

Using 'Minutiae' to Match Fingerprints Can Be Accurate

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Fingerprint image with four different minutiae points marked. Minutiae types shown are (from left) a bifurcation, ridge ending, core and delta.

A study by the National Institute of Standards and Technology shows that computerized systems that match fingerprints using interoperable minutiae templates—mathematical representations of a fingerprint image—can be highly accurate as an alternative to the full fingerprint image.

NIST conducted the study, called the Minutiae Interoperability Exchange Test (MINEX), to determine whether fingerprint system vendors could successfully use a recently approved standard for minutiae data rather than images of actual prints as the medium for exchanging data between different fingerprint matching systems.

Minutiae templates are a fraction of the size of fingerprint images, require less storage memory and can be transmitted electronically faster than images. However, the techniques used by vendors to convert fingerprint images to minutiae are generally proprietary and their systems do not work with each other.

For many years, law enforcement agencies have used automated fingerprint matching devices. Increasingly, smart cards—which include biometric information such as fingerprints—are being used to improve security at borders and at federal facilities. The increased use and the desire to limit storage space needed on these cards is driving the use of minutiae rather than full images.

Fourteen fingerprint vendors from around the world participated in MINEX. Performance depended largely on how many fingerprints from an individual were being matched. Systems using two index fingers were accurate more than 98 percent of the time. For single-index finger matching, the systems produced more accurate results with images than with standard minutia templates. However, systems using images and two fingers had the highest rates of accuracy, 99.8 percent. Results of the test are available at fingerprint.nist.gov/minex04/.

Source: NIST

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