Finding fake fingerprints

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It was once the stuff of science fiction security, open your eye wide and look into the camera to gain entry to the spaceship flight deck or press a finger tip or palm of your against the pad to access the secret database that lets you take control of the baddies' weapons. Today, of course, iris recognition, fingerprint readers, and other biometric systems are becoming increasingly commonplace. Most modern smart phones have a fingerprint reader that lets you unlock your phone without having to

remember a password or number.

Of course, from a security perspective, what's to stop a third party "lifting" your fingerprint, and creating a facsimile of its loops, whorls and arches with a piece of a skin-like rubbery material and then presenting this to the biometric device to gain access? The simple answer is nothing! Moreover, for a simple fingerprint ID system, there would be no way for it to know that the presented fingerprint was not part of a living person's finger rather than a rubber dab.

However, writing in the *International Journal of Biometrics*, a team from India describes their approach to developing a system that not only reads fingerprints but can detect the "liveness" of the fingerprint based on an algorithmic analysis of micro and macro features. Rohit Agrawal and Anand Singh Jalal of GLA University, in Mathura, and K.V. Arya of the Institute of Engineering and Technology, in Lucknow, explain that their approach sidesteps the problem associated with earlier statistical methods that work well with micro, but not the macro, features of a fingerprint.

The team explains that they have combined local Haralick micro texture features with macro features derived from neighbourhood grey-tone difference matrix. This allows them to generate an effective feature vector. They then train the algorithm with known fingerprints and test it against genuine and fake fingerprints. They achieve an almost 95 percent accuracy with a low error rate. Earlier systems can boast only 90 percent accuracy.

More information: Rohit Agrawal et al. Fake fingerprint liveness detection based on micro and macro features, *International Journal of Biometrics* (2019). DOI: 10.1504/IJBM.2019.099065

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