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SEMINAR ON PALM VEIN TECHNOLOGY (TOUCHING THE PERFECTION)

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EEE

IV/IV, (B.Tech)
PALM VEIN TECHNOLOGY

-- (TOUCHING THE PERFECTION)

Your hand is the key

World’s first contact-less palm vein authentication technology
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1. ABSTRACT:

With the increase in technology threat to personal data and national security had also increased. The methods that were developed to secure important information from outside intervention were not up to safe mark. There was a need to introduce a technology that secures our data more efficiently from unlawful intervention.

Fujitsu has developed a palm vein pattern authentication technology that uses vesicular patterns as personal identification data. Vein recognition technology is secure because the authentication data exists inside the body and is therefore very difficult to forge. It is highly accurate. This technology can be used in various fields like banking, hospitals, government offices, in passport issuing etc. Business growth will be achieved with these solutions by reducing the size of the palm vein sensor and shortening the authentication time. This paper is about the palm vein technology, its applications, how this technology is applied in real time applications and the advantages of using this technology.

2. Introduction:

In the ubiquitous network society, where individuals can easily access their information anytime and anywhere, people are also faced with the risk that others can easily access the same information anytime and anywhere. Because of this risk, personal identification technology is used which includes Passwords, personal identification numbers and identification cards. However, cards can be stolen and passwords and numbers can be guessed or forgotten. To solve these problems, Fujitsu developed four methods: fingerprints, faces, voice prints and palm veins. Among these, because of its high accuracy, contact less palm vein authentication technology is being incorporated into various financial solution
products for use in public places. This paper palm vein authentication technologies and some examples of its application to financial solutions.

3. PALM VEIN TECHNOLOGY REVIEWS:

3.1 THE BASIS OF PALM VEIN TECHNOLOGY

An individual first rests his wrist, and on some devices, the middle of his fingers, on the sensor's supports such that the palm is held centimeters above the device's scanner, which flashes a near-infrared ray on the palm. Unlike the skin, through which near-infrared light passes, deoxygenated hemoglobin in the blood flowing through the veins absorbs near-infrared rays, illuminating the hemoglobin, causing it to be visible to the scanner. Arteries and capillaries, whose blood contains oxygenated hemoglobin, which does not absorb near-infrared light, are invisible to the sensor. The still image captured by the camera, which photographs in the near-infrared range, appears as a black network, reflecting the palm's vein pattern against the lighter background of the palm.

An individual's palm vein image is converted by algorithms into data points, which is then compressed, encrypted, and stored by the software and registered along with the other details in his profile as a reference for future comparison.

Fig: 3.1 veins in palm
Then, each time a person logs in attempting to gain access by a palm scan to a particular bank account or secured entryway, etc., the newly captured image is likewise processed and compared to the registered one or to the bank of stored files for verification, all in a period of seconds. Numbers and positions of veins and their crossing points are all compared and, depending on verification, the person is either granted or denied access.

3.2 REGISTERING THROUGH PALM VEIN TECHNOLOGY

Step 1:

Palm vein authentication technology consists of a small Palm vein scanner that's easy and natural to use, fast and highly accurate. Simply hold your palm a few centimeters over the scanner and within a second it reads your unique vein pattern. A vein picture is taken and palm pattern registered.

Step 2:

The registered palm pattern is stored into the database along with the personal details of the client.
3.3 WORKING OF PALM VEIN SECURITY SYSTEMS

1. One should place his/her palm near to scanner

![Palm on Sensor](image)

Fig 3.3: Palm on Sensor

2. The scanner makes use of a special characteristic of the reduced hemoglobin coursing through the palm veins — it absorbs near-infrared light. This makes it possible to take a snapshot of what's beneath the outer skin, something very hard to read or steal.

![Infra red on Palm](image)

Fig 3.3.1: Infra red on Palm

3. The integrated optical system in the palm vein sensor uses this phenomenon to generate an image of the palm vein pattern and the generated image is digitized, encrypted and finally stored as a registered template in the database.
3.4 HOW SECURE IS THE TECHNOLOGY?

On the basis of testing the technology on more than 70,000 individuals, Fujitsu declared that the new system had a false rejection rate of 0.01% (i.e., only one out of 10,000 scans were incorrect denials for access), and a false acceptance rate of less than 0.00008% (i.e., incorrect approval for access in one out of over a million scans). Also, if your profile is registered with your right hand, don't log in with your left - the patterns of an individual's two hands differ. And if you registered your profile as a child, it'll still be recognized as you grow, as an individual's patterns of veins are established in utero (before birth). No two people in the world share a palm vein pattern - even those of identical twins differ. In addition the devices ability to perform personal authentication was verified using the following:

1. Data from people ranging from 6 to 85 years old including people in various occupations in accordance with the demographics realized by the Statistics Center of the Statistics Bureau.

2. Data about foreigners living in Japan in accordance with the world demographics released by the United Nations.

3. Data taken in various situations in daily life including after drinking alcohol, taking a bath, going outside and waking up.

3.5 WHAT HAPPENS IF THE REGISTERED PALM GETS DAMAGED?

There may be a chance that the palm we had registered may get damaged then we cannot use this technology, so during the time of registration we take the veins of both the hands so that if one gets damaged we can access through the second hand. When hand get damaged up to large extent we can get veins because deeper into the hand veins are obtained.
When we apply this method we can maintain complete privacy.

3.6. CONTACT LESS PALM VEIN AUTHENTICATION DEVICE (HYGIENE CONCERN):

The complete contactless feature of this device makes it suitable for us where high levels of hygiene are required. It also eliminates any hesitation people might have about coming into contact with something that other people have already touched.

In addition to being contactless and thereby hygienic and user-friendly in that the user does not need to physically touch a surface and is free of such hygiene concerns, palm vein authentication is highly secure in that the veins are internal to the body and carry a wealth of information, thereby being extremely difficult to forge.
4. ADVANTAGES:

In addition to the palm, vein authentication can be done using the vascular pattern on the back of a hand or a finger. However, the palm vein pattern is the most complex and covers the widest area, because the palm has no hair, it is easier to photograph its vascular pattern. The palm also has no significant variations in skin color compared with fingers or back of the hand, where the color can darken in certain areas.

5. APPLICATIONS:

This palm vein authentication technology is used in various areas for more security. The following are some of the important areas where it is used.

5.1. ATM:

In July 2004, to ensure customer security, Suruga bank launched its “Bio Security Deposit” the world’s first financial service to use Palm Secure. This service features high security for customers using vein authentication, does not require a bank card or passbook and prevents withdrawals from branches other than the registered branch and ATMs thereby minimizing the risk of fraudulent withdrawals. To open a Bio-Security Deposit account, customers go to a bank and have their palm veins photographed at the counter in order to guarantee secure data management, the palm vein data is stored only on the vein database server at the branch office where the account is opened.

In October 2004, The Bank of Tokyo launched its “Super –IC Card”. This card combines the functions of a bankcard, credit card, electronic money and palm vein authentication. This Super –IC Card contains the customer’s palm Vein data and palm authentication algorithms and performs vein authentication by itself. This system is advantageous because the customer’s information is not stored at the bank. When a customer...
applies for a Super –IC Card, the bank sends the card to the customer’s home. To activate the palm vein authentication function, the customer brings the card and his passbook and seal to the bank counter where the customer’s vein information is registered on the card. After registration the customer can make transactions at that branch counter and ATM using palm vein authentication and a matching PIN number.

5.2. PERSONAL COMPUTERS:

In personal computers palm vein technology can applied, by inserting the vein sensor inside mouse. When power is supplied to system the mouse also gets power and the sensor in the mouse will be ready to sense palm veins. When one place his/her palm the sensor sense the veins and if they are matched with the registered one the system allows the person to use it. One can use this technology even to lock folders, which can be maintained as private information.
5.3. IN HOSPITALS AND LIBRARIES:

A public library in Japan is set to become the first in the world to use palm-vein biometrics as a substitute for conventional library cards.

The University of Tokyo hospital has taken delivery of a contactless palm vein authentication system to secure physical access to its Department of Planning, Information and Management.

![Fig: 5.3 Using Sensor](image)

5.4 AUTHENTICATION:

In front of our homes we can apply this Palm vein technology so that by registering the veins of our family members and relatives we can maintain high range security which is not possible through other technologies. Japanese recently used this technology before front doors and getting high range security.

![Fig: 5.4 Near Front Doors](image)
6. CONCLUSION:

Palm vein pattern authentication technology developed by Fujitsu was being used in a wide range in Japan. If this technology is introduced in our country we can solve many problems such as password protection in ATM, security in various fields and if we implement this technology in government offices we can make the employees to work according the government timings. Surely this technology will bring a revolution in the field of science and technology in the near future.

7. REFERENCES:

3. http://www.google.co.in/