SMART KEYLESS BIOMETRIC IGNITION SYSTEM

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Abstract: - Fingerprint is one of the important and authentic human identification method. Fingerprint of every person is unique. In this project with the help of fingerprint bike ignition on and off process is done. Fingerprint scanner is used to scan the finger print of a new user. Scanned fingerprint is stored in a database of the microcontroller and it is called as master fingerprint. Before any user can use the vehicle, his/her fingerprint image is scanned and it is match against the master fingerprint in the database. If both the fingerprints are identical then control circuitry of the microcontroller sends appropriate signals to the motor relays operating the bike ignition of the vehicle If user fingerprint is not match with the database then it is prevented from using the vehicle and microcontroller sends signals to alarm circuitry to warn about an unauthorized user. This project is totally reduces the theft problem and increase the security level of the bike.

Keywords: Fingerprints, Microcontroller, Vehicle ignition, relays.

I.INTRDUCTION

Automatic identification of a living person is based on physiological characteristics of a human. There are number of biometric techniques are available like face recognition, fingerprint recognition, finger geometry, hand geometry, vein recognition, voice recognition and signature recognition. Out of these fingerprint recognition system is inexpensive compared to other biometric techniques. It is user-friendly, high reliability and can be used in a Variety of environments. Biometric method requires the physical presence of the person to be identified. This emphasizes its preference over the traditional method like use of password, a smartcard etc. Also, it potentially prevents unauthorized admittance to access control systems or fraudulent use of ATMs, Time Attendance Systems, cellular phones, smart cards.

Biometric recognition systems provide higher security and convenience than traditional methods of personal recognition. In this project results are shown through the algorithms involves running data for usually related to a positive identification of a user or other individuals. The issue of bike hijacking or snatching on highway, bike theft problem due to easy access of bike functional system can be reduced by using fingerprint as a biometric system for starting the bike engine as the necessity of protection. This project is totally focussed on providing strong security system to the bike.

II. FINGERPRINT SCANNER

A fingerprint scanner is a type of biometric scanner which scans the human fingerprint. Fingerprint scanner is classified into two types i.e. optical and capacitive. Main difference between these two types of fingerprint is that the optical fingerprint captures minutiae by light and capacitive fingerprint scanner captures minutiae and current. In this project, the optical scanner is used because it is less accessible to electrostatic discharge (ESD) as compared to capacitive fingerprint scanner. The fingerprint scanner is frequently implemented in control access system because every human have different fingerprint minutiae which helps in identifying the true data of a person accurately. In the case of bike ignition access system, the person who wishes to enter the building needs to scan their fingerprint. In this project the Adafruit fingerprint scanner is used that can cater up to 162 fingerprints. The fingerprints are stored in the on board Flash Memory which has the size of 512bytes. The fingerprint and fingerprint scanner is shown in Fig.1

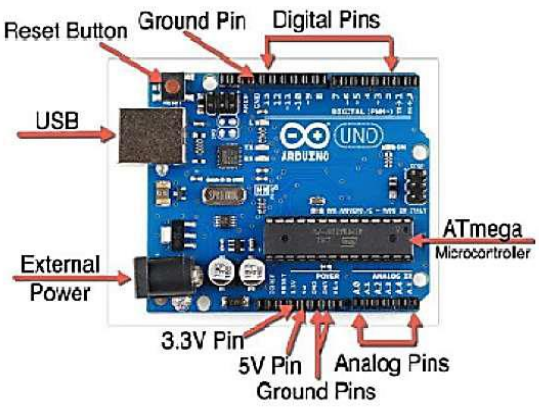
"Fig.1: Fingerprint scanner"

III. FINGERPRINT MATCHING TECHNIQUES

Fingerprint matching techniques are divided into two categories: minute-based and correlation based. Minutiae based techniques first find minutiae points and then map their relative placement on the finger. However, there are some difficulties while using this approach. It is difficult to extract the minutiae points accurately when the fingerprint is of low quality. Also, this method does not consider the global pattern of ridges and furrows. So, correlation-based method can overcome the difficulties of the minutiae based approach and it is use for this project.

IV.COMPONENT

A. Arduino Uno



"Fig.2 Arduino uno"

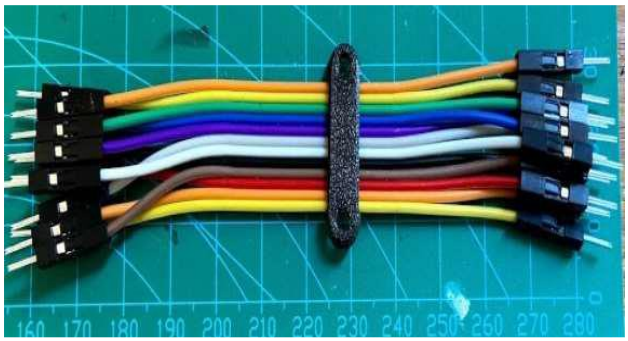
Arduino is an open-source electronics platform based on easy to use hardware and software. These boards are able to read inputs and give the output in the form of LED on/off. In this, Microcontroller is placed on board and set of instructions are provided to microcontroller that uses for arduino programming language (based on wiring) and arduino software (IDE) based on processing. The arduino uno microcontroller operates at 5v with 2Kb of RAM, 32Kb of flash memory for storing programs and 1Kb of EEPROM for storing parameters shown in Fig.2. It operates at a clock speed of 16 MHz, that translates 3,00,000 lines of C source code per second. The board has 14 digital Input output pins and 6 analog input pins. The device holds a variety of configurations features of usual peripherals: internal oscillator, timer including PWM, Watchdog, USART (universal synchronous asynchronous receiver transmitter) and SPI (serial peripheral interface).

B.Relay module

"Fig.3 *Relay module"*

This is a 2 Channel 5V Relay module shown in fig.3, be able to control various appliances and other equipment with large current. It can be controlled directly by Microcontroller (8051, AVR, PIC, DSP, ARM, MSP430, TTL logic). 5V 2-Channel Relay interface board and each one needs 15-20 mA Driver Current equipped with high-current relay, AC250V 10A; DC30V 10A Standard interface that can be controlled directly by microcontroller (8051, AVR, PIC, DSP, ARM, ARM, MSP430, TTL logic) Indication LED's are for Relay output status.

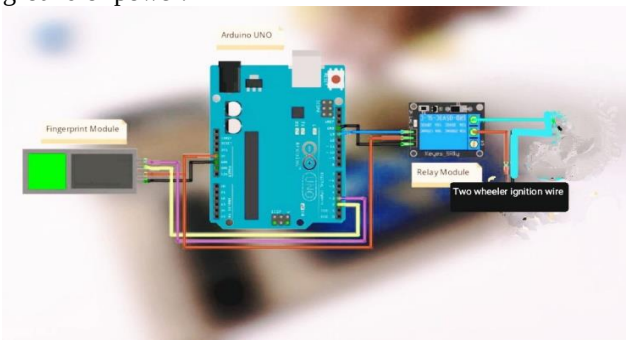
C. Jumper Wires



"Fig.5 jumper wires"

Jumper wires are having the connector pins at each end it is used to connect two points to each other without soldering as shown in fig.5. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed. Jumper wires are available in different colour and colours can be used in

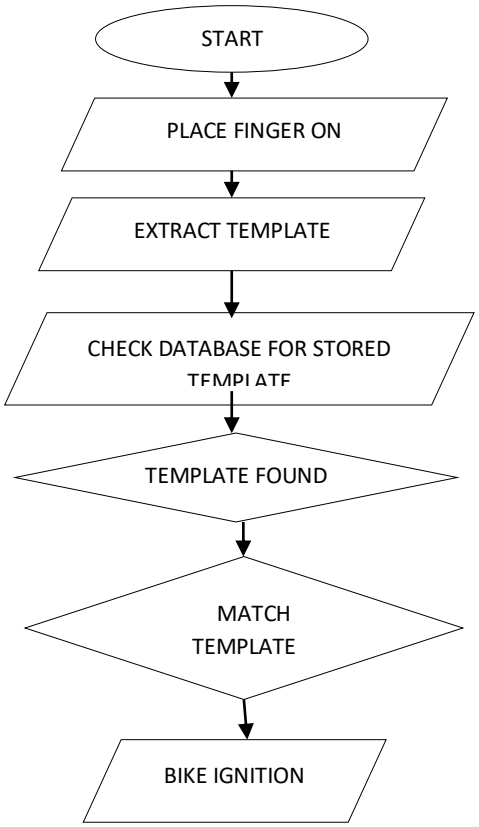
order to differentiate between types of connections, such as ground or power.



"Fig.6 Jumper wire connection"

Fingerprint scanner has four jumper wires purple, white, red and black. The purple color wire is connected to 2 number point on Arduino, white wire connected to 3 number point on arduino, red wire connected with 3V supply on Arduino and black wire connected with the ground on Arduino. The relay has three points of jumper wire connection at Arduino side which is vcc, ground & input. Vcc connected with 5v supply on Arduino, ground connected to ground of Arduino and the input connected to 9 number points on Arduino. And the other side of relay has two wires which are connected to the ignition wires of two wheeler.

V.FLOWCHART

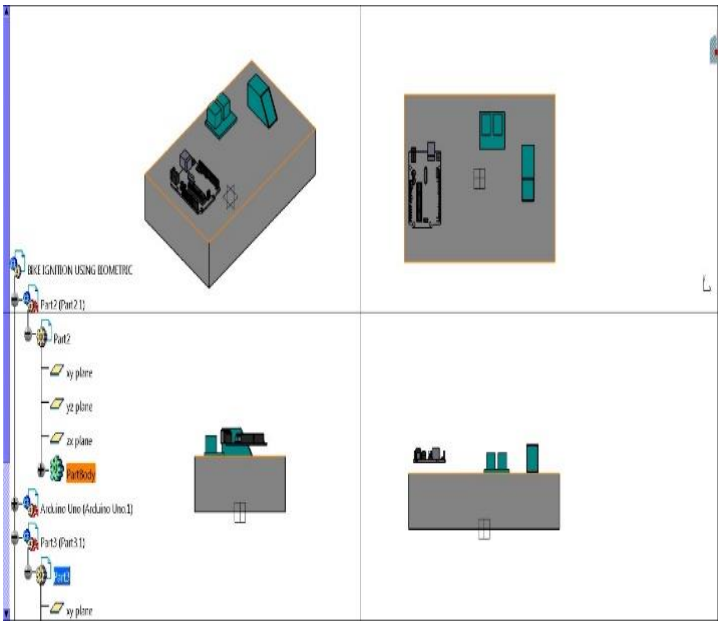


"Fig.7 Flowchart"

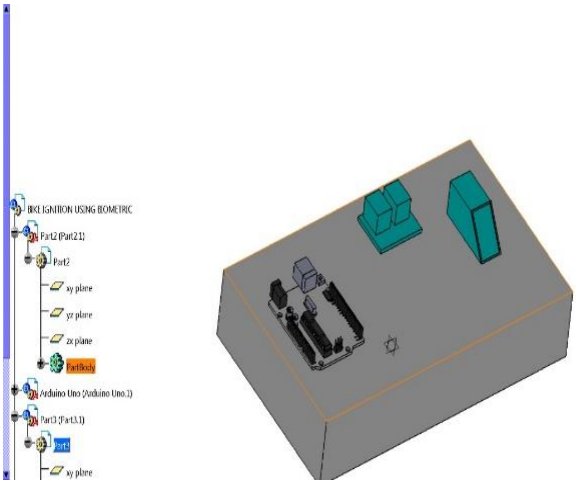
VI. ALGORITHM OF FINGERPRINT BASED VEHICLE STARTING SYSTEM:

1. Start
2. Place finger on the scanner and master finger print is saved in database.
3. Fingerprint template extracted.
4. Now user placed finger on fingerprint scanner
5. If fingerprint match with the master fingerprint then LED blink.
6. Bike start
7. If finger print does not match with master fingerprint then bike avails from ignition.
8. Stop.

VII. CATIA MODEL



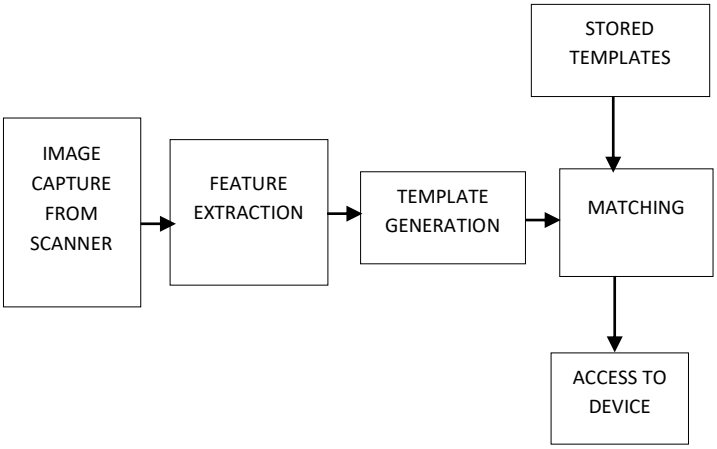
"Fig.8 (a) Catia Model Top and side view"



"Fig.8 (b) catia model Top view"

VIII. THE SYSTEM SOFTWARE IDENTIFICATION PROCESS

The software sub-system includes the control hardware interfaces, minutiae extraction, database and the template matching process. Its main function is the extraction of template from the scanned fingerprint and stores the acquired template in the database. It also the match the acquired template with the stored template in the database. The template is first extracted in the enrolment part and then in the matching part. At the enrolment part, the template is extracted from each user to be stored in the database of the system while in the matching part the template is extracted from each user to be verified with the already stored template of the user during enrolment. The entire fingerprint templates extracted from each person are stored during the enrolment process. Each acquired fingerprint is then compared with the stored template in the database for verification. The flowchart of the fingerprint acquisition control process is shown in Figure 9.



"Fig.9 Block diagram"

IX.PROCEDURE TO ENROLL FINGERPRINT

1. Open Arduino IDE
2. Under the FILE menu, and Examples, find the Adafruit's
3. Fingerprint library.
4. Upload the enrol example.
5. Open the Serial Monitor.
6. Select the baud rate to be 9600.
7. Enter the Finger Print ID number when the serial monitor prompts to enter the fingerprint id number.
8. Place the finger you need to enroll on the sensor.
9. Place the finger again on the sensor once prompted by Serial monitor.

X.PROGRAM

```
Int value1;
#define relay 9
Const int ignition=7;
Void setup ()
{
serial.begin(9600);
pinMode(relay,OUTPUT);
pinMode(ignition,OUTPUT);
digitalWrite(relay,LOW);
}
Void loop()
{
Serial.print("Reading");
while(Serial.available()==0);
value1= serial.read();
Serial.print(value1);
if(value1==1)
{
Serial.print("Start");
digitalWrite(relay,LOW);
digitalWrite(ignition,HIGH);
delay(1000);
}
If (value1==0)
{
digitalWrite(relay,HIGH);
Serial.print("Stop");
}
}
```

XI.WORKING PROCEDURE

1. Basically, fingerprint based ignition system operate by scanning and converting fingerprint data into a numerical template.
2. Once you place your finger into the scanner for the first time the conversion of scanned fingerprint into numerical data is takes place and the fingerprint template is saved.
3. This process is then repeated every time you want to grant someone new access.
4. The next time someone places his/her finger on the sensor it matches the data obtained through the finger with the pre-saved values.
5. If a match is found, access is granted and the ignition starts.

XII. EXPERIMENTAL SET UP ON BIKE

"Fig.10 (a) Experimental set up on bike"

Fig. 10(b)

XIII.ADVANTAGES

1. Fingerprint based security system is most secured system as compared to other systems because RFID card or Keys of lock can be stolen, password may be leaked. However fingerprint of every human is unique, so lock will not open unless the same person is present to give the impression of fingerprint.
2. No need to carry the keys to open the lock or even there is no need to remember the password or any Pin number.
3. It can be accommodated in all the vehicles and easy to use. This also provides a more security for the vehicle and vehicle stolen problem can be reduces.

XIV.CONCLUSION

The main objective of implementing the fingerprint sensor for the two wheelers is to provide the security for vehicles. As human fingerprint is unique so this technology reduces the theft cases. The system requests for user's finger, process it and gives the appropriate output based on if the finger is stored in the fingerprint module or not. Hence, fingerprint technology improves the security of bike making it possible for all automobile to be used by only authorized users. Therefore implementing this system on bike makes the achievement of our security system comes in a cheap and easily available form.

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