

## Security is in the eye of the beholder

The recent subway bombings in London, the 9/11 attacks, and the growing threat of identity theft have brought a renewed focus to iris-recognition security systems, which are now being employed in a plethora of applications worldwide.

Yet, despite the rapidly growing use of iris recognition, some experts point towards its potential limitations. A report from the London School of Economics & Political Science (LSE) evaluating the merit of creating national ID cards that contain iris and fingerprint biometrics determined that iris scans may be ineffective for up to one million people in the UK due to a variety of eye diseases.

But, according to computer scientist John Daugman PhD from Cambridge University, whose algorithms form the basis for all iris recognition technology used today, the LSE's negative assessment of iris scanning is largely due to the confusion between the retina and the iris.

"This is a very common confusion, especially in the media. The LSE authors think that glaucoma affects the iris; in fact it affects the retina. They think that diabetes affects the iris; in fact it affects the retina. Similarly, although cataracts would make the retina hard to scan, they have no effect on the iris," he said in an interview with *EuroTimes*.

Still, Ivan Schwab MD FACS, a professor of ophthalmology and director of cornea and external disease service at the University of California at Davis, thinks that certain eye diseases, including certain forms of uveitis including sarcoid, ankylosing spondylitis, Reiter's syndrome, as well as iris tumors, and essential iris atrophy, among others could affect the iris' structure enough to confound the scanning process.

"None of these diseases are common, but there are enough of them that this could be an issue occasionally. Most, but not all, of these diseases progress slowly and the scanner would have some ability to recognise minor distortions, so there would be a point in the process when a disease would cause a rejection by the scanner," he said in an e-mail interview from Australia where he is currently working on bioengineered tissue for the ocular surface.

### As precise as DNA testing

Iris scanning moved from pure science fiction to reality only after 1987 when American ophthalmologists Drs Leonard Flom and Aran Safir patented their conjecture that the iris could be an effective way of identifying individuals because no two irides are alike. With 266 independent characteristics, the iris provides more information than a fingerprint and its accuracy is at least as good as DNA analysis. Drs Flom and Safir asked Dr Daugman to create algorithms that would allow the speedy analysis of the iris' random patterns, and he patented his algorithms in 1994.

Despite some of the criticism, iris scanning is already being used by some countries on a large scale. In the largest national deployment of the technology, the United Arab Emirates



John Daugman

(UAE) uses iris scanners on all of its air, land and sea borders to prevent banned foreigners from re-entering the country. Since 2002, every traveller's iris is compared to a central database of expellees. In the last two years, the system has prevented more than 9000 foreigners from illegally entering the country. UAE officials consider the technology a success and will continue using it at all of their borders.



Deployment of iris recognition technology in UAE

Other airports have adapted the technology to allow frequent travellers to bypass regular passport checks to reduce their time spent in line. Airports in Frankfurt, London, Orlando Washington DC, Boston, the Netherlands, Japan, and Pakistan all have run test projects in which travelers run their passports through a scanner and have a camera scan their irides. The reported satisfaction with the technology indicates that iris scanning may become a standard way of speeding up the immigration process and security checks at most airports.

### Technology used in unexpected ways

Even though iris identification technology is predominantly used in high-security access situations, the technology has also found its way into more commercial settings. For example, in October 2003, the Department

of Motor Vehicles (DMV) in Connecticut (US) pioneered the first iris scanning authentication system in a vehicle emissions inspection program.

In the gritty environment of 270 private automotive repair shops, the sophisticated technology is used to verify the identity of any inspector who is about to perform a government-mandated inspection. The DMV installed the system to prevent authentication violations that were very common with a badge-and-pass code verification system, and reported that since the system's installation such violations have been virtually eliminated.

Another example of unexpected usage is happening at the Richland County Sheriff Department in Columbia, South Carolina, USA, where officials announced last June that they have installed an Iris ID device to help locate and identify some of South Carolina's 7000 missing children. At New Egypt Elementary School in Plumsted, New Jersey, US, iris scanning is used to prevent unauthorised individuals from entering the school and picking up children.

The list of applications for iris recognition technology is virtually endless. The English bank Nationwide just completed a pilot programme implementing iris scanners at automated bank machines.

Iris scanners were also used at the Winter Olympics in Japan to identify biathlon participants before they were granted access to their rifles. A Bavarian hospital in Germany installed an iris scanner in their infant station to prevent infant abductions. The scanners are also used routinely on PCs for ID verification. Demonstrating that the technology is transferable to other species, a research institute in Japan is using iris recognition to identify racehorses.

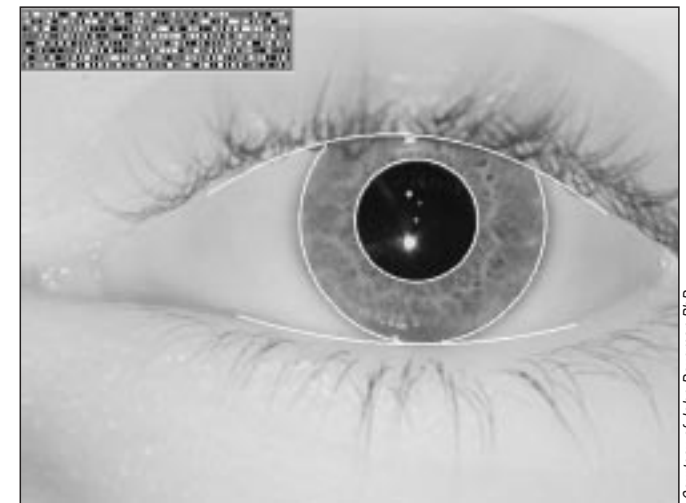
### Iris recognition business about to boom

After Drs Flom and Safir patented their conjecture about the uniqueness of each iris, they co-founded with Dr Daugman the New



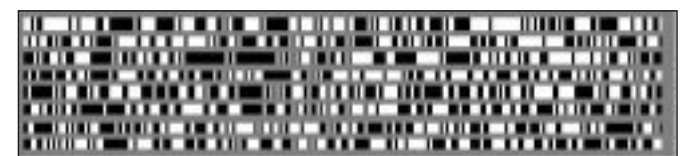
Iris vitiligo with sector iris atrophy from attack of Varicella Zoster

Courtesy of Ivan R. Schwab MD FACS



Iris code

Courtesy of John Daugman PhD



Iris code magnified

Jersey-based company Iridian technology. Until now, Iridian technology has controlled the entire iris recognition market by licensing software and technological knowledge to companies like Panasonic and LG electronics. But this is about to change: the Flom patent expired in the US last February and will expire in Europe and Asia in 2006, which will allow other companies to enter the market with new products.

Nevertheless, it seems there will be enough business to go around for both the established Iridian technology and smaller start-up companies. A July article in the online issue of *Business Week* stated that the iris scanning market is expected to face a seven-fold increase from \$81 million to \$518 million in the next four years.

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