

ADVANCED BIOMETRIC AUTHENTICATION SYSTEM FOR LOCO PILOT IN TRAIN

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Abstract: In today's world, unauthorized access to the valuable and the confidential sources is very common. An example can be recent hijacking of a train, which caused great loss to the railways. Based on this reason we thought it would be an apt project to make a secured protection for locomotives. To have a secured protection, a unique identification is necessary and we decided to use the fingerprint of the person as the identification. The objective of the project is to develop an embedded unit which only can be used while the driver start the engine by deploying his finger print as the authorization source. The focus of this paper is intelligent human-machine interfacing of behavior biometrics, which seems to play an important role in future generations of A-machines.

Keywords: Ultrasonic fingerprint scanner, GSM modem, LCD display

I INTRODUCTION

In today's world unauthorized access to the valuable and the confidential source is very common. An incident of Chennai suburban train hijack made a great loss to the Indian railways. This made an impact on us which paved a way for the development of this project. Here we use a unique identification of pilots fingerprint. The finger print of all loco pilots will be stored in a database. The lever will be released only when the authenticated person access the train. In case of unauthorized access, it produces a siren and message will be transmitted to the RPF. Here we use an advanced technology of fingerprint scanning called ULTRASONIC FINGERPRINT SCANNER, by which the fingerprints cannot be tampered.

II. METHODS

2.1 Existing System

2.1.1 Pin and RFID Authentication System

The present driving mechanism in train is push-pull lever mechanism. The engine can be switched

on by inserting the key in the key hole, thus the lever gets released. When the pilot pushes the lever the train starts moving. Some of the system use simple keypads with PIN (personal identification number) codes "swipe" or insert cards such as magnetic stripe, non-contact system having less security than biometric access control system. They are connected to an intelligent engine controller which contains stored programming information from access control software about who is allowed where and when as well as other function that the system can perform. Proximity cards are used in conjunction with an access control card reader connected to the door controller. Also, telecommunication has been redefined; applications of mobile phone aren't only restricted to send SMS (Short Message Services) or making conversations. New innovations which has been generated from it has further enhanced its capabilities making it suitable controlling applications the for remote GSM/GPRS module; Bluetooth module based system is used in our existing system, it is not used for the future purpose



Fig 1: password detection system



Fig 2: RFID card detection system

2.2 Proposed System

In our proposed system, we have included a fingerprint scanner on the lever. The engine can be switched on using the keys yet the lever remains locked. The lever can be released only when the driver's fingerprint is authorized. Whenever the driver starts the engine he will be supposed to give his fingerprint as the authorization source. The scanner that we use here is an ultrasonic scanner so that the fingerprints cannot be tampered. When the driver gives his/her fingerprint it will be verified with the database in the local server and will display a message on the LCD display through GSM modem present in the train. If a unauthorized person tries to start the train the buzzer produces a siren and will send a message to the RPF.

III. DESIGN

The major components used in this system are the arduino microcontroller, GSM modem, Ultrasonic

fingerprint scanner. When the driver places his/her fingerprint on the scanner the fingerprint is captured and is verified with database containing the fingerprints of all loco-pilots. The authentication is given through the GSM modem placed in the train to the LCD display. When the fingerprint is authorized the lever's lock gets released

3.1 Required Components

3.1.1 Arduino UNO microcontroller

An Arduino board consists of an Atmel 8, 16, or 32 bit microcontroller. It has 32KB memory space. The clock speed is about 16MHz so it can perform a particular task faster than other processor or controller. It supports USB connectivity so that we can do data transformation. Arduino works on 5volts.

3.1.2 GSM Modem

The GSM modem is used for low cost, wireless communication channel for data transmission.

3.1.3 Ultrasonic Fingerprint Scanner

Ultrasonic sensors use very high frequency sound waves to penetrate to the epidermal layer of skin. Since the dermal skin layer exhibits the same characteristic pattern of the fingerprint, the reflected wave measurements can be used to form an image of the fingerprint. This eliminates the need for clean, undamaged epidermal skin and a clean surface

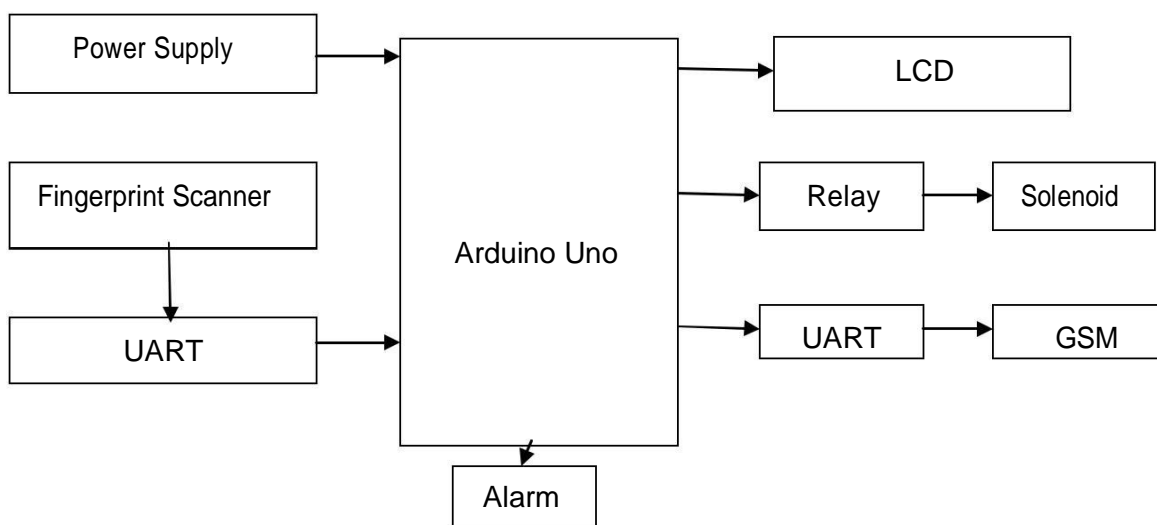


Fig 3: Block diagram

3.1.4 Working

The proposed system works when the authorized loco-pilot places his/her finger print on the scanner. It is compared with the database and sends an authentication message via GSM modem to the LCD display present in driver's cabin. An unauthorized entry makes the siren ring and sends a message to the RPF personnel

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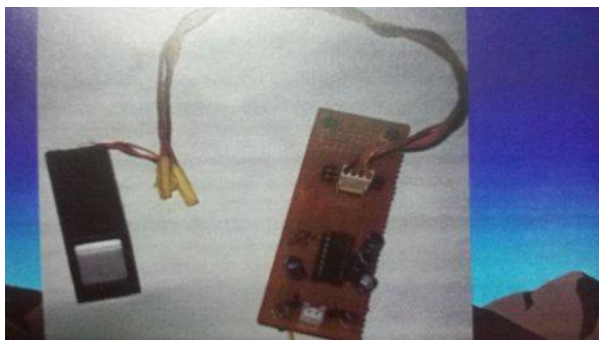


Fig 4: Finger print scanner



Fig 5: GSM Modem

IV RESULT

When the authorized person gives his fingerprint it will be verified and the lever lock is released. If unauthorized person gives his fingerprint produces an alarm and a message will be sent to RPF personnel

V CONCLUSION

In this paper, we have presented the railway security system using biometrics. This idea can completely avoid hijacking of trains. It can also be implemented in other sources which helps in avoiding hijacking and accessing personal and confidential sources.

References

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