

VEHICLE TRACKING SYSEM USING GPS AND GSM WITH FINGER PRINT MODULE

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Abstract: This study has been undertaken to investigate Vehicle Tracking System Using GPS and GSM with Finger Print module a Satellite Based navigation system based on radio ranging technique using GSM. The GPS will provide very accurate three dimensional position, velocity and timing information to users anywhere in the world .GPS can also be used in other applications such as Geographical information systems (GIS), marine navigation, search and rescue and military applications, and vehicle monitoring for traffic management in urban areas, which when coupled with GSM mobile phone technology, the technology can help locate stolen vehicle and retrieval process. The proposed framework made great utilization of a well known innovation that consolidates a Smart telephone application with a microcontroller. Finger print sensor is also used for bio-metric verification. There are many fingerprint sensor technologies. Captured finger image is digitally processed and stored in memory as a template. The fingerprint of Vehicle's driver is taken by this device before the starting of vehicle. Fingerprint matching algorithm is used to compare with previously enrolled image for checking authentication. Among correlation-based matching, ridge feature-based matching and minutiae-based matching, last one is popular as it is efficient and accurate.

IndexTerms - Arduino Mega, Arduino Nano, Fingerprint, GSM, GPS, Vehicle tracking, Microcontroller.

I. INTRODUCTION

Vehicle following frameworks were initially presented for the delivery/load enterprises since individuals need to know the vehicle area at whatever point they required. Presently a-days the innovation is becoming quick a robotized following of the vehicle framework is being utilized as a part of an assortment of approaches to track and show the area of the vehicle. A vehicle tracking system combines the installation of an electronic device in a vehicle or fleet of vehicle to enable the owner or third party to track the vehicle's location and collecting data in the process. Modern Vehicle Tracking system (VTS) is the technology used to determine the location of a vehicle using different methods like GSM and GPS module and other radio navigation systems operating through satellites and ground based stations. GSM and GPS based vehicle location and tracking system provides effective, real time mapping based vehicle location tracking. The system uses geographic position and time information from the Global Positioning Satellites. After emerging of GPS system developed by The United States government, first it was only for military purpose. After opening for public, it has been used widely. In this research work, a system has been developed based on Arduino Mega2560 that consists of a GPS and GSM. A two way communication process is achieved using a GSM modem. This study also comprises of a bio-metric protection system of the vehicle and fingerprint verification of the driver of the vehicle is used to protect the vehicle from anti-theft. Fingerprint recognition or fingerprint authentication can be defined as a method of verifying a match between two human fingerprints in an automated behavior. Fingerprints are one of many forms of biometrics used to identify individuals and verify their identity. It is known that every person has a unique fingerprint image. When driver gives his verified fingerprint image before starting the vehicle, the system will be considered as fair condition. But when vehicle's location is hanged without fingerprint verification, the system will be taken as abnormal condition. Then the system will send an SMS to owner of the vehicle. In our Proposed System the Vehicle is in High-End Security, which means the Vehicle can be accessed only through the User Finger print only.

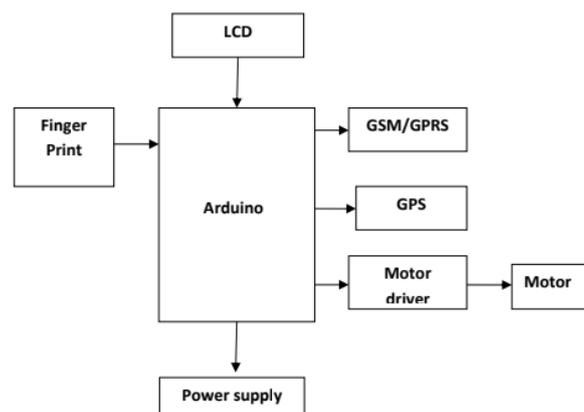


Figure 1 vehicle tracking system with finger print

Even though it's stolen user can easily communicate and track his vehicle using GSM. In this system we have also implemented the Global Positioning System (GPS) to acquire the Latitude and Longitude Values of our present vehicle. In this research work, Arduino Mega2560 is used for interfacing to various hardware peripherals. An Arduino mega2560 is interfaced to a GSM modem and GPS receiver. A GSM modem is used to send the position of the vehicle from a remote place. SIM800 is used in this study. Both GSM and GPS engines are included in one device. FR017 is used as fingerprint device.

II. PROPOSED HARDWARE COMPONENT AND SOFTWARE SYSTEM USING ARDUINO

2.1 HARDWARE COMPONENT:

The Arduino Micro Controller is an extremely easy to utilize and installed on an unmarried chip. It is an In-System-Programmable Device this implies the customer haven't any need to utilize the dispose of the IC, we can without a moment's delay join the Arduino to the PC and picking the best possible COMM port. The Arduino has many sorts like UNO, MEGA and numerous others; here we utilize Arduino MEGA 2560 rev3 board. The UNO board will appear this way. The Programming of the Arduino is either in C/C++. In case you're familiar with C, programming of the Arduino is direct to perceive. In the event that you are not acquainted with C no bother picking up information of is to be had in the example codes. The Arduino Board is referred to as ISP transforms into when the code dumped inside the Board can be use at each time, anyplace.

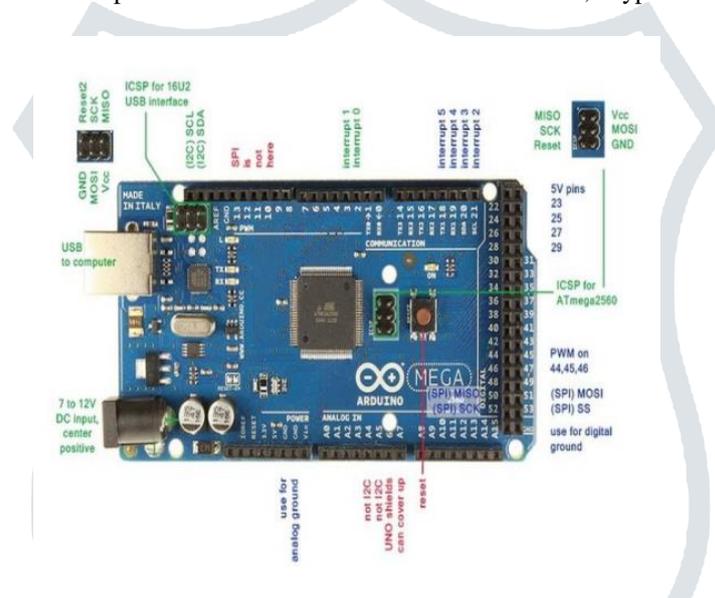


Figure 2 Arduino mega2560

Fingerprint processing includes two major parts: fingerprint enrolment and fingerprint matching (the matching can be 1:1 or 1:N). While enrolling, the user needs to enter his/her finger two times. The system will process the finger images and then generate a template of the finger based on the processing results and store the corresponding template. While matching, the user enters the finger again through the optical sensor and the system will generate a template of the finger and compare it with available templates of the available finger library. For 1:1 matching, the system will then compare the live finger with the specific template designated in the given Module; for 1:N matching, or searching, the system will then search the whole finger library for the available matching finger. In both such circumstances, the system will then return the matching result, as either success or failure.

2.2 SOFTWARE SYSTEM USING ARDUINO

Arduino IDE is a GUI based Software that supports all the Arduino based microcontrollers. It is a cross platform application written in the programming language Java. It is an open-source Software (IDE) that makes it very easy to write code and also upload it to the board. It runs on various operating systems Windows, Mac OS X and Linux. It originated from the IDE for the languages such as Processing and Wiring. A program written with the IDE for Arduino is called a "sketch". The Arduino IDE supports the languages such as C and C++ using special rules to organize the code. The Arduino IDE supplies a software library called Wiring from the Wiring project, which provides a lot of common input and output procedures.

Windows 7 or greater Operating System is required for the Fingerprint Sensor. Windows 10 is preferably the better choice, since it supports all the legacy devices and its drivers. The Arduino Mega2560 has a resettable poly fuse that protects your computer's USB ports from shorts and overcurrent. Although most computers provide their own internal protection, the fuse provides an extra layer of protection. If more than 500 mA is applied to the USB port, the fuse will automatically break the connection until the short or overload is removed.

III. FINGER PRINT MODULE

Fingerprint enrollment, image process, characters acquisition, fingerprint template creation, fingerprint template storage, fingerprint compare (1: 1, 1: N), fingerprint delete. This module can work with different devices based on UAWRT such as PC, SCM and soon. Only easy circuits and fingerprint module can enhance your product into fingerprint authentication power. It is widely used by electronics business, information security, access control, identity authentication and other security industry.

3.1 Application Solution

When FPRS is embedded into your system, the other functions will be controlled by MCU Controller, so developer can realize his own function logic, user interface and communication port through hard ware and software development., such as fingerprint time and attendance and so on.

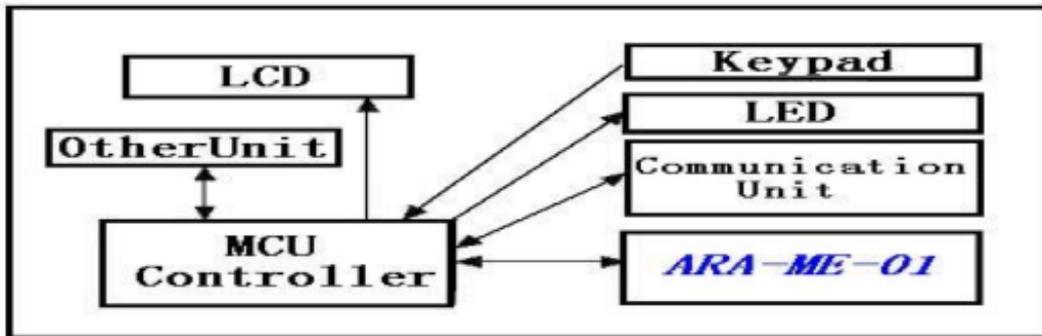


Figure 3 MCU controller diagram

3.2 Fingerprint Authentication Performance

The following table which specifies the finger prints authentication performance.

Item	Specification
Sensor	AES2510
Image	256*288
Resolution	500DPI
Register time	<3%
Math time (1 : 1)	<0.1%
Math time (1 : N)	<0.5%
FRR	<0.1%
FAR	<0.001%
Fingerprints capacity	160 fingerprints

Table 1: Finger print authentication performance

3.3 Interface

Type	Description
UART	3.3V CMOS level Baud rates up to 921.6kbps (factory default is 115.2kbps) RS232/422/485 supported via additional level converter
Digital I/O	3.3V CMOS level 8 ports separately configurable 26bit Wiegand I/O supported via additional level converter

Table 2: Interfacing

IV. RESULTS AND DISCUSSION

4.1 Main Circuit Diagram of Proposed System

we are using Arduino UNO for Controlling and Monitoring the Status and LCD to display the Data on to the user, Finger Print Module which scans and stores the Finger image in the Data Base, Motor Driver to Control the Motor, GSM and GPS for Receiving the Data Wirelessly. As per the Circuit Diagram we have made the Connections in our project. After the Execution the Vehicle can be accessed only with finger and if user wants to track the location of the Vehicle with an easy communication with the GSM we can have the Latitude and Longitude values of the Vehicle.

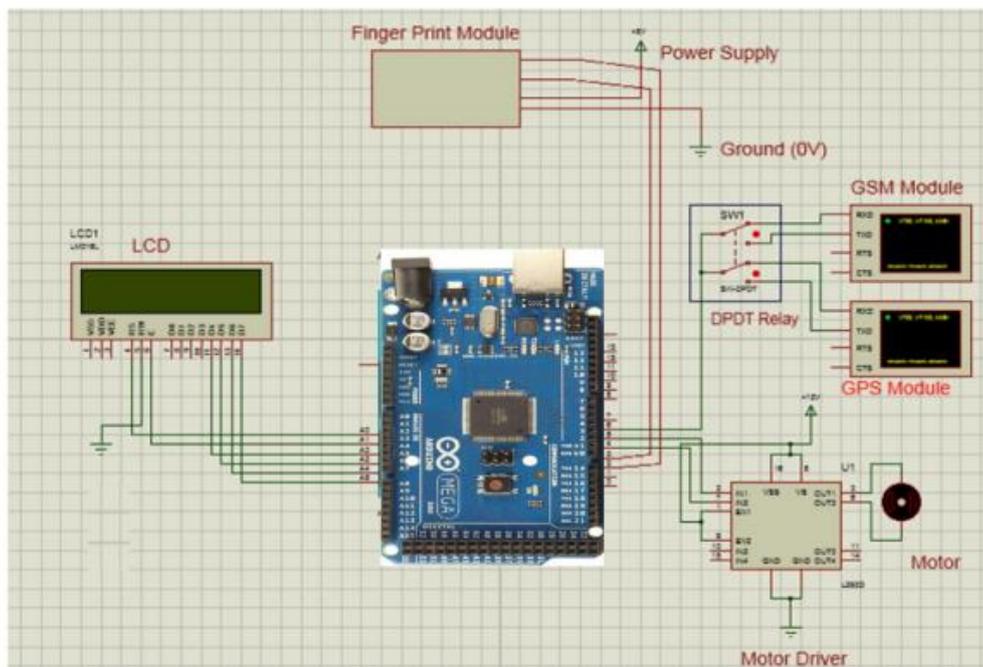


Figure 4 Main circuit diagram of proposed system

4.2 Working model expo

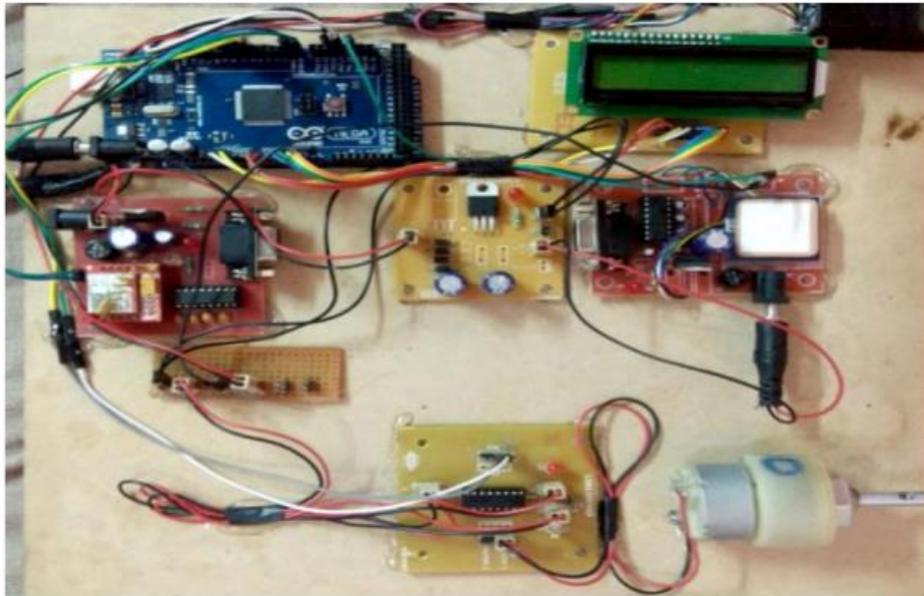


Figure 5 Working model Expo

The Arduino Mega 2560 access the fingerprint image. When the user provides a fingerprint, the Arduino Mega2560 checks its database to see whether it is valid or not. If the fingerprint is valid, a message will be sent to owners mobile requesting for access. Now the LCD will display access requesting message as shown in over view

4.3 Conclusion

The outline and implementation of vehicle tracking system by using finger print module is verified. So that it allows only authorized user to use the vehicle. This framework is valuable in much application, for example, observation, security following, which might be introduced in mining trucks, payload trucks, autos, cruiser, and robot. The framework can be helpful for some applications. Security access control using gps and gsm is widely spread and people are getting accustomed is using this powerful tool in order to provide themselves with extra safety.

V. ACKNOWLEDGMENT

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