

HitachiVeinID

An Introduction to Hitachi's Finger Vein Technology for Securing Financial Transactions

Japan is leading the world with the introduction of new biometric technology for the authentication of banking transactions.

The banking sector in Japan has faced rising levels of cash card fraud and the subsequent illegal withdrawal of funds from customer accounts. Victims of banking fraud filed legal claims against banks to demand compensation and lobbied to encourage banks to provide higher levels of security. In 2004, the Japanese National Police Agency requested the banking community to consider using biometric technology to counter the growing social problems, and to fight against forgery, spoofing, and other related financial fraud.

In 2005, the Japanese Bankers Association urged its member banks to consider using biometric technology to enhance payment systems. Also, the Japanese Financial Services Agency (FSA) requested the financial institutions to accelerate their efforts to minimise the potential damages and social impact of cash card forgery.

Biometrics was seen as the answer. Legal steps were taken in April 2005 to allow for implementation including the Act for Protection of Personal Information along with FSA Guidelines on Protection of Privacy. These measures enabled banks to start the adoption of biometrics for consumer transactions late 2005. To date more than 50 banks have accepted implementation of biometric solutions, and several of these are already operational using technology from Hitachi.

Around 75% of accepting banks (including two of the mega-banks) will implement Finger Vein Technology from Hitachi Ltd. Along with over 30 other banks, Japan Post, the largest financial group in Japan, has selected Hitachi's system.

Over the coming year more than 20,000 ATMs equipped with FV scanners and more than 500,000 MULTOS smart cards with biometric applications will be deployed by the banks in Japan.

In 1997 Hitachi decided to develop new biometric technology for "societal use" applications like banking, local/central government, security/access control, mobile devices, internet authentication etc. In 2000, research results showed that vein biometrics offered the most promise for the creation of a new

and secure identification system. Finger vein patterns are different in each finger of each person and since they are hidden beneath the surface layer of the skin, forgery is very difficult.

The world's first thesis on finger vein (FV) authentication was developed at this time and initial products for physical door access control followed shortly after.

The banks reviewed available solutions and decided that vein biometrics offered advantages over existing technologies based around four key issues: Privacy, Practicality/Ease of use, Security and Transaction speed. For ATM transactions, a key requirement is to keep transaction times near to current levels.

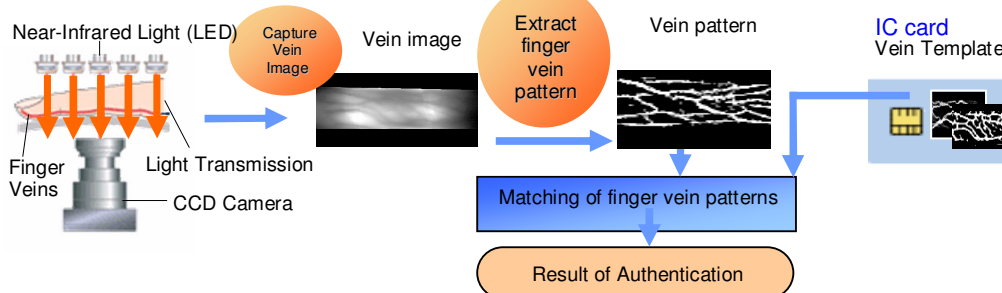
In Hitachi's system (see below), the finger is scanned to create a biometric template. The system works by transmission of near infra-red light into the finger from LEDs inside the scanner. Light penetrates the finger and is absorbed by the haemoglobin creating an image for capture by CCD camera. The image is processed to create a finger vein pattern that is digitized, compressed and stored as template data in a smart card.

Benefits of Hitachi's system

- The FV pattern **inside** the finger cannot be acquired easily without consent.
- Processing time is very **fast**, around 0.5 seconds to acquire, process and validate.
- There is no link to criminality as in the case of finger-print systems.
- Other systems are subject to constraints for practical deployment.
- A key metric is the "FTE" or "Failure to Enrol" rate, Hitachi's experiments show that FTE for finger-vein system is 0%.
- FAR (**false acceptance rate**), the ability of a non registered person to be authenticated, is very accurate (0.0001%)
- FRR (**false reject rate**), the ability of a registered user to **not** be recognised is very accurate (0.01 %).

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Process flow for finger vein authentication transactions when used with IC cards for banking transactions



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