Recognition at last: Face recognition computers can see through your disguise

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A rapid but superior method for computerized face recognition could revolutionize security systems especially if it can see through disguises, according to research published in this month's issue of the *International Journal of Intelligent Systems Technologies and Applications*.

Every face has special features that define that person, yet faces can also be very similar, explains Lin Huang, of Florida Atlantic University, in Boca Raton. That makes computerized face recognition for security and other applications an interesting but difficult task.

Face recognition software has been in development for many years. However, for biometric authentication at border crossings, for access to buildings, for automated banking, crime investigation, and other applications, has not yet become a mainstream application. The main technical limitation is although the systems are accurate they require a lot of computer power.

Early face recognition systems simply marked major facial features - eyes, nose mouth - on a photograph and computed the distances from these features to a common reference point. In the 1970s, a more automated approach using a facial template extended this idea to map the individual face on to a global template. By the 1980s, an almost entirely statistical approach led to the first fully automated face recognition system.

In the late 1980s researchers at Brown University developed the so-

called "eigenface method", which was extended by a team at MIT in the early 1990s. Since then, approaches based on neural networks, dynamic link architectures (DLA), fisher linear discriminant model (FLD), hidden Markov models and Gabor wavelets. Then a way to create a ghost-like image that would succumb to an even more powerful analysis was developed that could accurately identify the majority of differences between faces.

However, powerful techniques have so far required powerful computers. Now, Huang and colleagues Hanqi Zhuang and Salvatore Morgera in the Department of Electrical Engineering, have applied a one-dimensional filter to the two-dimensional data from conventional analyses, such as the Gabor method. This allows them to reduce significantly the amount of computer power required without compromising accuracy.

The team tested the performance of their new algorithm on a standard database of 400 images of 40 subjects. Images are grey scale and just 92 x 112 pixels in size. They found that their technique is not only faster and works with low resolution images, such as those produced by standard CCTV cameras, but also solves the variation problems caused by different light levels and shadows, viewing direction, pose, and facial expressions. It can even see through certain types of disguises such as facial hair and glasses.

More information: "A method towards face recognition" in *Int. J. Intelligent Systems Technologies and Applications,* 2009, 7, 282-295

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