



# SMART VEHICLE ANTI-THEFT CONTROLSYSTEM

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## ABSTRACT

Vehicle theft is a rampant issue, and efficient detection systems are essential to curb this criminal activity. This project proposes a Vehicle Theft Detection and Alert System using Arduino. The system incorporates various sensors and an Arduino microcontroller to monitor the vehicle's status. In the event of unauthorized access, the system triggers an alarm and sends alerts to the owner, aiding in the swift recovery of the stolen vehicle. In these system we are implementing the ultrasonic sensor and vibration sensor for detecting the vibrations.in these two sensors anything goes wrong an alert will send to these related authorized person along with the exact location of vehicle identified using Global Positioning organization (GPS) and Global system mobile communication (GSM). This organization continuously track location of theft vehicle and report the status to user. GSM send SMS to Arduino board.in addition to these we are also adding WiFi module to continuous monitor the GPS location of the vehicle.

## Keywords:

- Anti-theft system
- GPS
- GSM
- Remote Engine Locking

## INTRODUCTION

Various technologies have been introduced in recent years to detect car theft. For example, immobilizer to remotely disable the lost vehicle, microdot identification to identify auto parts using unique microdots, Electronic Vehicle Identification (EVI) to identify the vehicle against the registration database, low jack system to use in-built transponders to tracking down vehicle, GPS to location the position of lost vehicle by using global positioning system and so on. In this project we are going to track the vehicle by using GPS –GSM modem. The engine whose ignition disabled through the relay fed from the Arduino which gets command from the GSM modem. In this system we are going to use Arduino board which is an opensource platform used for building electronic project. We also used GSM and GPS for tracking the location of vehicle. LCD

display used for display values of latitude and longitude of vehicle location. Buzzer is used to detect the vehicle by using sound of buzzer.

### EXISTING SYSTEM

Current Vehicle security systems often rely on basic alarm systems or GPS trackers. While these solutions provide some level of security, they may lack the ability to detect unauthorized access accurately. The proposed system aims to overcome these limitations by integrating multiple sensors for enhanced theft detection.

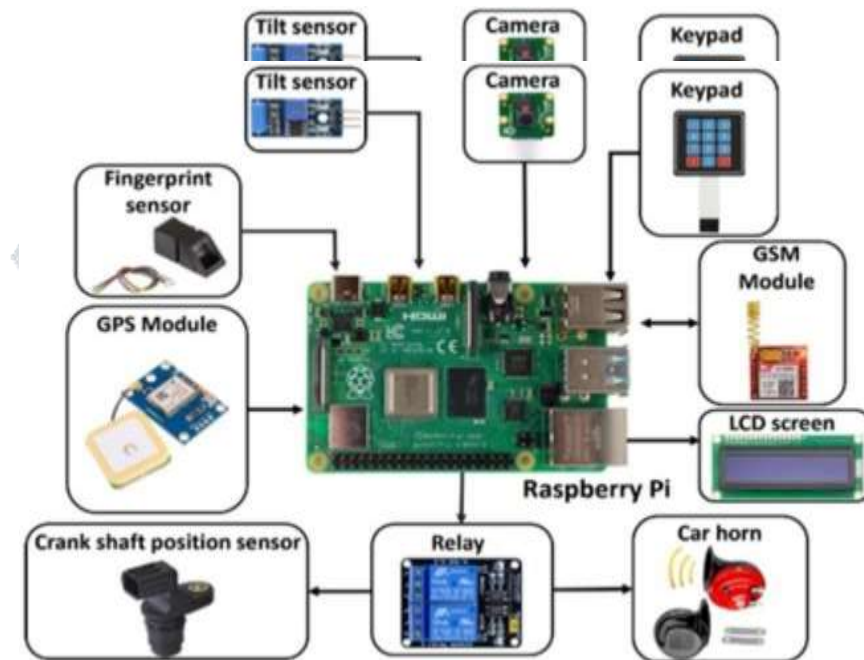


Fig: Existing system of Anti-theft control system

### PROPOSED SYSTEM

#### Hardware Requirements:

- Arduino uno
- Vibration sensor
- 16\*2 LCD
- Buzzer
- GSM module
- GPS module
- ESP8266 wifi module etc

In this proposed system aims to overcome these limitations by integrating multiple sensors for enhanced theft detection. The Vehicle Theft Detection and Alert System using Arduino utilize various sensors, such as vibration sensors, GSM module, and GPS modules, to monitor the vehicle's status. The Arduino microcontroller processes sensor data and triggers alarms if unauthorized access is detected. Additionally, the system sends alerts to the

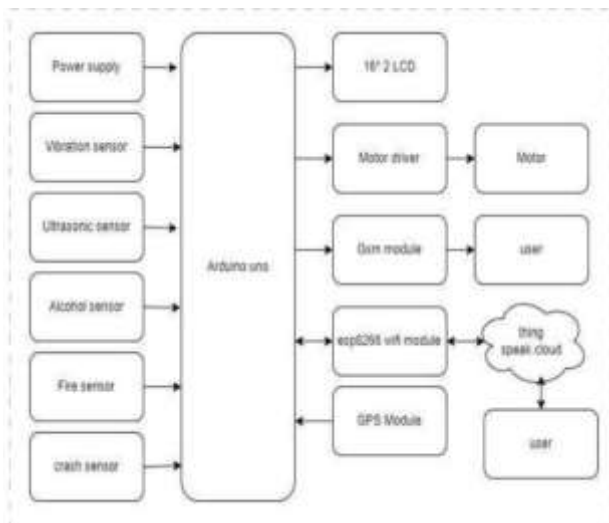


Fig.2. Block diagram of proposed system

owner through SMS or a mobile application, facilitating prompt action to recover the stolen vehicle.

## Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). 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 an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform.



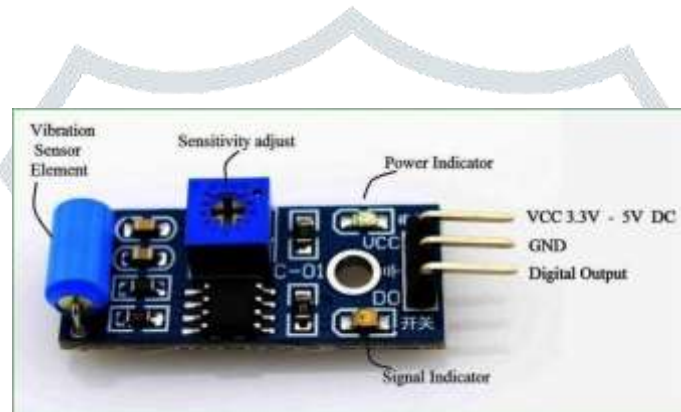
specifications of Arduino:

- Microcontroller: A T mega328
- Operating Voltage: 5V
- Input Voltage(recommended): 7-12V
- Input Voltage(limits): 6-20V
- Digital I/O pins 14 (of which 6 provide PWM output)
- Analog Input Pins 6
- DC Current per I/O PIN 40 mA
- DC Current per I/O PIN 40 Ma
- Flash Memory

- 32 KB of which 0.5kb used by bootloader
- SRAM 2KB
- EEPROM 1KB
- Clock Speed 16 MHz

## Vibration Sensor

A vibration sensor is a device that detects mechanical vibrations. It measures the vibration levels in your machine and alerts you to any potential problems, like equipment failure or worn parts that need replacement. Vibration sensors can help improve efficiency and prevent costly downtime by detecting these problems before they happen



## 16\*2 LCD

Fig: Image of Vibration Sensor

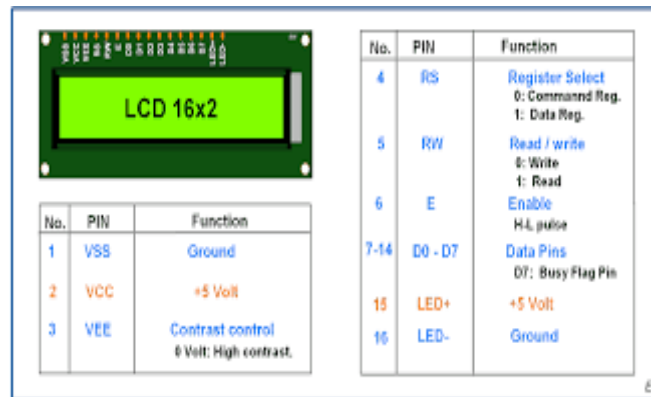


Fig:16\*2 LCD

A 16×2 LCD display is a liquid crystal display that can show 16 providing a total of 32 characters of information. It's commonly used to display alphanumeric information in various electronic devices.

## Buzzer



Fig.7. Image of Active Passive Buzzer

A buzzer is a small yet efficient component to add sound features to our project/system. It is very small and compact 2-pin structure hence can be easily used on breadboard, Perf Board and even on PCBs which makes this a widely used component in most electronic applications. There are two types are buzzers that are commonly available. The one shown here is a simple buzzer which when powered will make a Continuous Beeeeeeppp, sound, the other type is called a readymade buzzer which will look bulkier than this and will produce a Beep. Beep. Beep. Sound due to the internal oscillating circuit present inside it. But the one shown here is most widely used because it can be customized with help of other circuits to fit easily in our application.

Features include:

- Alarming Circuits, where the user has to be alarmed about something
- Communication equipment
- Automobile electronics
- Portable equipment due to its compact size

## GSM Module

GSM (Global System for Mobile communications) is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM networks operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. Some countries in the Americas use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated.

Fig: GSM Module



## GPS Receiver Module

GPS receivers require different signals in order to function figure. These variables are broadcast after position and time have been successfully calculated and determined. To ensure that the different types of appliances are portable there are either international standards for data exchange (NMEA and RTCM), or the Manufacturer provides defined (proprietary) formats and protocols.



Fig: Image of GPS Receiver Module

1. GGA (GPS Fix Data, fixed data for the Global Positioning System)
2. GLL (Geographic Position–Latitude/Longitude)
3. GSA (GNSSDOP and Active Satellites, degradation of accuracy and the number of active satellites in the Global Satellite Navigation System)

## WIFI Module ESP8266

An ESP8266 Wi-Fi module was introduced and developed

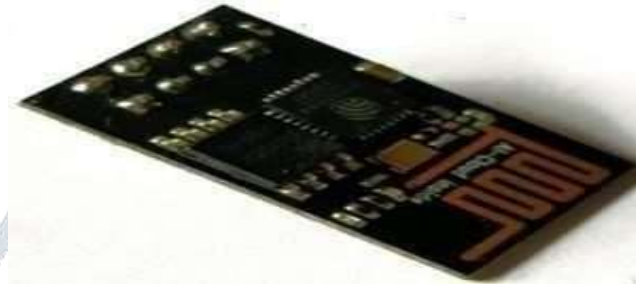
**Step1:** Arduino IDE Initial Setup by third-party manufacturers like AI thinkers, which is mainly utilized for IoT-based embedded applications development. It is capable of handling various functions of the Wi-Fi network from another application processor.

It is a SOC (System On-chip) integrated with a TCP/IP protocol stack, which can provide microcontroller

access to any type of Wi-Fi network. This article deals with the pin configuration, specifications, circuit diagram, applications, and alternatives of the ESP8266 Wi-Fi module.

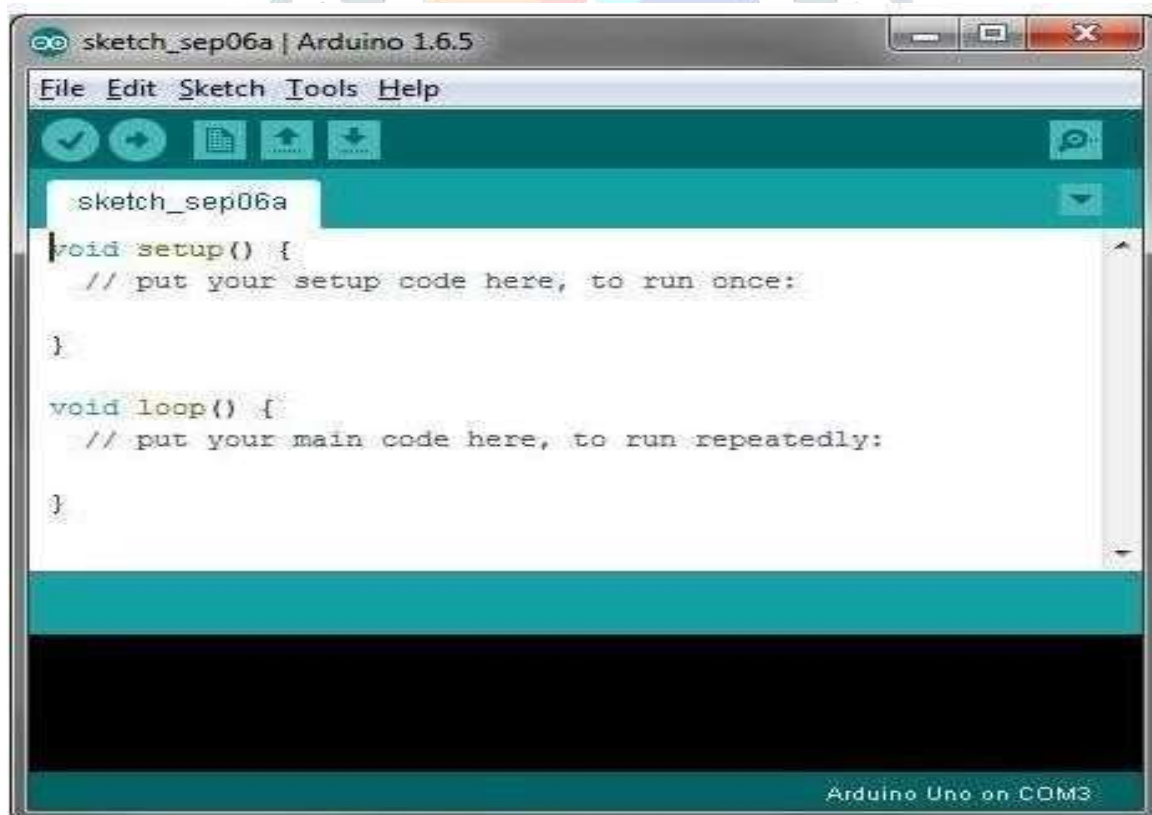
What is the ESP8266 Wi-Fi Module?

An ESP8266 Wi-Fi module is a SOC microchip mainly used for the development of end-point IoT (Internet of things) applications. It is referred to as a standalone wireless transceiver, available at a very low price. It is used to enable the internet connection to various applications of embedded systems.



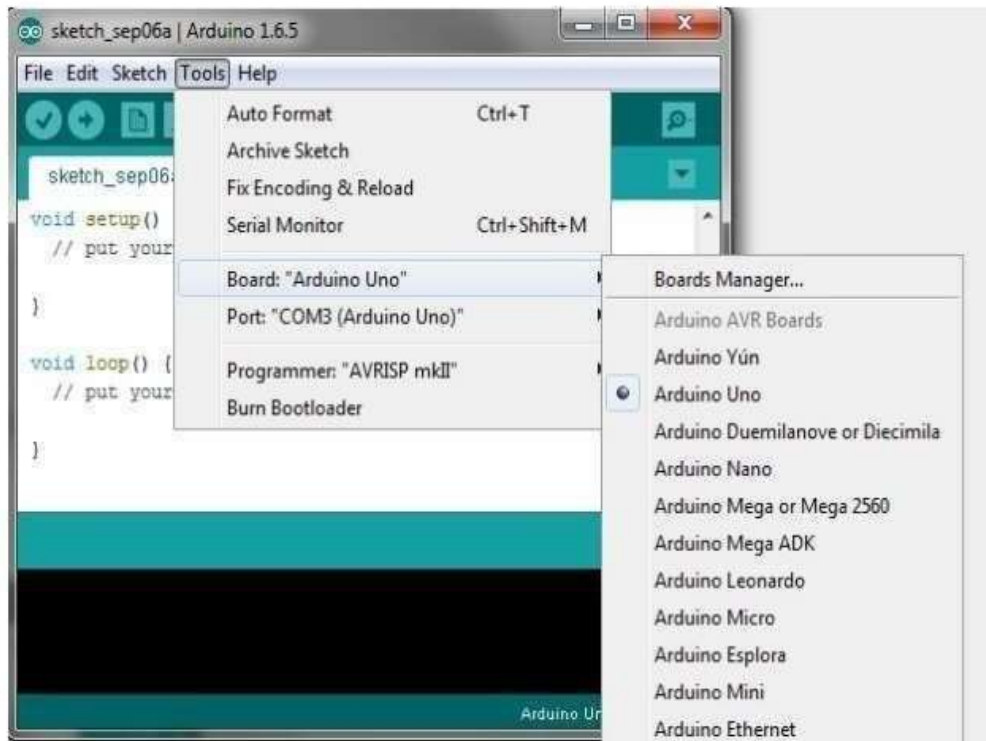
**Step1:** Arduino IDE Initial Setup.

Fig: WiFi Module ESP8266SYSTEM DESIGN



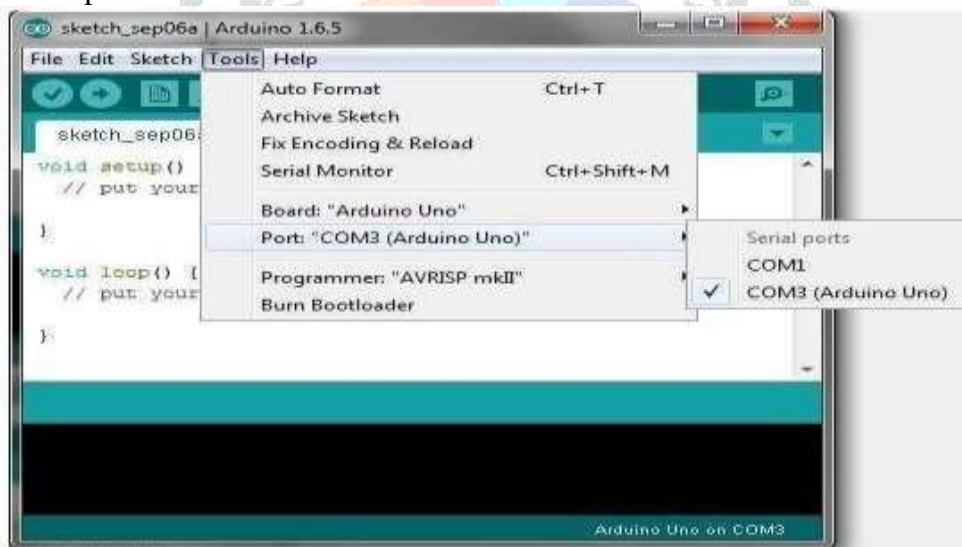
Arduino IDE Default Window

### Step 2: Arduino IDE Board Setup.



Arduino IDE: Board Setup Procedure

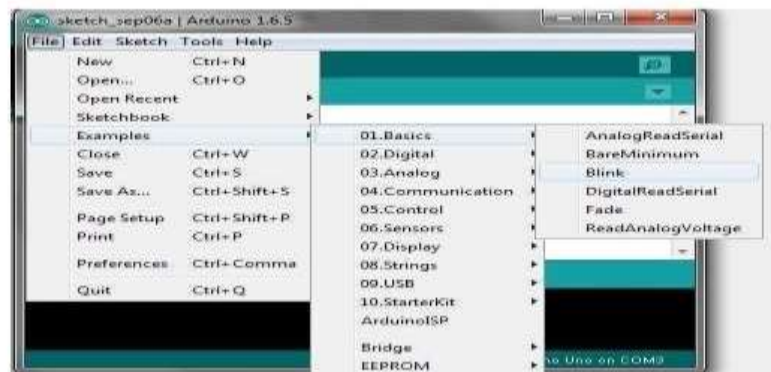
### Step 3: COM Port Setup.



Arduino IDE: COM Port Setup

### Step 4: Testing.

Upload Button: 



Arduino IDE: Loading Blink Sketch



## OUTPUTS

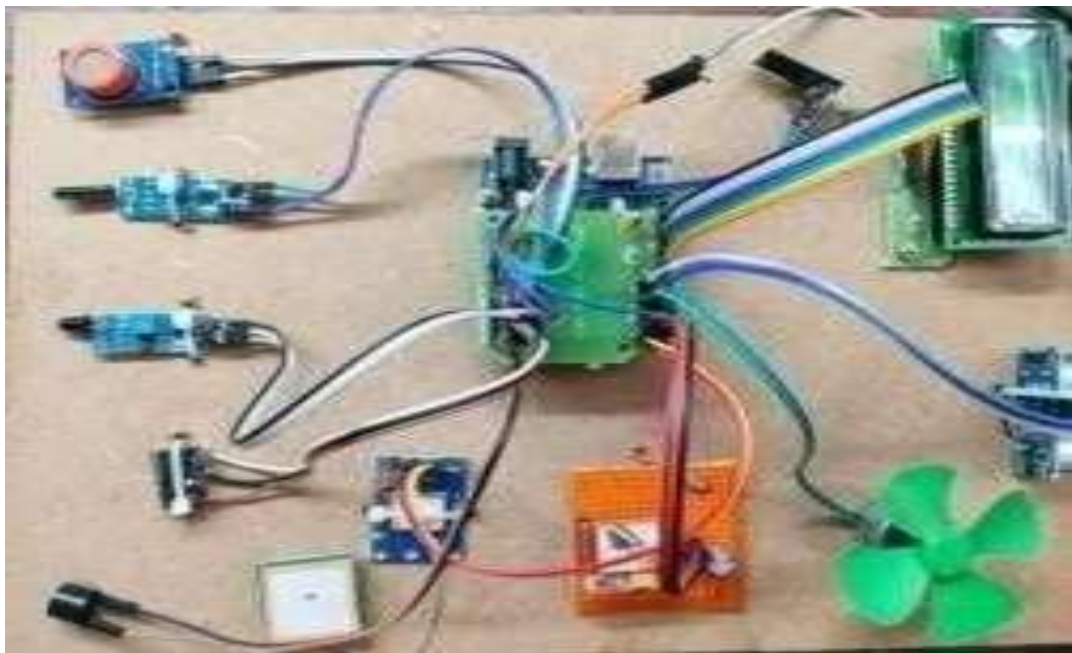


Fig: Prototype of the system

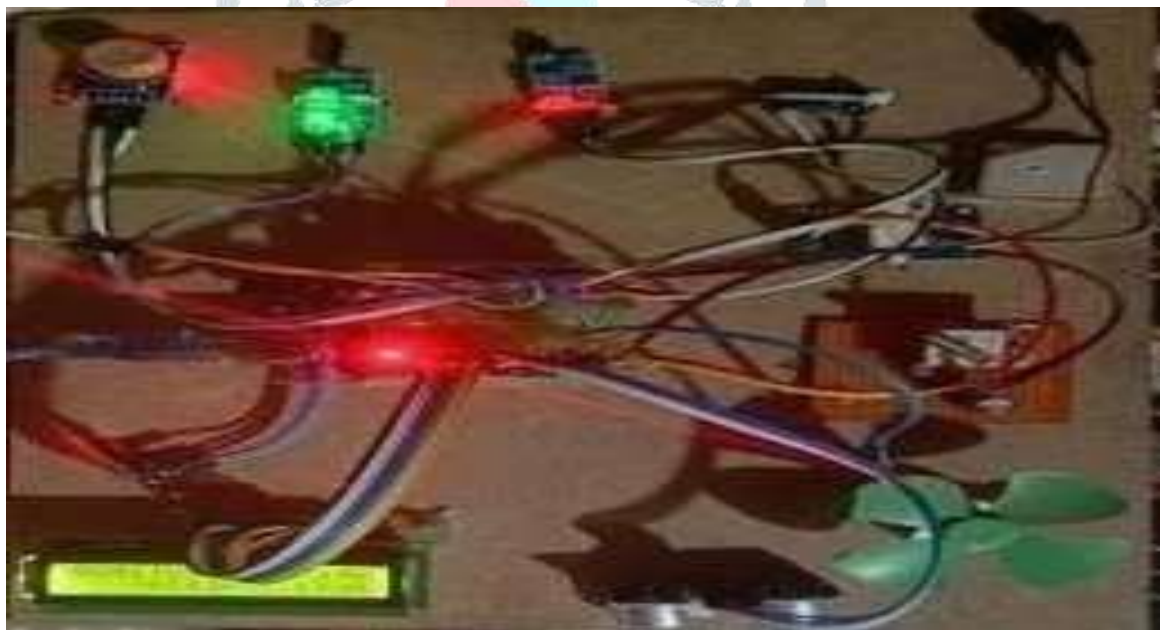


Fig: Hardware Output

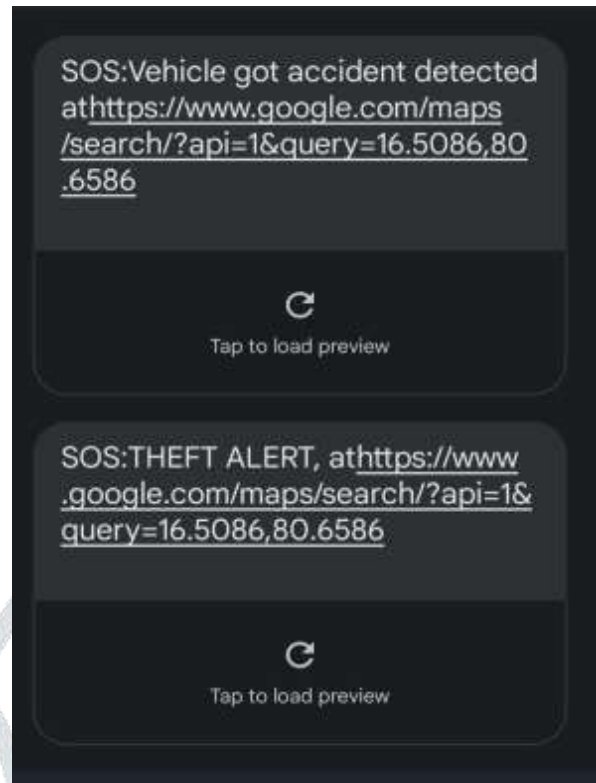


Fig: Output Theft detect notification displayed on mobile

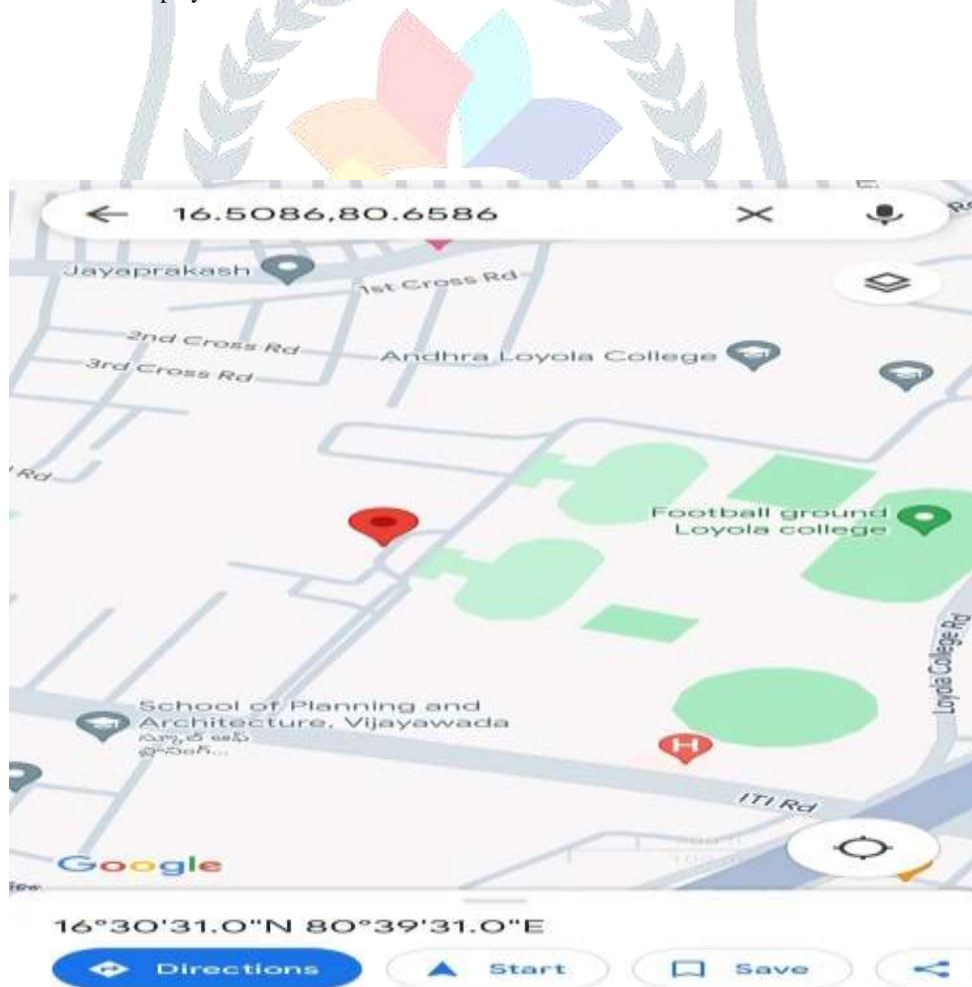


Fig: GPS Track the vehicle location

## ADVANTAGES

- Real time Alerts: Instant notifications enable quick response for vehicle recovery.
- Cost-effective: The system offers advanced security features without significant expenses.
- Customizable: Users can customize the system based on their specific security needs.
- Enhanced Security: Multi-sensor integration improves the accuracy of theft detection.

## CONCLUSION

- The Vehicle Theft Detection and Alert System using Arduino offer an effective solution to the growing problem of vehicle theft.
- By combining various sensors and communication modules, the system provides enhanced security and real-time alerts, contributing to a more proactive approach in handling vehicle theft incidents.
- The proposed system is to be provided to reduce the risks and incidence of car theft and provide peace of mind to car owners.

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