

ATM SECURITY USING RED-TACTON

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ABSTRACT

ATM fraud is a common problem in today's world. Shoulder surfing or observation attacks, including card skimming and video recording with hidden camera's while users perform PIN-based authentication at ATM terminals is one of the common threads for users. In our project we are using Red Tacton which uses human body as a medium for transfer of data because Human Area Networking is an emerging trend in the field of communication. It uses IEEE802.3 standard to achieve a data rate of 10Mbps. Red Tacton transceivers use the body's electric field to transmit digital messages and optic crystal inside the receiver will convert the changes in electric field back into the signal. It can be used in various purposes like scientific, military, private and so on. Here we are also using finger print sensor for further security. User first keeps his/her fingerprint to access the ATM and the user holds the transmitter module where his/her password is stored and when he/she touches the ATM the password is automatically received by the receiver and transaction is performed. We are also using MEMS sensor to sense ATM theft or if the vibration is above a threshold level automatically the shutter will close and the initiation is given via buzzer and message is given via GSM to control section.

Keyword: Human area networking, IEEE 802.3, 10Mbps,Red Tacton

1.INTRODUCTION

“RED”for warmth, “T”for touch and “acton” for action. Red-tacton is a small device used for Human area networking.This system is proposed for secured transaction in ATM MACHINE. These efforts are made to minimize processing time for detection and recognition process. It consists of transmitter and receiver section. The data's are transmitted through human body. The data rate of red-tacton is 10Mbps.It uses human bodies electrical field to transmit digital messages. This method of data transfer is harmless. Red-tacton will provide: speed, security and lack of interference.Two people each with red-tacton enabled cellphone clasp hands and automatically transfer information to each other phones.The main disadvantage posted by the red-tacton method is noise interference, Thus we are using a fingerprint sensor.It sends a 5 volts pulse along the surface of the body.The human body shunts most of this electricity to the ground resulting in a weak electric field that can be modulated to carry signals.

For safest transaction we are using a PIC Microcontroller and finger print sensor technique. The person using the tacton has to scan his/her fingerprint for personal recognition. The microcontroller compares the input image and reference image available in the memory. If the image match then data flow takes place through the human skin. This proves to be the safest and reliable transfer of data. Wireless communication creates connections when signals arrive, allowing for easy connections because connectors are unnecessary. However, seen from another aspect, the arriving signals can be intercepted, so security becomes an issue. Wired communication transmits data between two connection points so interception is difficult. Taking the above points, Red Tacton is situated directly between wireless and wired communication. It is better than wireless LAN as signals don't weaken.

II. RELATED WORK

There are many ways for ATM security including finger vein technique, SEPIA and face detection. In finger vein the system first captures the vein image, extracts it and pattern matching will be done. This system has disadvantages such as high cost and arthritis patients cannot place their hand on scanner properly. In SEPIA the ATM will generate an OTP which user needs to enter and thus transaction is performed, but his method is costly and user needs to have a smartphone. In face detection method the face of the user is captured and matched with the database, if it does not match the door of ATM cabin will be locked and OTP is sent to the security personnel. The disadvantage in this system is image quality, image size, face angle and this system requires high processing and storage.

III. PROPOSED SYSTEM

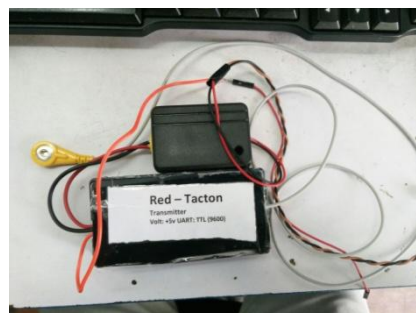
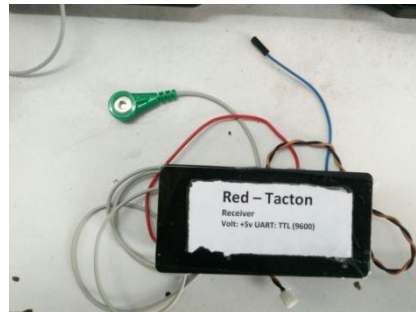
A system is proposed for secure transaction in ATM machines. This process is made to minimize processing time for detection and recognition process. Here we are using Red Tacton technology, which means it contains transmitter and receiver section the data's are transmitted through human body. Initially user needs to keep fingerprint to access the ATM, also the user can hold the transmitter module where the user's password is stored. When the user touches the ATM the password is passed through human body to the receiver section. The receiver consists of optic sensor which senses the changes in the electric field and changes them into signals. The MEMS sensor used here to find out the ATM machine theft or vibration above threshold level which leads to automatic close of ATM cabin shutter.

IV. HARDWARE USED

1. Red Tacton

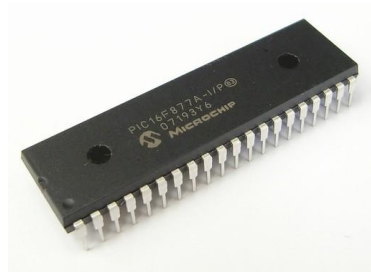
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disadvantage posted by the red-tacton method is noise interference, Thus we are using a fingerprint sensor. It sends a 5 volts pulse along the surface of the body. The human body shunts most of this electricity to the ground resulting in a weak electric field that can be modulated to carry signals.



2.PIC16F877A Microcontroller

In our project we are using Peripheral Interface Controller. The main advantage is that it can be write-erase as many times as possible because it uses FLASH memory. It totally has 40 pins and there are 33 pins for input and output. An EEPROM is also featured in it which makes it possible to store some of the information permanently. It consists of two 8 bit and one 16 bit timer. Capture and compare modules, serial ports, parallel ports. In our project we are using two PIC16F877A Microcontroller for transmitter and receiver respectively.



3.Fingerprint sensor

In our project we are using finger print sensor for verification of users. Fingerprint for human beings are unique. The scanner uses a light sensitive microchip (either a charged couple device or a CMOS image sensor) to produce a digital image. The microcontroller matches this image with the already stored image in the database and compares it. If the pattern is matched the transaction will be processed or it will send message to the account owner.

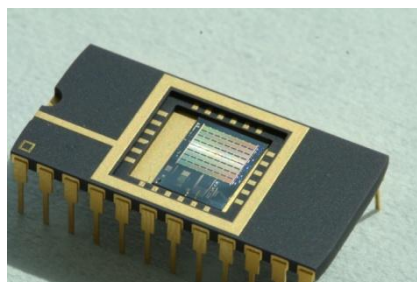


4.MEMS sensor

The functional elements of MEMS are miniaturized structures, sensors, actuators and microelectronics. This sensor has the ability of sensing both dynamic acceleration (shock or vibration) and static acceleration (inclination or gravity). The sensor such as accelerometer measures in one, two or three orthogonal axes. They are typically used in one of three modes:

1. As an initial measurement
2. As a sensor of inclination, tilt or orientation in 2 or 3 dimensions.
3. As a vibration or impact sensor.

We are making use of MEMS sensor for ATM theft. If there is any tilt or change in the orientation of ATM machine the buzzer will alert the surroundings and the shutter of the ATM will close automatically and an alert message will be sent to the server.



5.GSM

Global System for Communication is a standard developed by the European Telecommunications Standards Institute to describe the protocols for second generation digital cellular networks used by mobile devices. It is a secure wireless system. In our project we are using GSM for authentication purpose. If the user is not the original owner of the account then he/she will first transmit password through Red Tacton and an authentication message indicating yes/no will be sent to the registered mobile number of the owner. If the owner presses yes then transaction will be successful else transaction failed.

6.UART

UART generally stands for “Universal Asynchronous Receiver/ Transmitter ” is a microchip which controls a computer’s interface with its attached devices through programming. Specifically, the computer is provided with RS-232C Data Terminal Interface (DTE) , so the data can be exchanged with modems and other serial devices .The Universal Asynchronous Receiver/Transmitter (UART) controller is the key component of the serial communications subsystem of a computer. UART is also a common integrated feature in most microcontrollers. The UART takes bytes of data and transmits the individual bits in a sequential fashion. At the destination, a second UART re-assembles the bits into complete bytes. Serial transmission of digital information (bits) through a single wire or other medium is much more cost effective than parallel transmission through multiple wires. Communication can be “full duplex” (both send and receive at the same time) or “half duplex” (devices take turns transmitting and receiving).

1.1. Asynchronous Receiving and Transmitting Protocol

Asynchronous transmission allows data to be transmitted without the sender having to send a clock signal to the receiver. In this case, the sender and receiver must agree on timing parameters (Baud Rate) prior transmission and special bits are added to each word to synchronize the sending and receiving units. In asynchronous transmission, the sender sends a Start bit, 5 to 8 data bits (LSB first), an optional Parity bit, and then 1, 1.5 or 2 Stop bits.

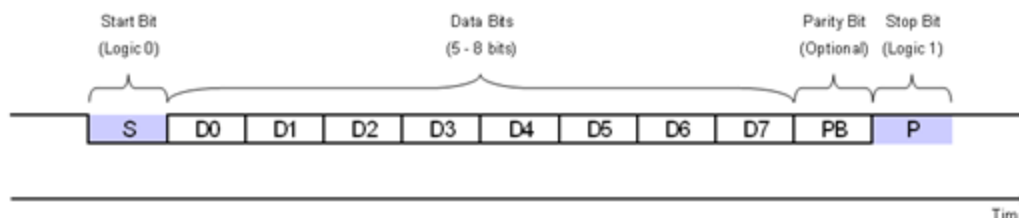
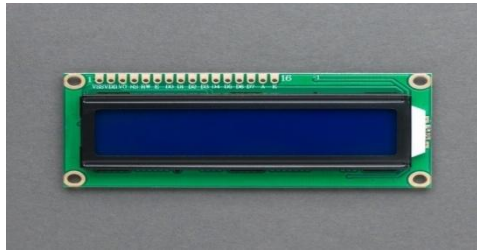


Fig 3.1 , Basic UART packet format: 1 Start bit, 8 data bits, 1 Parity bit and 1 Stop bit

6.LCD

A Liquid Crystal Display is a flat panel display or other electronically modulated optical device that uses the light modulating properties of liquid crystal. They are used to display arbitrary images or fixed images with low information content and 7 segment display, as in digital clock. Here we are using LCD to display Transaction successful, Transaction failed, Finger Print matched or not and shutter closing.



V. SOFTWARE REQUIREMENTS

1. EMBEDDED C

High-level language programming has long been in use for embedded-systems development. However, assembly programming still prevails, particularly for digital-signal processor (DSP) based systems. DSPs are often programmed in assembly language by programmers who know the processor architecture inside out. The key motivation for this practice is performance, despite the disadvantages of assembly programming when compared to high-level language programming.

2. MPLAB IDE

It is used to develop applications for microcontrollers and signal controllers, generally running on PC (Windows, MAC OS, LINUX). It provides a single integrated environment which is helpful in developing code for controllers, hence the name Integrated Development Environment (IDE). MPLAB IDE is user friendly, easy to use and includes a host of free software components for developing application fast and super-charged debugging.

Step1: The user will enter the ATM cabin with or without Red Tacton.

Step2: If the user is the original owner of the account he/she will keep his/her fingerprint and if the fingerprint matches then they can pass the PIN number and Card number through Red Tacton by touching the ATM and the transaction is processed.

Step3: If the user is not the original owner then first he/she will pass the password through Red Tacton and an authentication message will be send to the owner and if he/she presses yes the transaction will take place or the transaction will be failed.



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