

Module R-305 Based Start Vehicle System

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Abstract— Present era is full of advancement in technologies, but the advancement in modern technologies have also increased the thefts of security systems. Even after providing best mechanical linkage security system, companies are unable to deliver 100% security, especially in case of motorbikes where huge amount of expenditure on security system is not an easy task. Hence required a more advanced and secured system to save our motorbikes and other special vehicles like ATV, Go-Kart etc. where there is not any security system which is pre-installed hence security of such vehicles is a matter of thought. Finger Print Start Vehicle System is a system based on Arduino and Finger Print Module R-305.

Key words: ATV, GO-Kart, Ridge, Confidence Number, Sensor, Relay

I. INTRODUCTION

The youth of India is moving towards converting the cities into ‘smart cities’. Environmentally conscious electric vehicle “ECEV” given by Hitachi including its EV Charging managing system has given rise to use of smart grid and saving of fossil fuels. [1] Further the concept of fingerprint security system fits appropriate to the purpose of smart cities. It is the duty of every citizen to pledge and contribute to make their city a smart one. With the installation of fingerprint security system we ensure that our city would be smarter and safer in terms of vehicle safety. This safety for the vehicles would allow the people to roam or move without any tension of stealing their vehicles from the burglars. Each and every human being can be distinguished on the basis of their finger raised skin of ridge also known as ‘friction ridge’ which provides friction similar to that of tire thread pattern. This ridge of skin starts developing in the third month of pregnancy and finally developed in the fourth month. The pattern of ridge once formed do not vary with time. The pattern of ridge is similar to that of DNA of a human body which is permanent. The pattern of skin ridge provided us the confirmation of the owner of the vehicle. This pattern once enrolled ensures that fingerprint will pass only after complete assurance of the finger of owner. Hence creating a 100% surety for the safety of the vehicle. Our Fingerprint security system is a combination of embedded and biometric system, Embedded means that it is a combination of both software and hardware or we can say that codes or data is being fed into hardware via software. Due to reliability and accuracy of electronic system the concept of fingerprint start vehicle system is found reliable than that of traditional lock system of Bike or Go-Kart. As per the era of modern world we our self in India are moving towards the making of our city smart and the concept of fingerprint security system fits appropriate and hence we can contribute to our city to make it smarter as that of any other city. By installation of this system we ensure that our city would be more smarter and safer in terms of vehicle safety also it creates a tension free mind in terms of safety of our vehicle by using this it develops a confidence to move around the city without carrying the burden of tension i.e. if our vehicle gets stolen.

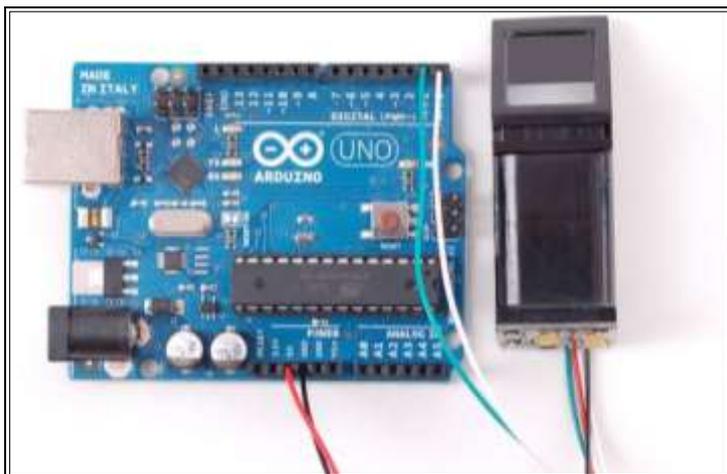


Fig. 1: Arduino UNO with R-305

II. LITERATURE REVIEW

Aditya Shankar: Proposed a door opening system based on embedded system and biometrics used for bank lockers, institution, school etc. He also proposed and compared the biometric system with Key lock and RFID security system. There is indication by the buzzer is connected to an audio amplifier which will activate when an unauthorized person try to open the security lock.[4]

Sowndharya.j: Introduced a fingerprint password protected system in that system he has used a FIM 3030 sensor by NITGEN and microcontroller used is AT89c52 which is a low power 8 bit microcontroller. Under this system fingerprint sensor is interfaced with a microcontroller to add or remove already existing data of fingerprint of the authorized person. In this system ignition system will start if the fingerprint of the authorized person matches with the existing data of the finger and vehicle will start. [5]

Kavyashree.M: According to her they have used module R303A as a scanner which has inbuilt ROM,DSP, and RAM. In this we can store up to 100 user's fingerprints. The aim of their paper was to design and implement a biometric security system for Bank lockers. They have used R303A as scanner as they consider it to best available scanner which is available and provide a high accuracy.

III. DESIGN IMPLEMENTATION AND WORKING OF PROPOSED MODEL

The above mentioned model is based on Fingerprint module R-305 and Arduino UNO. In this model we need to connect the fingerprint module to Arduino UNO via Breadboard, ground and supply of sensor are connected to ground and 5V point on the arduino board Transmitter and receiver are connected to pin 2 and 3 of the arduino. Further other electronic components:220ohm-2 resistor,6V Relay, transistor and 2 Led's of different colors are used to give indication by red led blow if the fingerprint is confirmed by the sensor and it indicates that the circuit is closed and the vehicle will start. Complete system mainly consists of two main steps:

A. Enrolment of Finger

First step is to add the program for fingerprint module to the Aruino Library and once the program is added to library go to files>examples>enrol. When you open the serial monitor you need to give an enrolment ID in the form of a numerical value and press the finger on the sensor red light of the sensor will blink ensures that sensor is working. The image taken by the sensor and converted and send into the forms of data Packets to the Arduino board for further use. On an average it can store around 162 ID's which ensures multiple identities to be enrolled at a time.

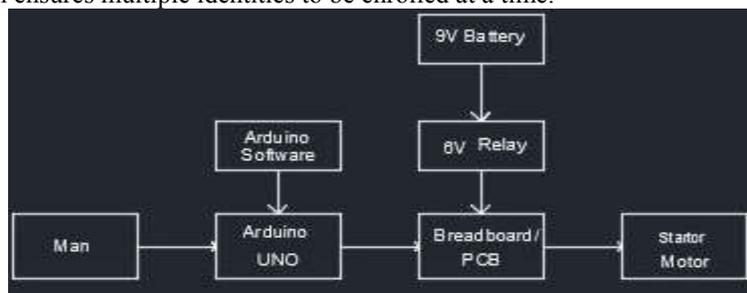


Fig. 2: Block Diagram Of Fingerprint Start Vehicle System

IV. CONFORMATION OF FINGER ENROLLED

After completion of the process of enrolment of fingers it's time to confirm the finger enrolled. Upload the complete program and place the finger back on the sensor to confirm the finger enrolled is detected or not if yes RED Led will blow otherwise not. The accuracy of the match of fingerprint could be defined in the form of confidence number of the match which could be seen on the software higher the value of confidence number greater is the match.

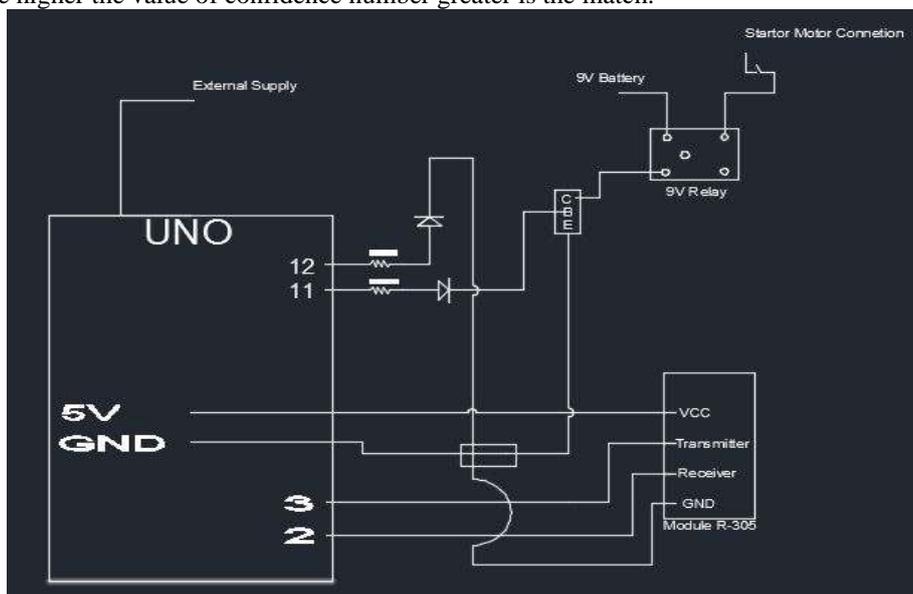


Fig. 3: Circuit Diagram of Fingerprint Start Vehicle System

V. COMPONENTS

A. Module R-305:

- Supply voltage: 3.6 - 6.0VDC
- Operating current: 120mA max
- Peak current: 150mA max
- Fingerprint imaging time: <1.0 seconds
- Window area: 14mm x 18mm
- Signature file: 256 bytes
- Template file: 512 bytes
- Storage capacity: 162 templates
- Safety ratings (1-5 low to high safety)
- False Acceptance Rate: <0.001% (Security level 3)
- False Reject Rate: <1.0% (Security level 3)
- Interface: TTL Serial
- Baud rate: 9600, 19200, 28800, 38400, 57600 (default is 57600)
- Working temperature rating: -20C to +50C
- Working humidity: 40%-85% RH
- Full Dimensions: 56 x 20 x 21.5mm
- Exposed Dimensions (when placed in box): 21mm x 21mm x 21mm triangular
- Weight: 20 grams

B. Resistor 220ohm:

- Power rating ;.25W
- Tolerance:±5%
- Maximum working Voltage: 250V

1) Arduino UNO:

- DC power jack (7-12)V
- USB connector (5V)
- Maximum current 50mA

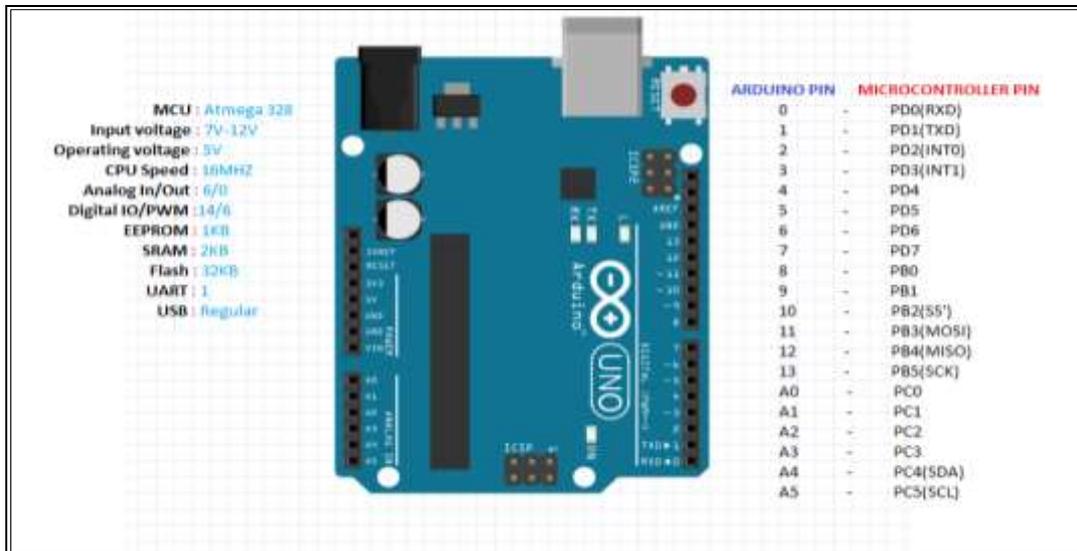


Fig. 4: Arduino UNO Pin Diagram

2) Transistor (BC547):

Is an NPN Bi-polar junction transistor (BJT) as shown in fig. a transistor, stands for transfer of resistance, is commonly used to amplify current. A small current at its base controls a larger current at collector & emitter terminals.

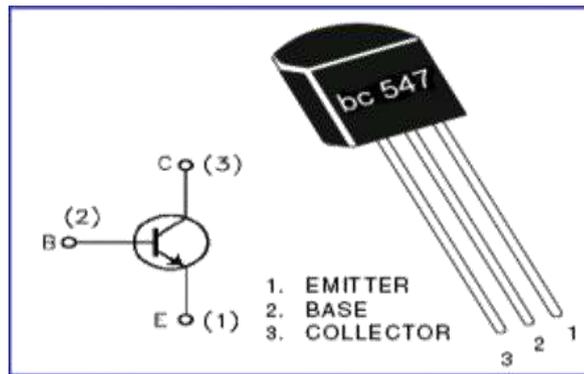


Fig. 5: Transistor bc547

3) Leds:

A light emitting diode (LED) is a device which converts electrical energy to light energy. LEDs are preferred light sources for short distance (local area) optical fiber network.

4) Jumping Wires:

It is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

5) Breadboard or PCB

6) Breadboard:

It is a widely used tool to design and test circuit. You do not need to solder wires and components to make a circuit while using a bread board.

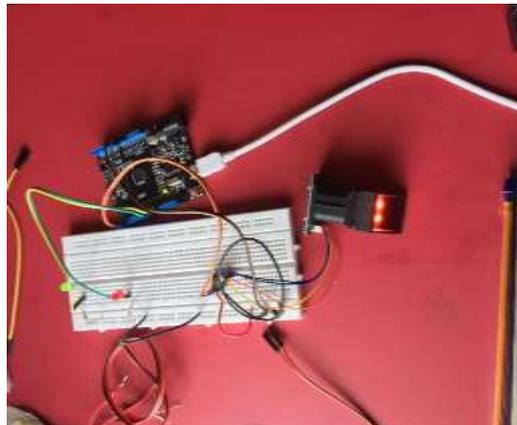


Fig. 4: Actual Picture of Circuit

7) 9V Battery:

A 9V battery is used as a supply for Relay. Most nine-volt alkaline batteries are constructed of six individual 1.5V LR61 cells enclosed in a wrapper.

VI. RESULT AND CONCLUSION

As per the model described we have developed a prototype based on the above concept and we have installed this circuit to our Go-Kart having 125cc engine and as per the reports of the test it was found that out of 20 attempts 2-3 were not successful on the other hand the rest were successful and the vehicle got start by closed circuit and passing 5V current to the starter terminals. The confidence number for the entire test varies between 175 to 300 confidence numbers. As per our test reports in terms of practicality we conclude that the system is safe and sound and it also ensures that vehicle will start only when the fingerprint is of owner of the vehicle or he is permitted to the vehicle. Person with even a slight change in the fingerprint attempting to start the vehicle will not start this ensures that vehicle could not be stolen by thefts and it will also do not permit the unauthorized person to start the vehicle or in terms of child safety and a smart technique for smart city it could be taken into consideration.

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