Security solutions for the advanced information society

PalmSecure—Our contactless palm vein authentication system

The ubiquitous networking world promises the convenience of an environment in which anyone can easily access information anywhere at any time, but it also brings increased risk of information leaks from unauthorized access to personal or confidential information. To respond to this problem, we developed PalmSecure, a contactless palm vein authentication system that reliably authenticates personal identity to ensure secure, authorized information access. We deliver original security solutions based on powerful information technology.

Increasing importance of personal identity verification

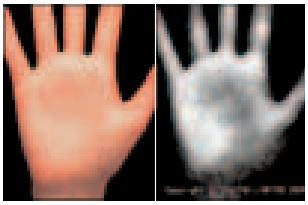
With the advent of the ubiquitous networking world, including the introduction of electronic government systems, the diversification of financial services, sophisticated access management for offices and airports, and the increasing adoption of working from home, the importance of personal identity verification is becoming ever more pressing. Although technologies such as security codes (PINs), passwords, and IC cards have been used up to now for identity verification, these methods are susceptible to problems such as theft, forgetting, forgery, and unauthorized transfer. Therefore, attention is now being focused on biometric authentication technologies that record in advance either features of the human body and/or features of the person's actions (habits) and then remeasure those features to confirm that they match the recorded information.

What is palm vein authentication technology?

We currently have active research and development initiatives in four biometric authentication technologies: fingerprints, face, voice and palm vein recognition. Of these, the one that is expected to be used in scenarios that require especially high authentication precision, such as public areas and the financial field, is contactless palm vein authentication technology. Palm vein authentication uses the blood vessel pattern formed by veins that can be seen as blue lines in the palm of the hand. Since this information is internal and intrinsic to the person, it is essentially "safe" information that is very difficult to steal. While there are other vein pattern authentication approaches that use, for example, the pattern of veins in the back of the hand or in a finger, the palm has a large area and the veins intertwine in complex patterns. Thus the palm provides a richer sample of data for identifying individuals than the other approaches. Moreover, blood vessels in the palm are thick and are less affected by cold or injury and thus allow stable recognition.

Contactless palm vein sensor reflects user considerations

In March 2003, we created the world's first completely contactless palm vein sensor, which is able to authenticate personal identity simply from a hand held over the sensor. In addition to being appropriate for applications that require a high level of hygiene, such as public places or medical work, from a psychological standpoint, this approach reduces the the sort of reluctance that people feel in using a unit after it has



Contactless palm vein authentication

Example of use in the financial sector ❶

In recent years in the financial sector, there have been increasing incidences of losses arising from cash cards being stolen or forged by skimming and criminals pretending to be the card owner to withdraw cash illegally from ATMs. With depositors calling for stronger security measures, increasing numbers of financial institutions have introduced IC cards or biometric-based authentication technologies to prevent losses from stolen and forged cards. Fujitsu was one of the first to propose the introduction of biometric-based authentication technologies in financial transactions as a means of improving identity verification. As a pioneer in this field, we were the first to achieve full-scale practical implementation of palm vein authentication technology. We have two types of solutions that use palm vein authentication technology, based on where the vein blood vessel pattern data is stored. One is a "server-type" solution, in which the patterns are stored on a server. This has the advantage of being able to centrally manage the processing for matching vein patterns. The other is an "IC card-type" solution, in which the pattern is stored on an IC chip embedded in the card. This type has the advantage that the vein pattern data resides with the user. As part of our financial solutions business, we have delivered systems to several banks, beginning with a server-type system for Suruga Bank and an IC card-type system for The Bank of Tokyo-Mitsubishi UFJ, Ltd.

Bank ATM with palm vein sensor

been touched by strangers. This design not only provides a highly secure authentication system for the organization installing the equipment but also delivers peace of mind to users.

Proof of high authentication precision

To verify the accuracy of the technology, we carried out tests using data on 140,000 individual palm patterns from 70,000 employees of the Fujitsu Group. As a result, we verified that the system had a correct acceptance rate (the percentage of people whom the system correctly recognizes) of 99.99% and a false acceptance rate (the percentage of people whom the system incorrectly recognizes as being someone else) of less than 0.00008%. In addition, we confirmed that the technology can reliably verify personal identity based on data from people with a variety of ages, professions, and nationalities, data collected over several years, and data from a variety of aspects of daily life.

Responding to worldwide demand

Responding to demand for higher levels of security outside Japan, in March 2005 we presented our contactless palm vein authentication system at the CeBIT international information and telecommunications trade show in Hanover, Germany, where it attracted much attention and received high marks for its superlative performance. Based on this reception, we began selling this product in June 2005 through our local subsidiaries in the Americas, EMEA, Australia, and Asia.

Promoting even wider adoption

In March 2006, we announced a new product under the unified worldwide brand: PalmSecure. To promote its adoption in an even wider range of application areas, we reduced the size of the sensor to one quarter (35×35 mm) that of the earlier model. At the same time, in addition to increasing its authentication speed and improving its environmental performance, we were able to achieve significant cost reductions. Along with providing a software development kit (SDK) for developers in both English and Japanese, we also developed a dedicated website for this product. By providing the latest technological information and software and implementing an individual support service, we are moving forward with the creation of an environment that will support the unhindered development of applications based on the creative ideas of developers.

PalmSecure™

Example of general market application ❷

Having started with applications in the financial solutions business, we are now working to extend our palm vein authentication system offerings to a broader range of general market applications. Two particular applications attracting considerable attention are palm vein authentication access control units, which guard the physical entrances and exits of buildings or offices, and palm vein authentication login control units, which guard data "entry and exit" electronically. Access control units are used to control access for buildings and rooms to which entry and exit is restricted to specified individuals. These units are implemented as a simple integrated structure consisting of the sensor unit (operating component), over which users hold their hand, and a control unit that performs the authentication processing and issues commands to unlock the door. This system is being used for places that manage confidential or personal information, such as machine rooms that handle critical functions and outsourcing centers that handle important system data for customers. Amid concerns over personal safety, these systems are also beginning to be deployed in condominiums and individual homes.

Palm vein authentication access control unit

Examples of Deployments of Contactless Palm Vein Authentication Systems

- The University of Tokyo Hospital (Room access control)
- Chiba Institute of Technology (IC card-based student IDs for access to grades and other information)
- Naka City Public Library (Cardless lending system)
- Kawasaki Shinkin Bank (PC login control)