International Journal of Engineering & Technology, 7 (2.33) (2018) 64-66

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

Highly sensitive-pin-accessibility for ATM using human body communication

M. Balamurugan [1] *, Jegan Amarnath. J [2], Pradeep Kumar Sahoo [3], Suresh Anand M. [2], C. Soorya [4], Subham [4], D. Sathyan [4]

[1] *Assistant professor Computer Science Engineering Sri Sai Ram Engineering College, Chennai, India*
[2] *Associate professor Computer Science Engineering Sri Sai Ram Engineering College, Chennai, India*
[3] *professor Computer Science Engineering Sri Sai Ram Engineering College, Chennai, India*
[4] *Student, Computer Science Engineering, Sri Sai Ram Engineering College, Chennai, India*
**Corresponding author E-mail:*

Abstract

Burglary of ATM have increased in recent days which led to the use of biometrics to get high level of security and accuracy. This paper defines a system that replaces the ATM cards and PINs by using a new technology. A system is proposed for secured transaction in ATM machine. The technology used in this process is called as Red-Tacton. This contains Transmitter and Receiver section which transmits the data's through human body. Initially user needs to keep the fingerprint to access the ATM. The user must hold the transmitter module where the user's password (PIN) is stored. When the user touches the receiver in ATM, pin is transferred from the transmitter to the receiver using human body as the medium. The temperature sensor used to detect the fire accident in the ATM activates the water pump motor to extinguish the fire. The MEMS sensor store the measurements of x-y-z axis of the ATM machine and used to find out if any theft in ATM or Vibration above the threshold level automatically shutter will be closed. Also the intimation is given via buzzer.

Keywords: *MEMS Sensor; Red-Tacton Reciever; Red-Tacton Transmitter; Temperature Sensor.*

1. Introduction

Human Area Network technology uses our body such as fingers, hands, arm, fingers and toes for data transmission. The transfer of data has a speed of near equal to 10 mbps. This technology will differ from IR and wireless as it uses minute electric field on surface of human body. In Japanese culture Red is an auspicious colour. Thus the technology is named as REDTACTON [1]. The human body is a perfect conductor of electricity and it can be used to transfer data by inducing it into the electric field. REDTACTON converts the digital data into low power electric pulse and transmit this pulse using human body [2]. This conversion is based on the properties of electro-optical crystal. This crystal will change according to the change in weak electric field. Photonic electric field sensor was developed by NTT for detecting electric field on human body [3]. The 3 main features of this technology are Touch, Broadband Interactive and Any-Media. Touch: when some touch it the Communication takes place [4]. Broadband and Interactive: It takes an interactive and duplex Communication. The data loss is very less and its speed is high up to 10 mbps. Large number of people can communicate simultaneously [5]. Any Media- we use dielectrics and conductors for transmitting data. The transfer of data can be through clothing and shoes but within distance 10 cm.

2. System model and assumptions

The concept of the designed system is to replace the ATM card by Red-Tacton transmitter and receiver. Red-tacton is a device which has a transmitter and receiver. The transmitter will contain the pin number of the account and receiver will be placed in the ATM machine. The receiver will have the electro-optic crystal in it. This will sense the presence of electric field and will recover the data from the electric field. This recovered data will be sent to the authentication unit and will grant the access to the user if the pin matches the user account.
The ATM machine will have the finger print scanner to make sure that the user who is having the transmitter is a valid user. Only if the users finger print matches with the data in bank then the user can go on with the banking process.

2.1. PIC16F877A microcontroller

The PIC microcontroller PIC16f877A is one of the most essential and well known microcontrollers in the industry. This controller has a great advantage of convenient usage and coding can also be performed more easily. This microcontroller stands renowned in the industry because it can write-erase as many times as possible, as it uses FLASH MEMORY technology. It has a total number of 40 pins and out of which 33 pins are for input and output. PIC16F877A is being used in many pic microcontroller projects. PIC16F877A also has many applications in digital electronic circuits

Copyright © 2018 M. Balamurugan et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

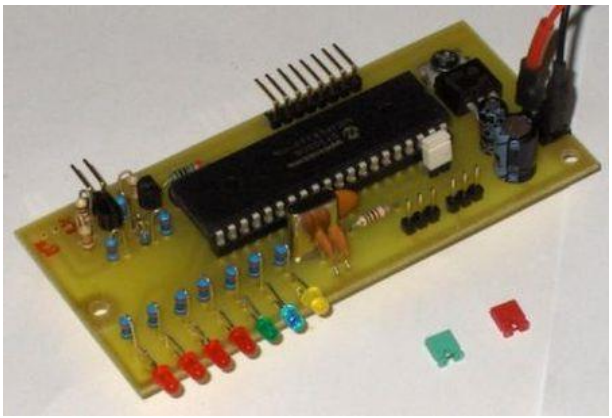


Fig. 1: PIC16F877A Microcontroller.

2.2. Red-tacton transmitter

The transmitter gives out an electric- field in the form of alternating current. This is imposed on the input data. When body gets in contact with the Red-Tacton transceiver, the electrical signals are transmitted. When the contact is not present, the transmission is also gets stopped. This communication can be possible only through user's body surface parts like hands, fingers, arms etc., and the most interesting part of this technology is that it also works in shoes and other clothing's as well. On the human body surface a weak electric field is induced by the transmitter. This signal will depend on the fluctuations in the electric field.

2.3. Red-tacton receiver

The receiver uses another electrode to read weak AC electric field which is induced on the body by the signal and demodulates it to recover the data from it. A photonic electric field sensor is provided to detect the electric field on the Red-Tacton receiver. It process the signal and detects electric field. This processed signal now becomes the data that can be downloaded.

2.4. Mems sensor

This sensor uses a technology in which a pair of capacitive plates consists of a suspended mass between them. This technology is called Micro Electro-Mechanical System. When this sensor is tilted, the mass which is suspended creates a difference in electric potential that is measured as a change in capacitance. This signal is then amplified to produce a stable output signal in digital measuring 4-20mA or VDC.

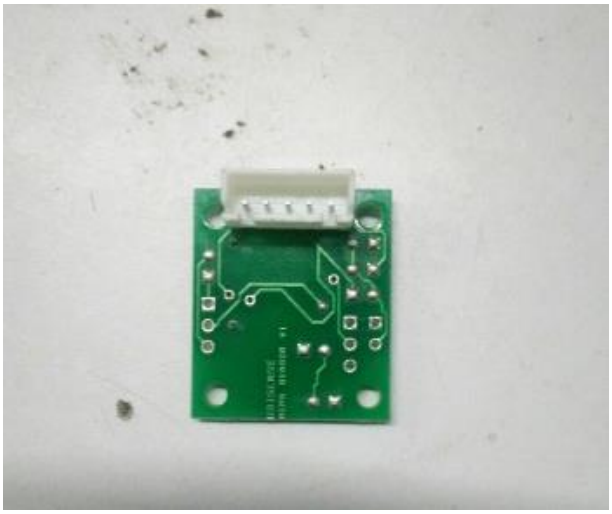


Fig. 2: Mems Sensor.

2.5. System model



Fig. 3: Red-Tacton Transmitter.



Fig. 4: Red-Tacton Receiver.

3. Efficient communication

The red-tacton is highly useful for reducing the theft in ATM. The MEMS sensor is used to detect theft and thus if the any robbery occurs the buzzer is turned on. This will alert the security person to catch hold of the theft easily. The Iot can be used to send the message to the nearest police station so that the police will get the intimation as soon as the theft has happened. There will not be any misuse of the ATM because it is highly authenticated and thus it will prevent from hackers.

4. Security

Red-Tacton actually is useful for short distance communication. In wi-fi communication the signals can be easily hacked and extra security is needed. And in wired transmission physical connection is required for data transmission. When more users try to retrieve data, the physical connection is a problem. But, there will not be many problems with security. Thus Red-Tacton technology will be in between wireless and wired connection. It provides maximum security and data transfer without any physical connections. The security will be maximum because data transfers will occur between two points only. The theft will also be reduced to a considerable extent with the use of MEMS sensor and temperature sensor

5. Result and discussion

From this project we notice the following:

1) ATM authentication will be made high secured.
2) The ATM theft will be reduced and the robbery can be easily identified.
3) As the data is transferred through human body there will not be any hackers trying to eavesdrop on our data.
4) Thus, red-tacton will replace the ATM cards to make the ATM process easy with highly secured.

The resultant graph may be displayed as:

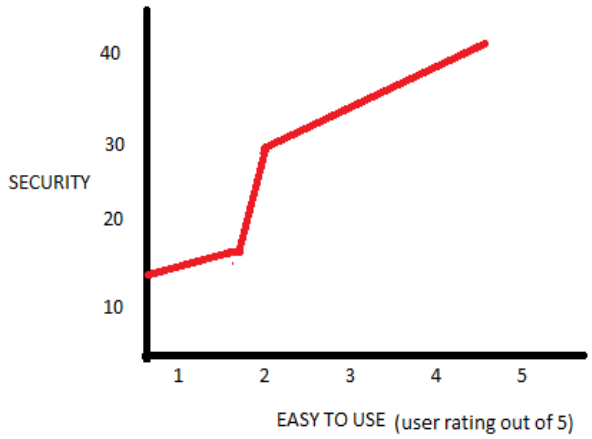


Fig. 5: Efficiency Grap.

6. Conclusion

The proposed system "Highly sensitive-pin-accessibility for ATM using human body communication" have been successfully implemented and testing is done and verified using the hardware results. it is a new technology and will gain growth in the upcoming years as it uses human body for communication. When RedTacton is compared with other technologies, it gives more security as there is no problem of hackers because the data transfer is through our body itself. The ATM frauds threat will be reduced to a great extent as the authentication process is highly secured and duplication of transmitter cannot be done. We can use this technology in fields like military, hospitality, defence areas where there is a high need for security.

Acknowledgement

This paper and project would not have been a reality if Mr.M.Balamurugan Assistant Professor, Dept. of computer science and Engineering, SSEC was not our mentor and guide. His guidance has been a major force in the completion of our working model. We would also like to thank Mrs.Latha HOD, Department of computer science and Engineering, SSEC for giving us permission to carry out this project.

References

[1] Jan Neuzil; Ondrej Kreibich; Radislav Smid, "A distributed fault detection system based on iwsn for machine condition monitoring" IEEE Transactions on Industrial Informatic, 11 November 2013.

[2] Andreas Willig," recent and emerging topics in wireless industrial communications: a selection", IEEE Transactions on Industrial Informatics (Volume: 4, Issue: 2, May 2008).

[3] Wei Shen; Tingting Zhang; FilipBarac; Mikael Gidlund ," prioritymac: a priority-enhanced mac protocol for critical traffic in industrial wireless sensor and actuator networks", IEEE Transactions on Industrial Informatics(Volume: 10, Issue: 1, Feb. 2014)

[4] Giuseppe Anastasi Marco Conti; Mario Di Francesco, "A comprehensive analysis of the mac unreliability problem in ieee 802.15.4 wireless sensor networks", IEEE Transactions on Industrial Informatics (Volume: 7, Issue: 1, Feb. 2011).

[5] Luigi Palopoli, Roberto Passerone, TizarRizano, "scalable offline optimization of industrial wireless sensor networks", IEEE Transactions on Industrial Informatics (Volume: 7, Issue: 1 Feb. 2011).