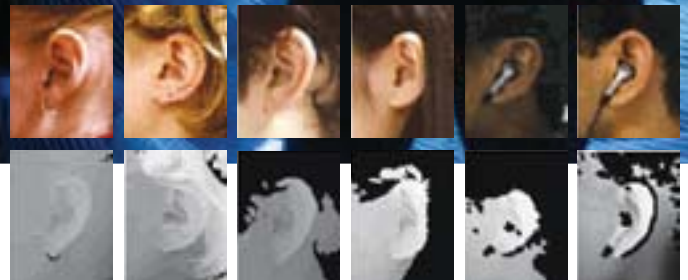
A team of computer scientists has come up with compelling results for detection and identification using the human ear.

Dr Syed Islam and his PhD supervisors Winthrop Professor Mohammed Bennamoun, Professor Robyn Owens and Dr Rowan Davies from the School of Computer Science and Software Engineering have recently demonstrated accurate recognition results for up to 99.9 per cent of detection tasks and 95.4 per cent of identification tasks, using two- and three-dimensional ear images.

Dr Islam was awarded a Distinction for his PhD on ear biometrics – biometrics is the application of statistical methods to the measurements of biological objects.

He said that traditional recognition systems based on identity cards and passwords could be easily be lost, damaged or faked.

“We propose to use ear images, which are common to all, as distinctly different for every person (even in twins) as fingerprints, and do not significantly change between the ages of about eight and 70 years,” Dr Islam said.



*Even hair, earrings and earphones cannot obscure ear identification*

“Ear shapes also do not change when facial expression changes and they can be easily captured non-invasively, even in public places.”

He said the team had developed a fast technique which could detect an ear within 7.7 milliseconds, from a large two dimensional side face image.

“Corresponding 3D data is extracted to compute a final match in only 2.28 seconds on a standard PC,” he said. “The approach works well even when the ear is significantly covered with hairs, earrings or ear-plugs.”

“Proposed complete, fully-automatic, highly efficient and accurate techniques will make significant improvements in thwarting identity frauds. They will help to create trust in e-banking, assist immigration and passport control, and reduce the use of plastic cards, with the added bonus of safeguarding the environment.”

Dr Islam said the non-invasive quality of ear biometrics would appeal to people who needed a fast, simple means of identification.

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# Have you heard about the latest ID research?

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"To use a fingerprint, you must put your finger on something; to use the iris as identification, you must look closely into a camera; a signature obviously requires you to sign something; and you need to speak to be able to use voice recognition techniques.

"You need only walk through something like a doorway for a biometric image of your ear to be captured," he said. "You can't fake it without having your ear cut off and an artificial ear put on your head in its place."

Dr Islam's work took Associate Professor Ajmal Mian and Professor Bennamoun's work on face recognition a step further. "At first, we didn't realise that ears were all so distinctly different," he said. "When we did, we became very excited."

A person's ears are 90 to 95 per cent symmetrical and identical, so either ear could potentially be used for identification. The team concentrated on using left ears, which provided successful results even when covered up to 50 per cent by hair, earrings or earphones. "We only need to match key local features, not the whole ear," he said.



Syed Islam says the ear is the perfect identification tool

"But it would be fairly rare for people younger than eight or older than 70 to partake in illegal activity, so, despite those early- and late-life changes, the ear still provides a reliable security check."

The research findings are available online in the *International Journal of Computer Vision*. Dr Islam was awarded the *UWA Early Career Postdoc Special*

*Commendation Award 2011* for this publication.

Dr Islam is currently working as a Research Assistant Professor in the School of Dentistry, extending his biometric work for the improvement of orthodontic surgery, especially for the management of obstructive sleep apnoea. He is funded by four competitive grants.

## Red hot Festival reminder

**The dazzling red lotus flower on the reflection pond provided us with a constant and stunning reminder of the Perth International Arts Festival.**

*Breathing Flower* was a camera magnet for the three weeks of its residency on

the Crawley campus, with barely a minute going by without a passer-by whipping out a camera or mobile phone.

The resident ducks kept away for the first week, but the braver ones gradually returned to swim in what looked like red

water, reflecting the colour of the giant flower.

The installation was created by Choi Jeong Hwa, the internationally recognised leader of Korea's pop art movement. PIAF's Margaret Moore, program manager (visual art), said she was happy that people honoured and respected the work of art. "It's always a risk putting art in public places, but it's an important part of the Festival," she said.

An air compressor inside the lotus kept it gently and constantly moving, and an internal light created a magical glow at night.

Head of security, Garry Jones, said strong winds blew it up onto the paving next to the pond one night, but otherwise, it did not cause any problems.

The Festival ran from 10 February to 3 March, but the Lotterywest Film Festival will continue until 15 April.



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\* see page 2

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Ear imaging developed by Dr Syed Islam may be the way to beat fraud in the future. Photo: Billie Fairclough

## Lost your ID card? Use an ear

Ears could be the identification card of the future, according to research by UWA assistant professor Syed Islam.

He said that unlike a card, password or fingerprint, which was easily copied or misplaced, ears could not be lost, were distinct to every individual - even twins - and did not change significantly between the ages of eight and

recognition published in the International Journal of Computer Vision.

It describes how he uses two and three-dimensional photography to collect data from tiny points across the ear that are unique to each person.

That data was converted to a "unique algorithm," he said. His tests of 942 images resulted in a detection rate of

Dr Islam said the technique could have wide application in thwarting identity fraud, passport and immigration control and making electronic banking more secure.

He said that in the US fraud cost US\$54 billion in 2009.

His work has been applauded by biometrics pioneer Professor Mark Nixon. Dr Islam is collaborating with

## Benz fraudster loses appeal

By DAVID COHEN

A Wembley woman who used five names while she committed fraud involving a \$65,000 Mercedes-Benz has lost a Supreme Court appeal against her sentence.

Khrits Jane Wiaceck (57) did not get jail for the crime. Instead, she was sentenced to a 12-month intensive supervision order and told to get psychiatric help.

Ms Wiaceck appealed over a juror saying "object, object" during her District Court trial, and over identification evidence.

Supreme Court judges McLure, Buss and Hall granted leave on the identification evidence but dismissed the appeal.

Ms Wiaceck gave a 75-year-old car salesman a \$65,000 cheque for the Mercedes in August 2009 after she said her name was Sari Singh.

A signatory to the closed cheque account was Carol Farrell, of Bunting Road, Churchlands.

Ms Wiaceck gave the salesman a mobile number in the name of Carol Saliba, of the same address.

The District Court heard Ms Wiaceck legally changed her name from Carol Elizabeth Farrell.

The court also heard a Singh email address was registered to

money went to an account for Carol Elizabeth Farrell.

Ms Wiaceck was arrested by police at the caryard 12 days after she got the Mercedes.

"She contended she had mistakenly gone to the caryard ... and was not otherwise involved in what had occurred," Justice Hall said last week.

"Her explanations for why she attended the caryard, were fanciful in the extreme."

Justice Hall said he did not believe the juror who said "object, object" should have been dismissed from the jury.

He said directions were given to jurors at the start of trials to determine cases on their merits.

"This does not mean jurors are expected to maintain stony-faced impassivity throughout the trial," Justice Hall said.

"A comment from a juror that an objection should be made could not reasonably be viewed as indicating either pre-judgment or bias against the appellant."

In the District Court trial the judge gave directions about identification evidence to the jury after they had reached a verdict.

Part of the evidence was that the salesman had been unable to pick a photo of Ms Wiaceck from a board of photos.

But Justice Hall said the appeal could be dismissed because