

# Designing Of Smart Vehicle by Using Arduino

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## Abstract

This work is based on Arduino and is used for the security reason. Arduino is an open-source prototyping stage base on accessible hardware and software. Arduino uses an ATmega328 microcontroller. This work focuses on the ignition of vehicle using fingerprint sensor and liquid crystal display, we are generating the same results along with same proficiency and accuracy in it by reducing its cost factor, so that it is easily affordable by customers and we can widely spread and implement the security in different domains. This approach would be fruitful to users who want to possess valid and authenticated entry. As safety is very vital role in now a days, so by using this work only the authorized person will be allowed to go into access by toward the inside the correct password. The circuit is tested in proteous and is functioning. It is very simple, cost completing and protected. The lock can be open if the secret code enter is correct and match to the password which is already stored in the internal memory. It also consist a LCD put on view which is used to interface with the mission to output lock condition. This mission can be used in ATMs, door of house, lockers, office and wherever anywhere protection is required.

**Keywords:** Arduino,GSM,LDR Fingerprint Sensor, LCD, microcontroller, Relay motor, scanner.

## 1.Introduction

Vehicles are necessary for our daily works But for every 13 min a vehicle is stolen in tamilnadu here is a require for a smart system for protecting the vehicles If we using a secret password, no one can operate our vehicle without our knowledge.This work is to improve the security system for the vehicles and to introduce smartness in the vehicle. A password is provided to for the vehicle for its accessing. By using 4x4 matrix interfacing number pad, and arduino, we can set a password for starting the vehicle when we put a correct password. It allows us to operate the vehicle else it makes the alert sound. And avoid for accident using ultra sonic sensor, we can monitor and can get alert the distance before and after our vehicles.

According to the MOTOR VEHICLES - Statistical Year Book India 2016 in Tamilnadu there are 1, 74, 12,248 (till 2012) includes bike, cars. Now it may reached approximately 2.5 crores. Vehicles are necessary for our daily works but for every 13 min a vehicle is stolen in tamilnadu here is a require for a smart system for protecting the vehicles. Every vehicle needs a key for turn ON. It is very simple to make a duplicate key by the unknown peoples. If we using a secret password, no one can operate our vehicle without our knowledge.

Several time we heed the cases of bike getting stolen starting parking area. Or sometimes we forget to get missing the keys from bike by fault. In these cases it is truly tricky to find the bike reverse. secret code base Lock for Bike security with explosion key project is planned to solve this use. Main conception following this task is of a bike safety system using a password enter through keypad. This system turns on the signal when incorrect secret code.

whenever you like user insert key in explosion lock, LCD display shows communication as enter Password. User have to enter secret code use Keypad give with this electronics project. If the enter secret code is accurate then Relay and DC motor is turned on.

client can adjust this secret code anytime he/she desire using a keypad. This changed secret code is store in exterior EEPROM memory IC. Thus bike security system project can store the changed password still if here is power cut.

## 2.Related Work

The main aim of this project is to prevent the vehicle from probable theft. To achieve this we are incorporating security by including biometrics, i.e. a fingerprint. In the beginning the owner of the vehicle must store his/her own fingerprint in the finger print module. The GSM modem is used to send and receive messages to and from the owner. The owner's mobile number has to be set fixed during the coding. To start the ignition of the four-wheeler one should enter the authorized fingerprint. If anyone enters an unregistered fingerprint, the owner will immediately receive a message and the local alarm system will be turned on. For theft prevention, we can also trace the four-wheeler by giving a call to the GSM modem which is embedded on the system. Then real time tracking begins and the GPS location of the vehicle is sent to the owner by SMS. The ignition of the vehicle can also be controller through notifications to the system. In this proposed project we are using GPS module to find the current latitude and longitude of the present location, the GPS module is UART (Universal Asynchronous Receiver/Transmitter) with a baud rate of 9600 bps. We are using two serial ports. One, for the GSM modem and another one for the GPS modem. The coding is written in embedded c language and Arduino IDE was used to program it.

It is a fitted device on the automobile. The whole monitoring of entire device is done by the mobile phone which delivers wireless connection amongst the vehicle tracking system device and the customer. The vehicle tracking device also has a dedicated sim card slot in which a GSM SIM card is inserted in to receive and send SMS. The user can send an SMS through his mobile phone, know the location of its vehicle and also the facility to safeguard the vehicle. So for the understanding of the whole operation of this vehicle tracking system is distributed in two parts:

1. Tracking the position of vehicle.
2. To provide security to vehicle.

The vehicle tracking system consists of a GPS receiver which provides real time position of the automobile. This real time data is deposited in MMC(Main Memory Module) after a set time of intermission by the MCU(Main Control Unit). GSM module is undoubtedly associated with the MCU which is then used to propel and receive the SMS. GSM module takes the information from the MMC and sends this information to the registered user's mobile cell phone. This data consists of longitude, latitude, altitude, the speed over ground, and the course over ground, the real time and date. By using Google maps we can then locate the exact location of vehicle. The vehicle tracking system also has another singular feature which tells not only the whereabouts of vehicle but also securing the automobile. To know the location of the automobile, it is necessary to stop the automobile as soon as possible. For repossessing the automobile, we are using to convey the message in such a way they are allied to the buzzer and other is associated to the power supply of the engine of automobile. User can simply deactivate the engine of automobile by sending a message from his cellphone and we can get the automobile back very soon.

### 3. Components In The Proposed Work

#### 3.1 Arduino UNO

An Arduino is actually a microcontroller based kit which can be either used directly by purchasing from the vendor or can be made at home using the components, owing to its open source hardware feature. It is basically used in communications and in controlling or operating many devices. It was founded by Massimo Banzi and David Cuartielles in 2005. The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions

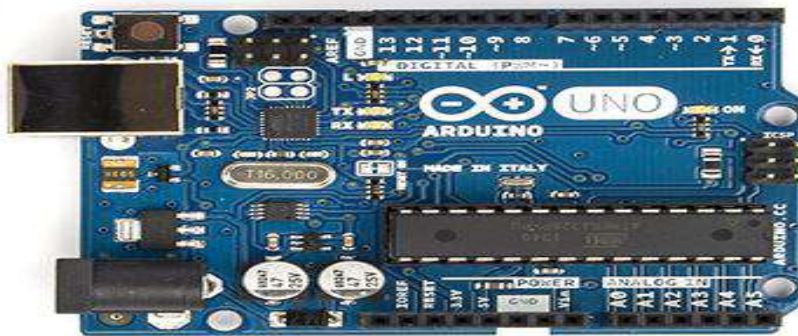
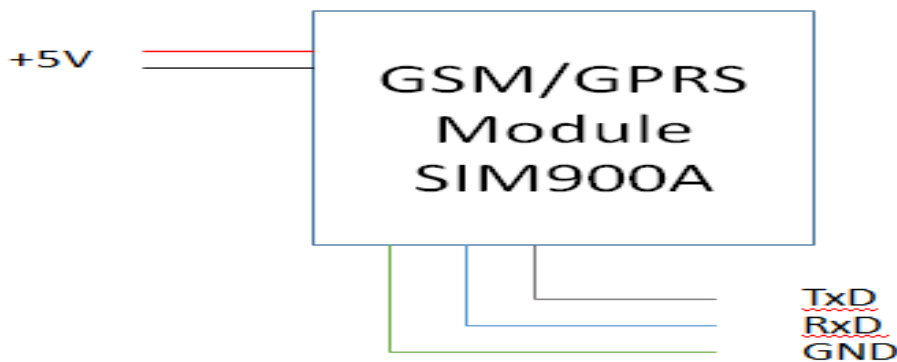


Figure 1. Arduino UNO

#### 3.2 GSM Module SIM900A

The GSM shield by Arduino is used to send or receive messages and make or receive calls just like a mobile-phone by using a SIM card of any network provider. We can do this by plugging the GSM shield into the given Arduino board and then plugging in a SIM card from any operator that offers the GPRS coverage. The shield employs the use of a radio modem by the company, SIMComm. We can communicate easily with the shield using the available commands. The GSM library contains the various methods of communication with the shield. [10] This GSM Modem can then work with any GSM network operator SIM card just like an ordinary mobile phone with its own 10 digit unique phone number. The advantage of using this modem is that its RS232 port can be used to interconnect and develop various embedded applications.

Applications like the SMS Control, the data transfer, remote control and logging can be developed easily using this module. The modem can either be connected to the PC serial port directly or to any microcontroller with the help of MAX232. It is used extensively to send/ or receive SMS and make or receive voice calls. It can also be used in the GPRS mode to connect to the internet and then run various applications for data logging and control. In GPRS mode you can also connect to any the remote FTP server and then upload files for the purpose of data logging. It is a highly malleable plug and play quad band SIM900A GSM modem for direct and easy amalgamation to RS232 applications. It supports various features like Voice, SMS, Data/Fax, GPRS and integrated TCP/IP stack. To be connected to any cellular network, the shield primarily requires a SIM card that is provided by a network provider. Most recent revision of the available board makes the connections of the such shield with the Arduino board by connecting its TX to pin 0 of Arduino and pin 1 of Arduino to RX of shield.



**Figure 2. GSM Module**

### 3.3 Light Dependant Resistor

A light dependant resistor also know as a LDR, photo resistor, photoconductor or photocell, is a resistor whose resistance increases or decreases depending on the amount of light intensity. LDRs (Light Dependant Resistors) are a very useful tool in a light/dark circuits. A LDRs can have a variety of resistance and functions. For example it can be used to turn on a light when the LDR is in darkness or to turn o\_ a light when the LDR is in light. It can also work the other way around so when the LDR is in light it turns on the circuit and when it's in darkness the resistance increase and disrupts the circuit. The way an LDR works is that they are made of many semi-conductive materials with high resistance. The reason they have a high resistance is that are very few electrons that are free and able to move because they are held in a crystal lattice and are unable to move. When light falls on the semi conductive material it absorbs the light photons and the energy is transferred to the electrons, which allow them to break free from the crystal lattice and conduct electricity and lower the resistance of the LDR.



**Figure 3. LDR**

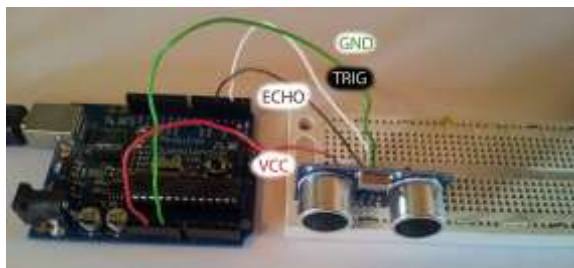
### 3.4 Ultrasonic Sensor

This application is based upon the reflection of sound waves. Sound waves are defined as longitudinal pressure waves in the medium in which they are travelling. Subjects whose dimensions are larger than the wavelength of the impinging sound waves reflect them, the reflected waves are called the echo. If the speed of sound in the medium is known and the time taken for the sound waves to travel the distance from the source to the subject and back to the source is measured, the distance from the source to the subject can be computed accurately.

This is the measurement principle of this application. Here the medium for the sound waves is air, and the sound waves used are ultrasonic, since it is inaudible to humans. Assuming that the speed of sound in air is 1100 feet/second at room temperature and that the measured time taken for the sound waves to travel the distance from the source to the subject and back to the source is  $t$  seconds, the distance  $d$  is computed by the formula

$d=1100 \times 12 \times t$  inches.

Since the sound waves travel twice the distance between the source and the subject, the actual distance between the source and the subject will be  $d/2$ .



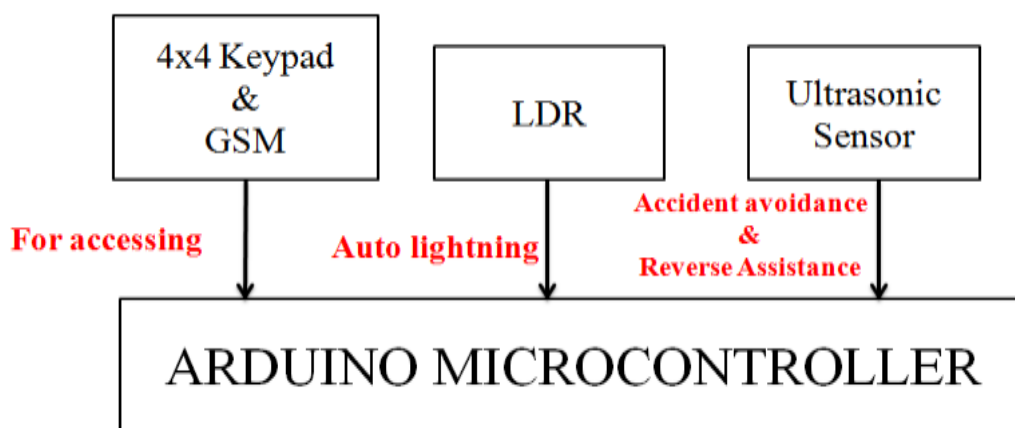
**Figure 4. Ultrasonic Sensor**

A single I/O pin is used to trigger an ultrasonic burst (well above human hearing) and then "listen" for the echo return pulse. The sensor measures the time required for the echo return and returns this value to the microcontroller as a variable-width pulse via the same I/O pin. Ultrasonic sensors have definitely diversified functions including "detection" of what you cannot see, "measurement" of length, thickness and amount, and "detection" of objects.

### 4. Working

In this project, a 5V supply is used which is linked to the LCD display and arduino. When the circuit is keyed up, you will be asked to enter 5 digits as secret code at the early boot/reset of the device. The first 5 digits you will enter at installation will be saved as your SETSECRET CODE. The device will go LOCKED following setting SECRET CODE. We have to input correct secret code to Unlocking. If a client needs to open the security system, first he/she will be ask to enter the password, After entering the password, the arduino will check whether the password match the password which is stored in the internal RAM is correct or not.

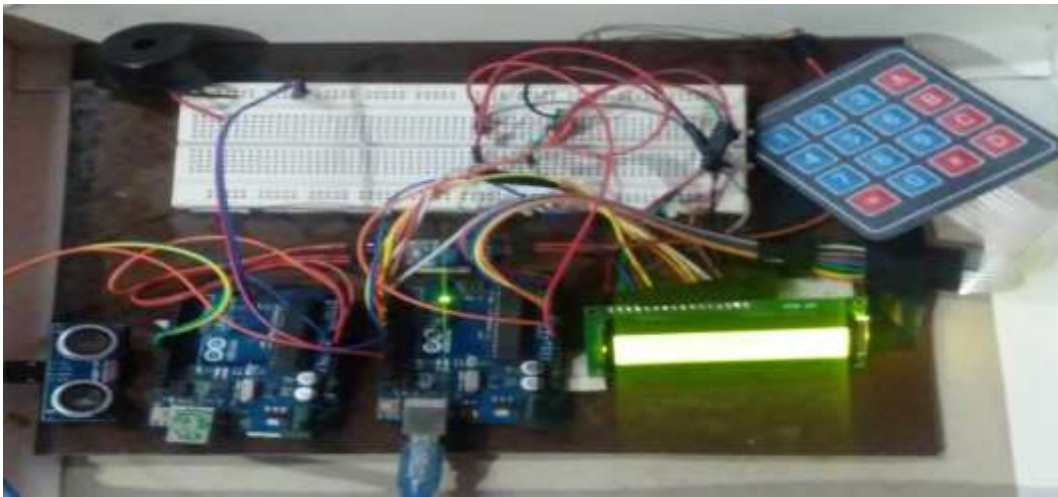
LED is connected to pin no. 13 will remain on for 3 sec, and then it will go to off state. If the pressed secret code is right then arduino will display entrée decided. It will be turn on the relay or other device. If the secret code is not correct it will display wrong password.



**Figure 5. Block Diagram of the Work**

When wrong password is entered further than 3 time, the system will be locked. To unlock it we then have to reset the system by pressing reset button and after resetting it the program will be reexcited. The major part of the over circuit diagram is arduino UNO. The power supply part is very important. It should give steady voltage to the devices for victorious operational of the project.

As like that, the ultrasonic sensor measures the distance of the motor vehicle going before and behind of the vehicle. When it closes to a vehicle or a obstacle it makes a warning sound and slow down our vehicle. This also used for reverse assistant. The Light Dependant Resistor used for automatic headlight operation. During low light or in night it automatically switch on the light and in the morning it switch off itself.



**Figure 6. Hardware Setup**

## 5. Conclusion

Digital padlock is completely base on arduino. Arduino have been the intelligence of thousands of projects. As compare to other microcontrollerbased digital lock it is easy and it required less hardware. It doesn't need addition A/D and D/A converter. The encoding is small bit complex. We can set the secret code and reset it without using external device. It is dependable. It is 90% working and can be simply implemented. The automatic lightning system and the distance measurement unit add some more credit to this project.

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