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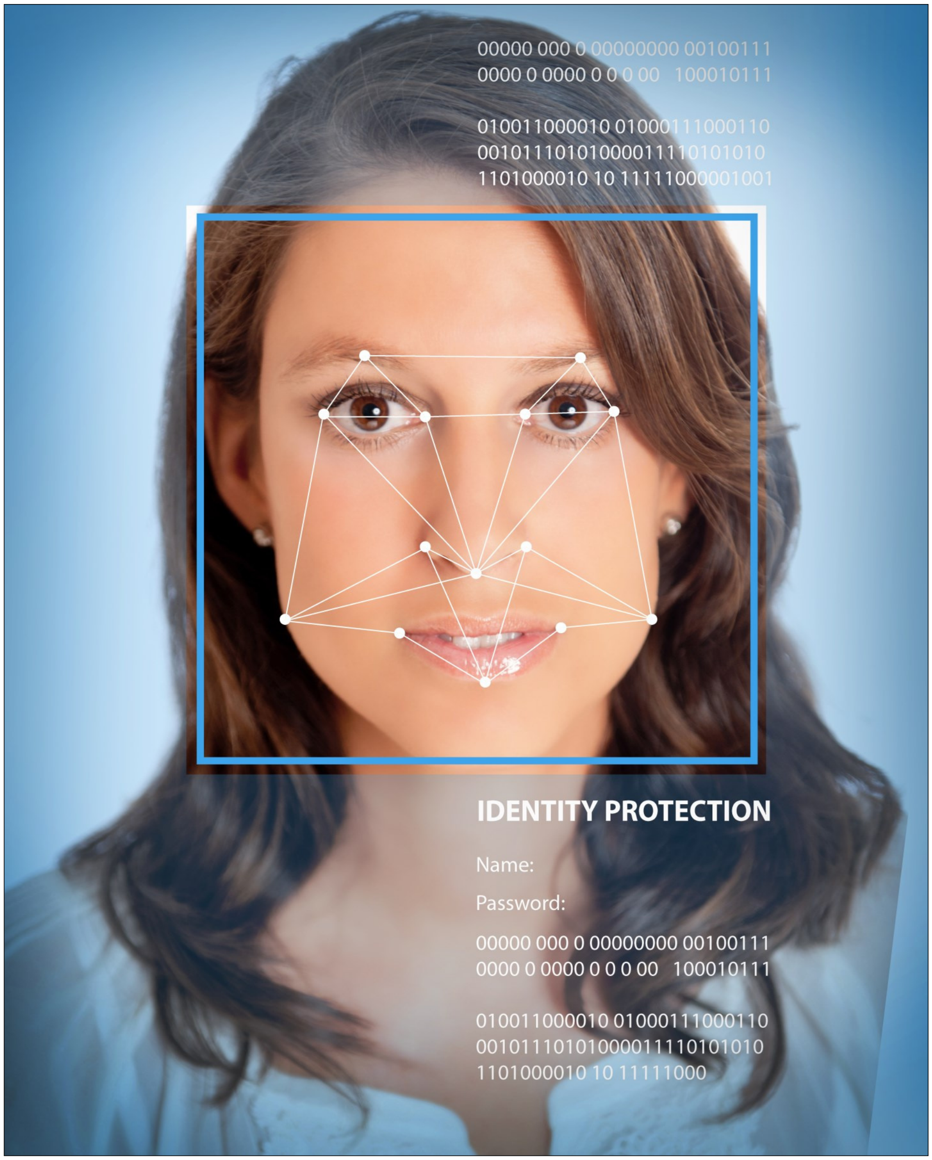
Face Recognition Improves Security

By: David Robertson, Ph.D.

Facial recognition technology has been widely used by the military for identity confirmation and surveillance. It is a unique biometric system because there is no contact necessary to gather images, unlike fingerprinting. Facial recognition, which is also used as a security feature on smartphones and computers, can be improved to more accurately identify a person based on their facial features. Researchers from the University of York FaceVar Lab are working on ways to improve facial recognition as a security feature that would also translate to improvements for military applications.

Automatic face recognition can be improved by copying the functions of the human brain. Security on smartphones is significantly improved if users store an 'average' photo of themselves. Combining different pictures of the user, rather than a single 'target' image, leads to much better recognition across all kinds of daily settings. [1]

Researchers [2] examined the performance of the 'face unlock' system on Samsung Galaxy phones. They found that the system was generally very good at rejecting imposters, but that it often failed to recognise the genuine owner too. However performance could be greatly improved, often to perfect levels, if users stored an 'average' of their own photos – formed by morphing together several different pictures of the user.



Researchers are improving facial recognition systems by creating "averages" of facial features.

We know that people are very good at recognising their family and friends over a range of conditions. But, photo identification is often unreliable because we are rather bad at recognizing unfamiliar faces. In fact, even passport officers, who match people to their photos every day, are rather poor at doing this. In an earlier study [3] officers with up to 20 years of experience were no better than untrained students.

If people are good with familiar, and poor with unfamiliar faces, then it ought to be possible to copy this "familiarity advantage" in computer-based face recognition. We know that the brain forms abstract representations of the people it knows, and one way to emulate this is to use photographic averages, derived from several different photos of the same person. [4]

David Robertson, PhD, lead author of this research, said "One striking aspect of this technique is that it works over different automatic matching algorithms – we are looking at *what* is matched not *how*. If your phone stores an average of your face, it shows significant recognition improvements across all kinds of conditions – inside and out, as well as in difficult lighting. It is very interesting that performance can be so much improved by copying a simple trick performed by the

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brain."

Continuing growth of facial databases would allow users of facial recognition technology to create better facial averages which would assist in military and first responder identification.

About the Author:
Dr. David Robertson received a degree in Psychology from the University of Glasgow and his Ph.D. from University College London. He has worked with the FaceVar Lab since October 2013 and his focus is on improving unfamiliar face recognition in real-world environments.

References

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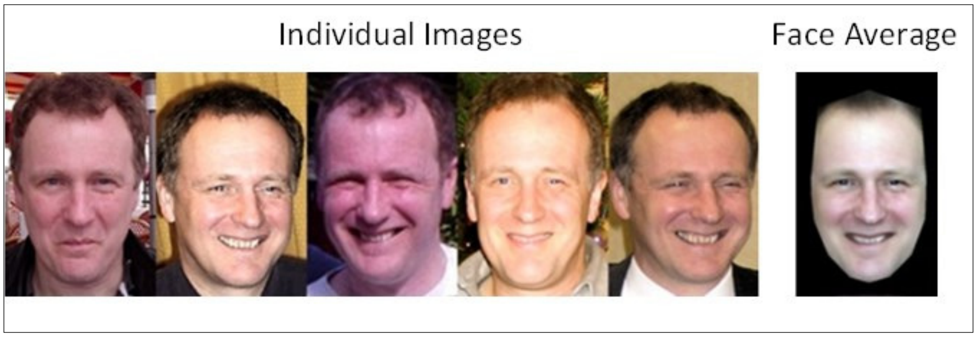

Individual images of the same person can look very different. Averaging these together produces a stable image, which will match a much wider range of the user's face—improving security. (Image courtesy of David Robertson)

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