"More than 400m citizens in India have already had their iris patterns stored in formats specified by the standard. Every day another million are added"

How a standard we developed enables the world's largest biometric project — while bringing unexpected benefits to people in rural India

A biometric system enables automated recognition of people based on their biological characteristics (eg fingerprints, face geometry, iris patterns), as well as their behavioural characteristics (eg *how* someone writes their signature rather than what it looks like).

Under the leadership of BSI and physicist Professor John Daugman, who developed the algorithm used in all commercially available iris-recognition systems, the iris-related part of the biometric data interchange standard ISO/IEC 19794-6 was revised in 2011 to provide a clearer explanation of how to produce images in more formats, including a new heavily compressed format.

National identification scheme

The revised standard is enabling the world's largest biometric project. Since 2011 it has helped the Unique Identification Authority of India (UIDAI) to begin the process of scanning the iris patterns, fingerprints and facial images of all 1.24bn residents of India.

This is part of a national identification number scheme called *Aadhaar*, which (according to UIDAI) seeks to "give the poor an identity so that they can claim their rightful benefits and enjoy greater social inclusion".

So far, more than 400m citizens in India have had their iris patterns stored in formats specified by the standard. Every day another million are added at some 36,000 enrolment stations nationwide, which are managed by 83 agencies.

As part of the national identification number scheme, iris images are sent for authentication from a variety of locations (including remote rural areas) to a central database over channels with very limited bandwidth. This would have meant having to transmit digital images in small payloads, which requires significantly more time to process.

But research carried out at Cambridge University showed that with suitable pre-processing, iris images could be compressed to less than one per cent of their original size, remaining usable at a data size of just 2,000 bytes.

Field trials

In May 2013, UIDAI confirmed successful use of the revised standard's heavily compressed image format in large-scale field trials, which yielded an impressive 99.13 per cent successful online authentication rate (compared to 99.30 per cent for uncompressed images).

This had an unexpected additional benefit, in that it enables rural shopkeepers to use their cash tills as a remote ATM service that offers immediate authentication and online counter-transfer into the shopkeeper's bank account. This means local people no longer have to make lengthy journeys into a city to visit a bank to withdraw cash.

Unexpected benefits

Although the various image formats in the standard are now used in all iris recognition projects worldwide, is it an example that shows that our work sometimes brings unexpected benefits — even to people living in the world's most remote locations.

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