

“ADVANCED FINGERPRINT AUTHENTICATION SYSTEM IN TWO WHEELERS”

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Abstract— The project is to create an authentication system for two-wheelers based on the most popular biometrics that are nothing but Fingerprints. Basically, it is made to prevent the two-wheeler from thefts. The self-start of the two wheeler is replaced with the fingerprint system. The recognition of the fingerprint is based on certain factors such as unique patterns, reference points etc. The project consists of the AVR microcontroller AT Mega 328, fingerprint scanner module R305, Fuel sensor and GSM Module. The fingerprint Module R305 has memory storage capacity of 256 fingerprints. As soon as the fingerprint module acquires the fingerprint, the fingerprint module immediately interacts with the microcontroller and checks if that fingerprint is present in the database of the module. For a valid fingerprint, the ignition system is started provided sufficient fuel must be present. If the fingerprint acquired is invalid then a message will be sent to the owner of the vehicle using GSM Module. LCD Display and DC Motor is interfaced with the microcontroller. LCD Display displays the desired output while the DC Motor starts with valid fingerprint and sufficient fuel.

Keywords —Fingerprint scanner module, AVR microcontroller, authentication etc.

I. INTRODUCTION

“Biometric” is derived from the term Biometry used in 20th century. Biometric system includes various types such as face recognition, voice recognition, fingerprint recognition, eye (iris) recognition. Among these techniques the fingerprint recognition is the most widely used. This is because fingerprint of every person on the earth is unique and can provide good reliability compared to the other conventional methods. Fingerprint biometrics are easy to implement. The two significant parts of fingerprint biometric system is Identification and Authentication. Fingerprint recognition or fingerprint authentication refers to the automated method of verifying a match between multiple human fingerprints. The process of identification tells you who the user is while the process of authentication tells you whether the user is valid or not.

II. RELATED WORK

In the field fingerprint identification, different types of work have been done by people.

We went through several research papers and the work done on the projects related to this topic till date.

The paper basically contains biometric fingerprint system which is used instead of other types. Using fingerprint form of biometric system provides us with high security. It is one of the most convenient and compact method to apply. The project uses a fingerprint module which has good storage of fingerprints in its database which can be done with the help of software. The hardware unit starts the ignition system of the vehicle. The basic concept is that when a correct fingerprint is obtained, the vehicle will be ignited. If the match is not found in the database then the vehicle will not be started. Interfacings are done using the PC parallel port. The PC parallel port is inexpensive and used in most of the projects. Embedded C language is used to write the entire system code. [6].

The paper describes a real time fingerprint authentication system based on a fingerprint matching strategy of an individual. The system is developed so that it can be applied to the latest technology of embedded systems for fingerprint authentication. This is done using suitable sensor and microcontroller. The system is comprised of fingerprint. [7]

III. METHODOLOGY

A. Block Diagram

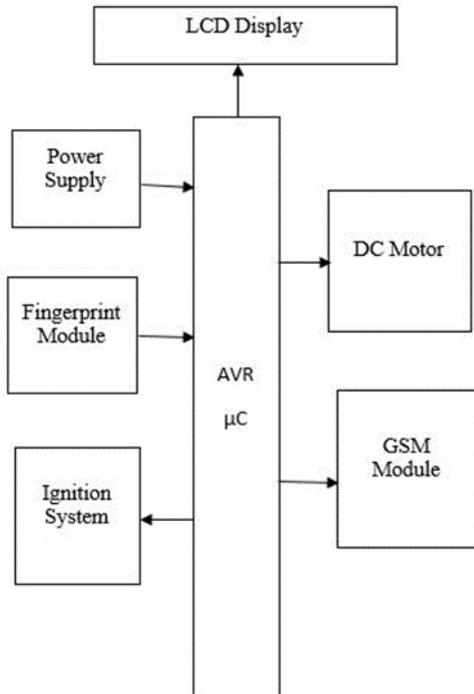


Fig.3.1 Block Diagram of the system.

Fingerprint module (R305) - It scans the fingerprint acquired and gives to microcontroller.

AT Mega 328 microcontroller- It does the function of processing the inputs and giving desired output.

Power Supply- It provides regulated 5V supply

DC motor – It starts the vehicle engine.

LCD display- It displays access granted or denied.

Fuel indicator-It checks whether fuel is present or not.

GSM Module-It sends a SMS on the mobile of the owner whenever an invalid access occurs.

B. Implemented Hardware

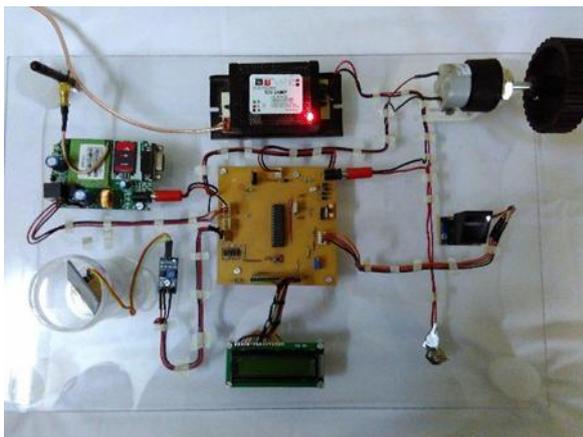


Fig 3.2 Hardware of the system.

C. Working

The working of the system is as follows:

1. The two wheeler starts with an ignition key.
2. The ignition key is present at the right bottom of the set up.
3. The ignition key should be turned on.
4. As soon as the key is on, the entire system is enabled.
5. The sensors as well as the output devices get interfaced with the microcontroller.
6. The LCD Display displays “Scan your finger!” as shown below.

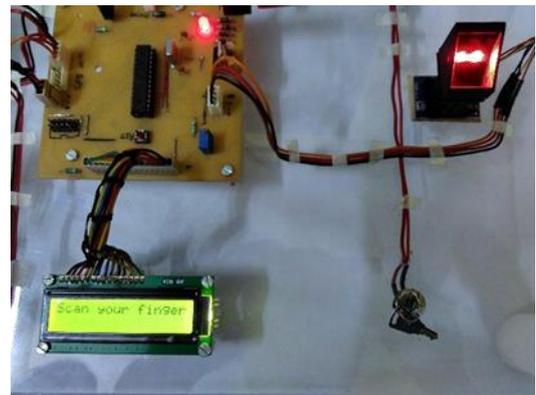


Fig. 3.3(a) Initial state of system.

The process of authentication of fingerprint matching and starting the two wheeler begins here.

Case I: Valid Fingerprint.

Fig. 1. User should scan its fingerprint on the fingerprint module.

Fig.2. It requires few milliseconds to scan the respective fingerprint acquired by the module and check if the fingerprint is present in the database or not.

Fig. 3. The microprocessor processes the data given by the fingerprint module and checks for the fuel.

4. If the fuel is low then the LCD display will display “LOW FUEL”.

5. If the fingerprint is valid and the fuel is sufficient, the LCD display displays “ACCESS GRANTED”.

6. The DC Motor is started.



Fig. 3.3(b) Case I: Valid fingerprint.
Case II: Invalid Fingerprint.

1. User should scan his finger on the fingerprint module.
2. The module again checks if the acquired fingerprint is present in the database or not.
3. If the fingerprint acquired by the module does not match with those present in the database, the LCD display displays "ACCESS DENIED" even though the fuel is sufficient.
4. The DC Motor is not started.
5. Along with this, a SMS is sent on the owner's mobile phone indicating that invalid person is trying to access the vehicle.
7. LCD Displays "SMS Sent".

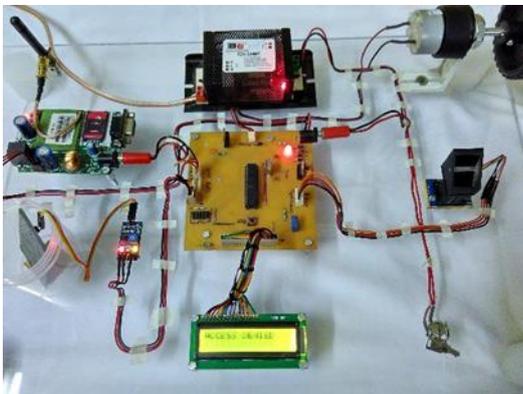


Fig 3.3(c) Case II: Invalid fingerprint.

IV. RESULT

Fingerprint module used for the secure ignition and authentication purpose in two-wheeler from anti-theft. The microcontroller monitors the all sequences and simultaneously starts the ignition system of the vehicle and control signal is given to the relay driver. Since, by the main objective of the project is obtained successfully but here DC motor is used in order to show the dummy model of fuel ignition system of two wheeler. An SMS is

sent with the help of GSM Module for every invalid access. The project is extremely suitable for the real-time application.

V. CONCLUSION & FUTURE SCOPE

This paper has presented the design and development of two wheeler ignition system which is based on fingerprint identification. The above implementation is a complete effort to understand how Fingerprint Recognition is used as a form of biometric to recognize identities of human beings in vehicles. It includes all the stages from minutiae extraction from fingerprints to minutiae matching which generates a match score. Various standard techniques are used in the intermediate stages of processing. In today's world, thefts and mishaps are drastically increasing. To secure our vehicles from these problems this project is made. The theft is controlled by the fingerprint matching process. In future, this project can be enhanced rather advanced for four wheelers by using Palm recognition also. In this project, we can add GPS to trace the exact location of the vehicles. To implement more number of operation and to get high throughput higher versions of controller can be used.

In future, we can upgrade the project by adding snap shot video camera so that whenever the thief is stealing the vehicle, it will record the scenario. We can also add GSM or GPRS technology so that a message can be sent to the owner. This system can be used in four wheelers too.

VI. APPLICATIONS

For Anti-theft. □

To measure RPM of the vehicle. □ Side stand indication. □

Fuel cut-off system at over speed. □

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