

Advanced Anti-deterrent Vehicle Security System using Camera, Fingerprint, GSM and GPS module

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Abstract : In time as the number of vehicles is increasing day by day, and vehicle theft rate is also increasing. To overcome this advanced anti-theft security system is designed. Today biometric has become one of the top security premises for many applications. So, this paper presents of replacing former key system in vehicles from fingerprint module. Further any misuse of system leads to acquisition of culprit's image by camera module. GSM and GPS module maintains communication between user and vehicle by updating the status of owner's vehicle. For the control of all these components Arduino mega microcontroller is used.

IndexTerms - - GSM (Global System for Mobile Communication), GPS (Global Positioning System), SD card (secure digital card), ATmega2560, OV7670 module.

I. INTRODUCTION

In the present world everything is getting upgraded from the very first human being to the technologies developed by them. And even criminals are showing more intelligence in their activities. So in order to reduce these thefts we've to raise the standards of our security system. when we speak about passwords pattern and key passwords are the most basic ones and can be easily hackable. But when it comes to fingerprint. It will be unique for each and every one. So, it provides high security at the very first stage. And even we may not have the fear of losing key or use of duplicate keys to steal our vehicle. By using camera high level of security is ensured. When there is a spoliation from an unauthorized person camera clicks the image and stores it in SD card. We can keep in track of our vehicle with the help of GPS module. Along with these GSM is used for the purpose of communication. The prototype model for this venture is built on embedded system i.e., ATmega2560.

II. HARDWARE COMPONENTS

1. Arduino mega

It is an embedded system designed for complex application which requires more number of pins and memory. This device is readily available since everything is already built in this board. In terms of coding, Arduino IDE software is used. It contains 54 digital and 16 analog input/output pins. Out of 54 pins 15 pins is used for PWM. It contains ICSP pin used for programming atmega chip by another Arduino or uploading programming through computer. It also contain 16MHz frequency crystal oscillator, USB cable port DC power jack. It has two voltage regulators i.e., 5V and 3.3V by making it more flexible. There is a ATmega16 on board and also contain reset, 4 hardware USART serial port which provide high speed communication. It can be used in combination with other Arduino and also for 3D printing projects, controlling of motoring action etc.

3. GSM (Global System for Mobile communication) module

It is required to develop communication between user of the vehicle and security system. GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900A, works on frequencies 900/ 1800 MHz. If the bike is theft then it sends message to the user. The Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. Using this modem, you can make audio calls, SMS, Read SMS, attend the incoming calls.

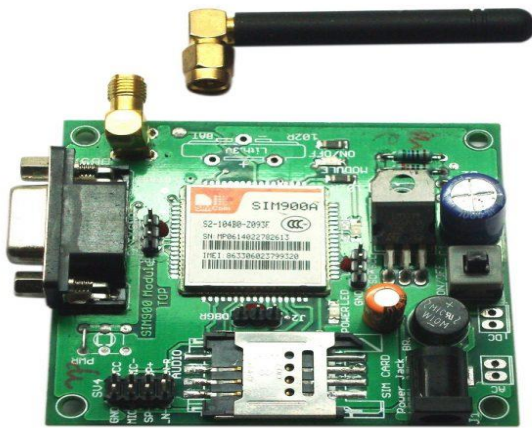


Fig3: GSM module

4. GPS module

GPS (Global Positioning System) The GPS system currently has 31 active satellites. The GPS receiver gets a signal from each GPS satellite. Used for tracking vehicle. Using this we can be able to identify the accurate location of bike. The GPS can tell how far it is from each satellite.

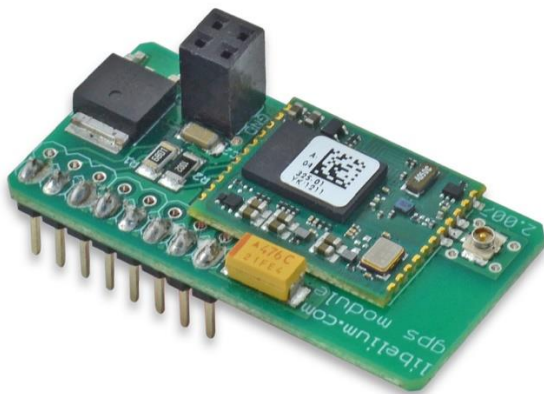


Fig4: GPS module

5. Relay

Relay is a switch which controls circuits electromechanically. The main operation of this device is to make or break contact with the help of a signal without any human involvement in order to switch it ON or OFF.

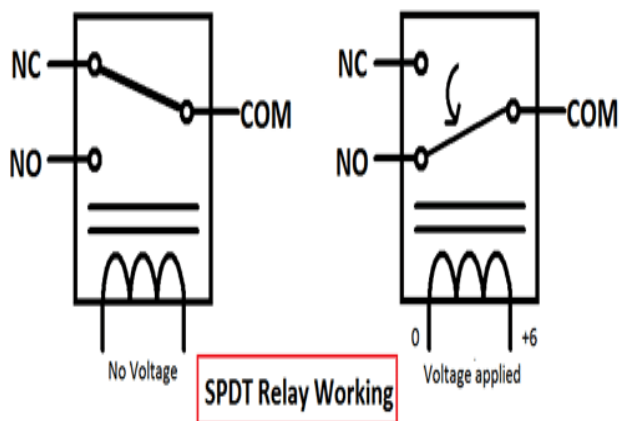


Fig5: circuit representation of relay

It is mainly used to control a high-powered circuit using a low power signal. Generally a DC signal is used to control circuit which is driven by high voltage like controlling AC home appliances with DC signals from microcontrollers. The relay also has two pins namely *normally closed* and *normally opened* (NC and NO).

6. SD card module

The SD Card Module is a simple solution for transferring data to and from a standard SD card. The pinout is directly compatible with Arduino, but can also be used with other microcontrollers. This module has SPI interface which is compatible with any SD card and it use 5V or 3.3V power supply which is compatible with Arduino UNO/Mega. Supports 2GB to 4GB memory. SD module has various applications such as data logger, audio, video, graphics.



Fig6: SD card module

7. Camera OV7670

The OV7670 image sensor is a small size, low voltage, single-chip VGA camera and CMOS image processor for all functions. It provides full-frame, sub-sampled or windowed 8-bit images in various formats, controlled through the Serial Camera Control Bus (SCCB) interface. The camera module is powered from a single +3.3V power supply. An external oscillator provides the clock source for camera module XCLK pin. With proper configuration to the camera internal registers via I2C bus, then the camera supply pixel clock (PCLK) and camera data back to the host with synchronize signal like HREF and VSYNC. The OV7670 camera module is a 0.3 mega pixel CMOS colour camera module, it can output 640x480 VGA resolution image at 30fps. It can be used in Arduino, STM32, Chip kit, ARM, DSP.

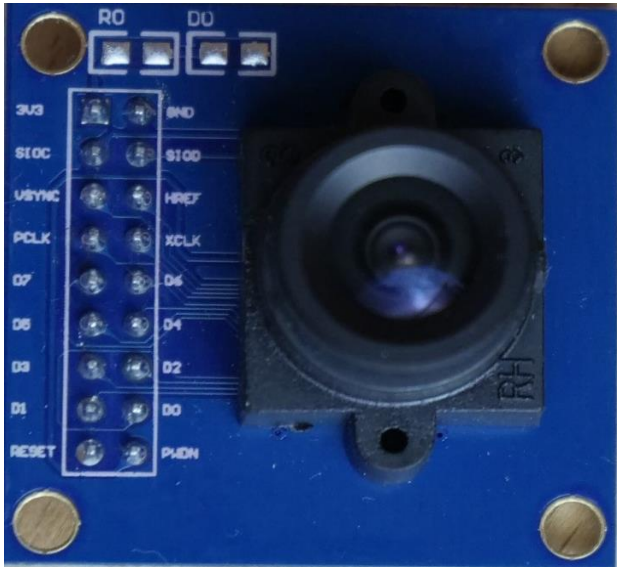


Fig7: camera module

III. WORKING

To start with the working of our model, first we power up the entire model by closing power switch. We have used a common switch (SW) between starter and petrol lid for two purpose:

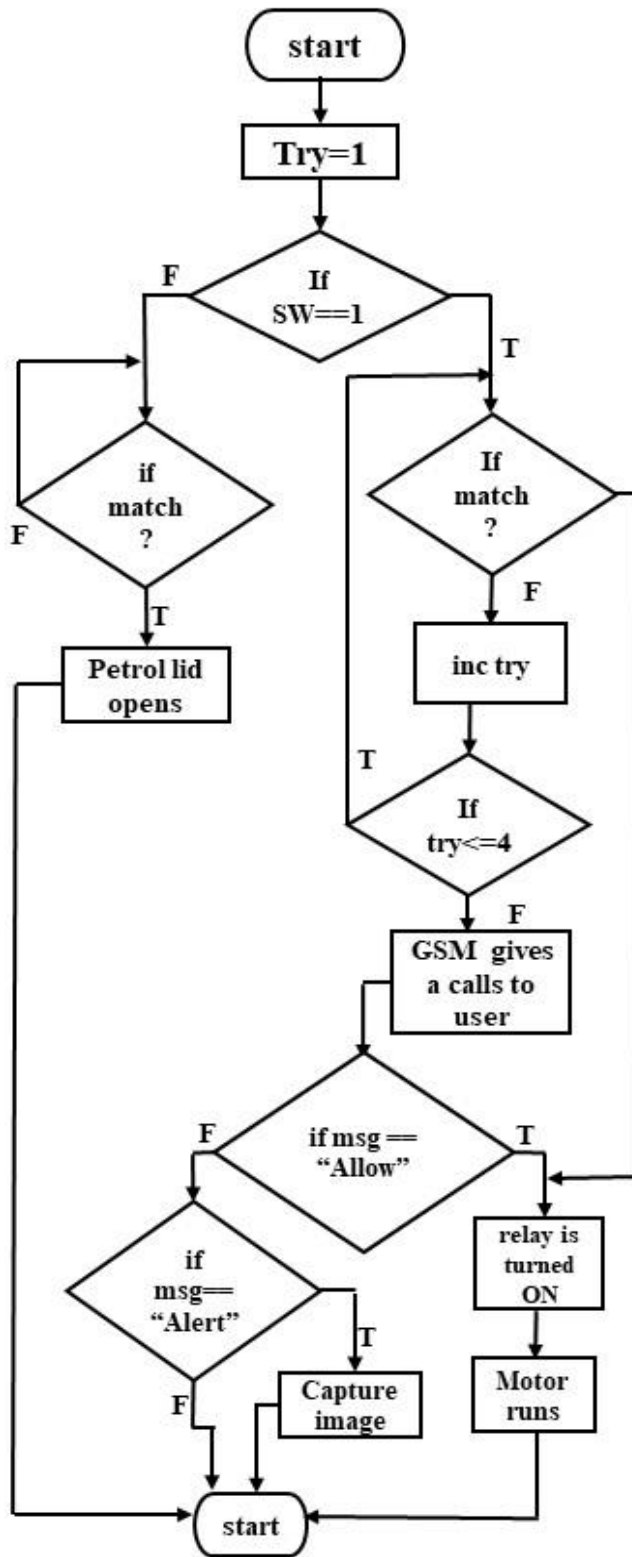
- i. Firstly, in order to initiate the starter, switch(SW) should be at position 1 and also the registered fingerprint has to be recognised by fingerprint module. When it is recognised ignition circuit will be closed and the starter is initiated.
- ii. Secondly in order to open the petrol lid, switch(SW) should be at position 2 and the registered fingerprint has to be recognised.

If an unauthorized person tries to use fingerprint sensor more than four times, GSM module will immediately give a call to the owner. Here two actions can occur based on owner's response, they are:

- a) If the owner sends back a "Allow" message to GSM, then the Arduino will initiate the starter without any authorization. This option is helpful in emergency situation.
- b) If the owner sends back a "Alert" message to GSM, then the Arduino clicks the image of a person through OV7670 camera module and saves it in SD card.

we have used a GPS tracker in order to locate the exact location of vehicle.

IV. FLOW CHART



V. BLOCK DIAGRAM

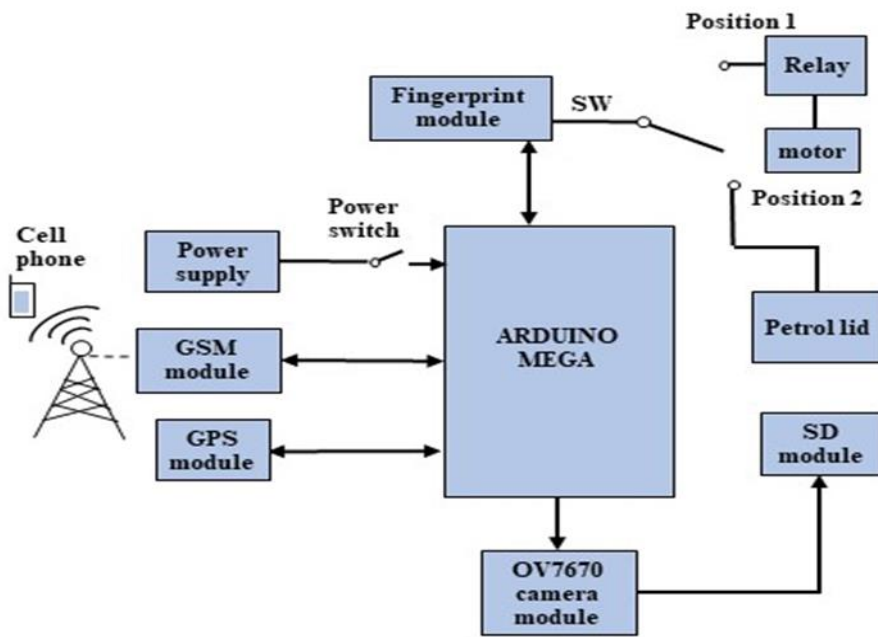


Fig8: Block Diagram

VI. CONCLUSION

By installing all the components discussed above we can ensure advanced security system for our vehicle. All these components are easily available and more economical.

VII. ACKNOWLEDGMENT

In this process we have gained a lot of information out of branch too. We are very grateful to our guide Ms. Nagarathna, Associate professor of Electrical and Electronics Engineering department, Global Academy of Technology.

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