

ANTI-THEFT VEHICLE SECURITY SYSTEM USING FINGERPRINT SCANNER AS WELL AS MANUAL

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Abstract

Today the theft of the vehicle is becoming very common, and it is one of the most vital problems for the people who purchase a bike. A fingerprint is the unique identities of any person, so I use the fingerprint scanner in my research and I include manual setup also which is used when your fingerprint is not working in your bike due to rain or any other reason. It is not a keyless authenticate system, it is having a key, if you lost your key so then also it will work so to do this you have to switch the fingerprint mode. A person, who wishes to drive the vehicle, first step is to insert the key and then verify their fingerprint or enter a password manually after all this the system will decide whether the person is allowed to drive the vehicle or not; by checking the database, once verification done then ignition system of vehicle will starts automatically. If the person is not valid in the Fingerprint Module or Password Module database then the vehicle will not get started.

Keywords: Fingerprint scanner, Vehicle Security, Arduino mega, GSM 1200, DTMF, Ignition System

1. Introduction

The paper presents the designing of fingerprint identification as well as manual keypad system in two-wheeler which is used to lock or unlock the two-wheeler. A fingerprint is one of the unique identities of any person. The proposed system is the design of key as well as keyless authentication system; it is providing a system based on biometric authentication. A person who chooses to drive the vehicle, the first step is to insert the key, if the person doesn't have key so firstly he/she has to switch on the fingerprint mode through slider key and then he/she has to verify their fingerprint or dialing the code on the keypad. If your fingerprint will match or your code will match to which is stored in the system than the system will automatically switch on the ignition system. An inbuilt system in

an automobile which prevents such cases has, therefore, become vital. This paper aims to introduce a hardware which detects the fingerprint as well as the manual code which behaves like a switch whose function is to turn on or off the ignition system based on the validity. The rest paper is organized in the following manner. In section 2, Block Diagram and System Description, system description and working of the system in section 3. Finally, the conclusion of the paper is presented in section 4 and references in section 5.

2. Block Diagram And System Description

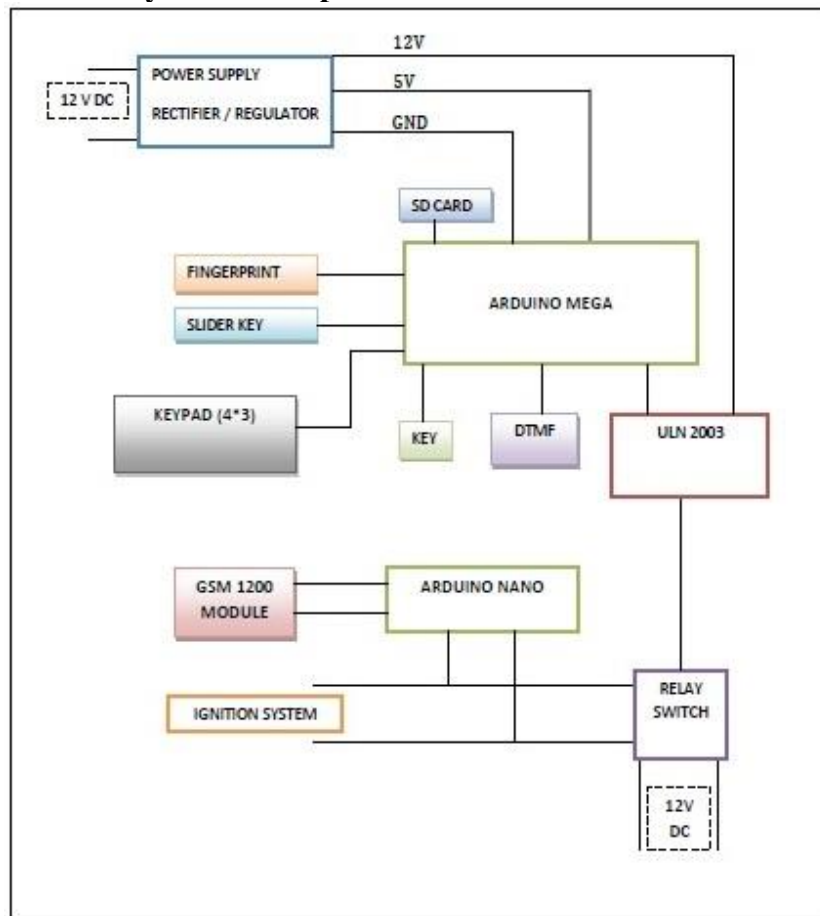


Figure 1: Device Block Diagram

In this system, a 12V DC power will be supply to Power supply rectifier and Relay switch to run the device. The system consists of the following component and they are:

- Power supply Rectifier/Regulator
- Arduino mega & Arduino nano
- Fingerprint scanner
- Slider key
- SD card
- Key
- Keypad
- ULN 2003
- Relay switch
- GSM 1200 module
- DTMF module

2.1 Power supply Rectifier:

It is used to supply constant power output or to convert AC input into DC output. In this device, it is used to provide 2 outputs (12V and 5V). The 5V output is connected to Arduino and 12V output is connected to ULN 2003.

2.2 Arduino mega:

The Arduino Mega 2560 is a microcontroller board. It is based on the ATmega2560. It has 54 digital input and output pins in which 15 for Pulse Width Modulation (PWM) outputs, 16 are analog inputs, 4 are UARTs, a 16 MHz crystal oscillator, one USB connection, one power jack, an ICSP header, and a reset button.

2.3 Fingerprint Scanner:

A fingerprint is an impression left by the friction ridges of a human finger. To capture the image of these friction ridges or to convert it into codes, we use a scanner which is known as a fingerprint scanner. The function of the fingerprint scanners is to capture an image of a person's fingerprint and compare it with its database. There are four types of fingerprint scanners: the optical scanner, the capacitance scanner, the ultrasonic scanner and the thermal scanners. We use an optical scanner in this device. It is connected to Arduino mega as an input.

2.4 SD card:

In this device, we are using SD card to store the database. Since in this device, we can store only 4-5 person fingerprints and this database can be stored in SD card only because the RAM of Arduino is too small and we cannot store much data on this.

2.5 ULN 2003:

It is a relay driver IC. It is an electro-magnetic switch that will be used whenever we want to use a low voltage circuit to switch a light bulb ON and OFF. In this device, we use this to give command to relay switch to ON and OFF the ignition system.

2.6 DTMF:

DTMF stands for Dual Tone Multi-Frequency. It is the signal that you generate when you press keys from your mobile or telephone. With DTMF, each key (phone) generates two tones of specific frequencies. One tone is generated from a high-frequency and the other one is from a Low-Frequency group. Here are the signals generated when you press your phone keys:

Digit	Low-Frequency	High Frequency
1	697	1209 Hz
2	697	1336
3	697	1477

4	770	1209
5	770	1336
6	770	1477
7	852	1209
8	852	1336
9	852	1477
0	941	1336
*	941	1209
#	941	1477

3. System Construction:

Firstly the system requires two 12V connection to run whole the system. The first 12V connection is the input of power supply rectifier/regulator who gives the 2 constant voltages (12V and 5V) as an output. 5V and ground (GND) will run the Arduino mega and 12V will run the ULN 2003. SD card, Fingerprint scanner, Slider key, Keypad, Key are the inputs of Arduino mega and ULN 2003 is the output of Arduino mega. Relay Switch and DTMF system are connected with ULN 2003. Arduino nano is connected to the output of the relay switch and through this Arduino nano will run and GSM 1200 module is connected to the Arduino Nano.

4. Working:

The system will start when, you insert the key, if you do not have key you have to activate the fingerprint mode by sliding the slider key. After this, you have to verify your fingerprint through a fingerprint scanner. Since fingerprint scanner is an input of Arduino and after taking the input the Arduino will compare your fingerprint with its database and after verifying the fingerprint it will give the signal to the ULN 2003 and then ULN 2003 command the Relay switch to close the circuit and the ignition system will start. In this process, an SMS will be sent by Arduino through GSM module to registered mobile no. and due to the SMS, the person gets to know that someone starts the bike. If he found that an unknown person stole his/her bike so to protect the bike he has to give the command to DTMF through the mobile to stop the ignition system and while doing this the rider will not ride the bike. Since this system requires a small mobile phone to operate the DTMF. And due to this small mobile phone we can trace the bike and we get to know the exact location of the bike.

4.1 How the system works:

Firstly we have to give anyone input (except key) to the Arduino for generating output. This output becomes the input of ULN 2003 whose function is to drive the relay switch. After getting the input to the relay switch, it gives the signal to the Arduino nano and also gives the power to run the ignition system. After getting the signal, Arduino nano gives the signal to GSM module to send the message to the registered mobile no. If any unknown people riding the bike so to protect the bike to theft the owner have to give the signal to DTMF through call and after getting the signal, DTMF will give the signal to the Arduino Mega to stop giving the signal to the ULN 2003 and due to this, the ignition system will not start.

5. CONCLUSION:

The main motto of this paper is to prevent the vehicle from the thief. Installation of this device in the vehicle will decrease the theft of the vehicle. This device will provide high security towards theft of the vehicle. Since the cost of the device is very less, it is in customer budget. It is having an advantage that if some unknown person starts the bike so you get to know about it through SMS in your registered mobile no.

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