Finger vein authentication using smartphone camera

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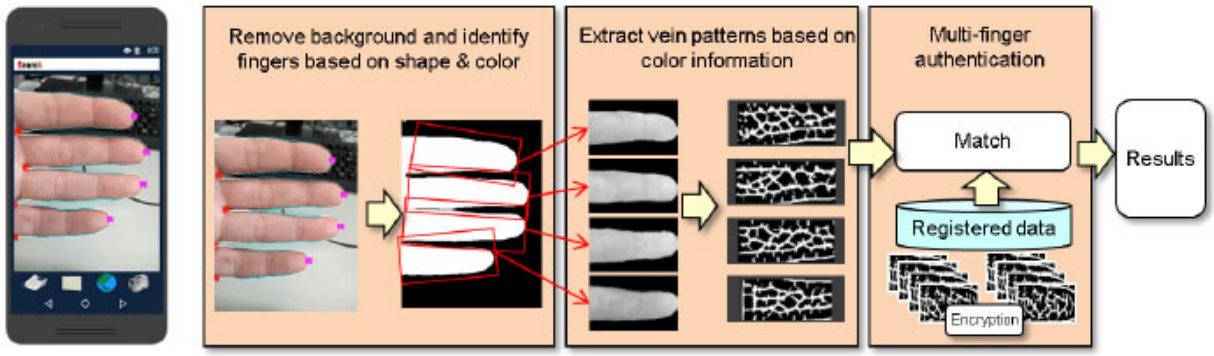

Finger vein authentication technology using smartphone camera. Credit: Hitachi

Hitachi today announced the development of highly-accurate finger vein authentication technology using the camera commonly integrated in the standard smartphone. This technology will enable the use of biometric authentication using finger vein patterns to be available as a personal identification method for smartphone transactions such as online shopping, providing higher security and accuracy as well as preventing unauthorized use.

With the increasing use of smartphones for online shopping, management of private data, etc. in recent years, smartphone transactions have increasingly become the target of crime. Conventional smartphone personal identification methods such as passwords and

fingerprint however continue to carry the risk of compromise and spoofing. Thus there is a growing need for even more secure and accurate methods for personal identification.

Hitachi has developed image analysis and authentication technologies to realize finger vein authentication on smartphones. The advantage of finger vein authentication is the characteristics used for biometric identification are in vivo, thus making it more difficult to forge or spoof compared to other biometric methods such as fingerprint, facial recognition or voiceprint. Until now, however, a dedicated image sensor using infra-red light was necessary to capture finger vein patterns which are hardly visible to the human eye. The technology developed now allows highly-accurate finger vein authentication using the camera built-in on smartphones without a dedicated image sensor. More specifically, the technology can identify each finger from a color image of the user's hand captured by a camera, and reliably extracts the vein pattern information. Authentication accuracy is increased by combining the information from multiple fingers.

As a result, it will be possible to apply finger vein authentication technology which is highly resistant to forgery or spoofing as a biometric authentication method for smartphones.

Features of the technology developed are as follows:

1. Image processing technology to reliably extract finger vein patterns camera-captured color image

Image processing technology was developed using the color information of the fingers to emphasize the color of the finger veins in the image captured by the smartphone camera without using a dedicated sensor with near infra-red light. As a result, it is possible to reliably extract

finger vein pattern information and distinguish information from skin surface creases which easily change.

2. Technology to increase the authentication accuracy by using multiple finger vein patterns

Technology was developed to accurately compensate for positioning and inclination of the fingers by using actual images to identify the shape and color of fingers so that only information from the finger area is extracted from the camera image. This raises the degree of freedom in finger position and angle. Further, by authenticating several different fingers at the same time greater security and higher accuracy can be achieved.

In future, Hitachi will combine this new technology with security solutions that it has foster to date, such as encryption, to contribute to an even safer and more secure society.

Provided by Hitachi

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