LiFi Based ATM Security using Hand Vein Biometric Identification by Wavelet Transform Algorithm

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Abstract:
We propose a real-time embedded LiFi based finger-vein recognition system for authentication on ATM devices. Initially we send the user's information using LiFi instead of card. The microcontroller gets the information from the LiFi. Then the ATM will scan the vein and will compare with the database. If finger vein matched, we can do the transaction successfully. If the vein is not matched, it will send the message to the authorized user and also the nearest police station via GSM technology. And also the door will close automatically. The alert also will ON.

Keywords: Authentication, Biometrics, biomedical imaging, embedded system, Humans, Veins.

I. INTRODUCTION

In this hi-tech world number of crimes such as ATM robberies, unauthorized entering of people into large industries, unauthorized entering of data etc. are increasing day by day. The main causes of these problems are due to the defects in existing security systems. Digital security has acquired special importance due to vast amount of digital information and the high value that is frequently been attached to it. Normally we use passwords for security. Effective user authentication applications are crucial to protect information security. In response to the growing number of threats to data security, a wide variety of authentication mechanisms have been developed. Here we introduce a new security system which uses finger vein recognition system for authentication in ATM networks. The Biometric is defined as the automated recognition of individuals based on their biological or behavioral characteristics. The finger-vein detection has been proved to fully comply with this definition and it provides many important biometric features: Uniqueness and permanence of the pattern almost impossible to forge or copy. The biometric parameter is hidden from general view. ATMs have become very popular with the general public for their availability and general user friendliness. Here we introducing the concept of ATMs network security by using biometric finger-vein pattern.

II. LITERATURE SURVEY

Title: Human Identification Using Palm-Vein Images
Author: Yingbo Zhou and Ajay Kumar

This paper presents two new approaches to improve the performance of palm based identification systems presented in the literature. The proposed approach attempts to more effectively accommodate the potential deformations, rotational and translational changes by encoding the orientation preserving features and utilizing a novel region-based matching scheme.

Disadvantages:
- Accuracy is low

III. EXISTING SYSTEM

Problem identified in Existing System In conventional methods, the information is traditionally provided only by passwords or Personal Identification Numbers (PINs). This type of implementation is easy to implement but result in terms of password forgotten or creates misuse. Hence, the biometrics concept is used to encode the human physiological or behavioral features instead of passwords. Since, there are many biometric patterns such as the face, iris, fingerprint, palm print, hand shape, voice, signature, and gait. With all the biometrics several applications are developed but still some limitations like high cost and low accuracy. It may not develop that is perfectly reliable or secure. While considering fingerprints and palm prints are frayed. In voice, hand shapes and iris images may easily get forged. There is a possibility of low accuracy in face recognition because it may affect by occlusions or face-lifts. These cases result in susceptible to spoofing attacks. To overcome these limitations there is a need to invent the secure model.

IV. PROPOSED SYTEM

Proposed research methodology In this method, a new biometric scheme based on hand vein is considered by replacing the ATM password. The usage of card type transactions needs more secure and safe. The attack or security issues are a major issue that creates complex problems. The security measures at ATM plays a significant role in preventing attacks on user's money. The replacement of existing fingerprint module with the introduced hand vein module is tested to improve the security level. Fig
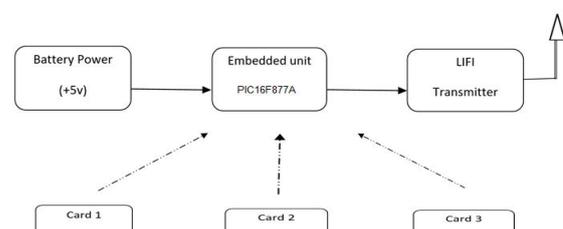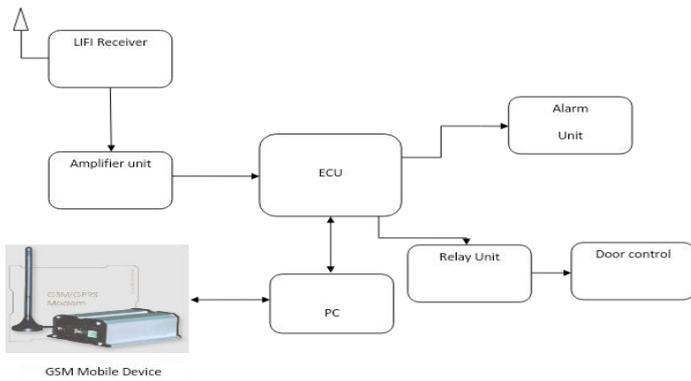

Figure.1. Card Section

Figure.2. Receiver Unit

REQUIREMENTS

The hardware requirements are listed below:

- Power supply
- Processing unit
- Li-fi Module
- Alarm unit
- Serial communication.

Similarly, the software requirements are listed as follows

- MPLAB IDE
- MATLAB
- PICKIT2
- Visual basic 6
- Language: Embedded C

V. DESCRIPTION

As shown in figure 3, the Electronic Controlling Unit (ECU) uses PIC16F877A for controlling all the process and maintains the receiving unit active. The Transmitted data is retrieved from the RF receiver module.

The received data is decoded and transferred to ECU. The +12 v power supply used in the proposed system to activate the LCD, RTC, GSM and buzzer. The hand vein system is initially processed by MATLAB and stored in the database. To verify the functionality of the proposed design, the stored database is compared with the real-time biometric hand vein through hardware part. Hence, in this research work, the hardware part consists of sensors units that are used to collect and store the data externally.

The collected information is processed and stored in the PIC microcontroller. Based on the program each unit may turn ON and OFF. In emergency conditions, the DC motor is used to open and close the door of ATM. It is operated in 12v. If an ATM robber trying to broke the ATM machine, the door is to be closed automatically with the help of DC motor. Hence, the power consumption will be very less.

For controlling the exact data and retrieve the stored data the coding is written and its process is controlled by GSM 900 Module. The client receives proper messages when there are any fluxations. The unwanted access may indicate through message, alarm and LED lights. The pin diagram for PIC16F877A is shown in figure 4. The GSM module is shown in figure 5, it supports all types of processor interfacing and used for communication. The baud rate is to be configured is to be configured from 9600 to 115200 bps through Attention (AT) commands based on the requirements.

Table.1. Fingerprint vs. Finger-vein biometric comparison

Criteria	Finger print Biometric	Vascular biometrics
AR and FRR	Higher	Lower
Accuracy	Medium	High
Template Size	Small	Medium
Cost	Lower	Higher
Security	Lower	Higher
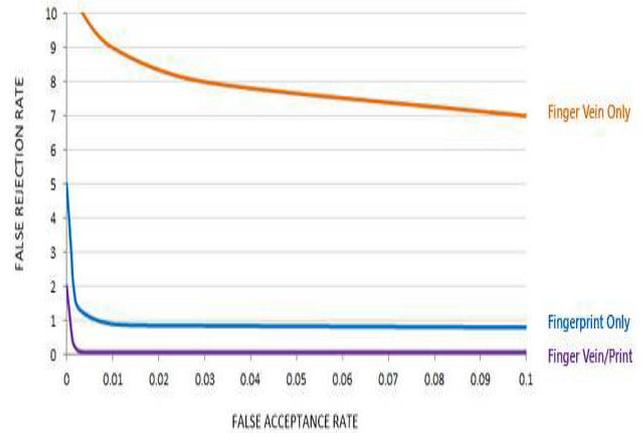
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