Vehicle Theft Controlling System

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***Abstract*— Vehicle theft has recently become a serious problem in developing countries. People are looking for smarter ways to remotely protect and monitor their vehicles as new technologies and advances emerge. Second, the vehicle's anti-theft system helps keep it safe. In light of this, GPS-based tracking systems are now commonly used in vehicle tracking. This research proposes an IoT (Internet of Things) based vehicle theft control system. This allows you to monitor the movement of the vehicle in real-time from anywhere. The system uses GPS (Global Positioning System), GSM (Global System for Mobile Communication), and microcontrollers to build this system, enabling users to monitor their vehicles in a convenient way. The system allows users to monitor vehicle movement and control the vehicle remotely via mobile applications.**

***Index Terms:* GPS Module, GSM Module, Arduino**

1.INTRODUCTION

In India, according to the 2019 car theft and burglary census in India, vehicle thefts are up approximately 11.7 percent on average. To combat this, technologies to prevent vehicle theft must be improved. Microcontroller-based real-time vehicle theft detection and prevention systems are one answer [4]. The GSM (Global System of Mobile) is a cellular communication standard that is universally recognized. The vehicle owner sends messages to a GSM modem and GPS system attached to the vehicle using a Subscriber Identity Module (SIM) installed in his phone [2]. This technology is cost-effective and may be used for any vehicle, such as buses, bicycles, or cars.

When a vehicle is stolen, the major goal of this project is to send an alarm message to the owner. A GSM modem, GPS system, microcontroller as well as a sensor to detect car theft, are all included in this project. When someone tries to take the vehicle, the microcontroller is halted, and the GSM Modem is instructed to send an SMS to the owner, informing him that his car has been stolen and providing the exact location of the vehicle through GPS. The ignition system is turned off by a message from the owner's phone, and the motor goes off.

2. HARDWARE IMPLEMENTATION

2.1. Arduino

Arduino is a free open-source device with customizable hardware and software.Arduino Uno is a microcontroller, the central controller for the whole unit. The Arduino belongs to the ATmega328 family. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, and a reset button. The current version of Arduino Uno comes with a USB interface, 6analog input pins, and 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM output pins.The board can be programmed with Arduino Software (IDE). The board can operate on an external supply from 6 to 20 volts. The recommended range is 7 to 12 volts. If using more than 12V, the voltage regulator may overheat and damage the board. Here we use Arduino as the main component based on requirements and specifications, Arduino UNO can meet our project needsso we choose this as the main component of our project [1].

Fig1 Arduino UNO

2.2 LCD display (16 X 2)

Liquid Crystal Display system. LCD is an electronic display module that uses liquid crystals to create visible images. A 16x2 LCD can display 16 characters per line, which means there are two such lines. Alphanumerical LCD display module. That is, you can display letters and numbers. 16 * 2 LCD can display 16 characters on one line, which means there are two such lines. On this LCD, each character is displayed in a grid of 5 * 7 pixels. There are two registers in this LCD, in particular Command and Data.

Liquid crystal display technology works by blocking light. Specifically, an LCD consists of two pieces of polarizing glass (also called a substrate), with a liquid crystal material sandwiched between them. The backlight produces light that passes through the first substrate. Hence we use this LCD to display the operation message on the display board.

Fig2LCD Display

2.3 GSM

A computer and a GSM-GPRS system communicate using a GSM module. To send and receive messages, a SIM card from the Global System for Mobile Communication (GSM) is put into the phone. The system stores the GSM SIM card number. As the use of GSM grows, network services have extended to encompass a variety of specialized applications, machine automation, and machine-to-machine communication. It works in the 900MHz to 1800MHz frequency range. The GSM module is crucial in this suggested system for transmitting information between the victim and the concerned emergency personnel.

Fig3Global System for Mobile Communication

2.4 GPS

The global positioning system (GPS) is a satellite-based system that measures and computes its position on the world using satellites and ground stations. The victim's position is determined via GPS. The operational frequency is 1575MHz, and the operating voltage is 3-5V. It is an exterior type long antenna. This sort of module requires a lot of data synchronization. A location tracker is the Global Positioning System (GPS). Longitude and latitude are used to track the current position. The GPS Coder Module, which is directly attached to the microcontroller's USART, will utilize this information to search for a specific address of that place, such as the street name, adjacent intersection, etc.

Fig4 Global Position System

2.5 Motor

A DC motor is an electric machine that converts electrical energy into mechanical energy. DC motors use direct current to convert electrical energy into mechanical rotation. Magnetic fields created by electrical currents are used in DC motors to power the movement of a rotor mounted within the output shaft. Both the electrical input and the motor design

influence the output torque and speed. We are employing a dc motor as the vehicle motor in this.

Fig5 Dc Motor

2.6 Google maps

CONNECTING GOOGLE MAPS TO MOBILE

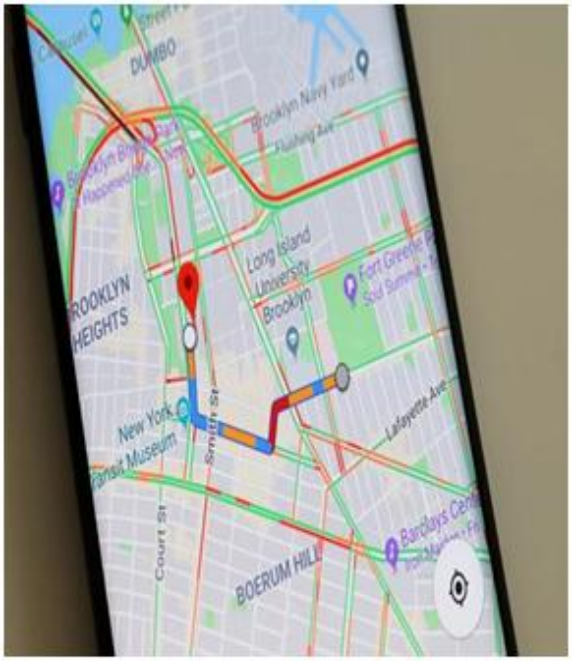

Fig6 Google maps

Use Google Developer to install Google Maps on your mobile. You can connect Google Maps to mobile by using programming. When the user receives a message from the device, the user can work through the mobile phone. The data is sent to the mobile phone that the vehicle is approaching.

2.7 Relay

A relay is an electromagnetic switch that is used to turn on and turn off a circuit by a low power signal, or where several circuits must be controlled by one signal.

Fig7 Relay

3. OUTLINE METHOD

The proposed vehicle theft controlling system assist vehicle owners. When they are away from their vehicle, they can easily obtain information such as whether it is started or not, as well as its location. If the vehicle is under someone else's control, the owner will receive information via text message and the vehicle will be recovered by him. Vehicle owners will benefit from this planned system by having their vehicles monitored at all times. The suggested system's hardware is depicted in Figure 8. The microcontroller is an Arduino. GSM (Global System for Mobile Communications) and GPS (Global Positioning System) modules are included in the design.

4. BLOCK DIAGRAM

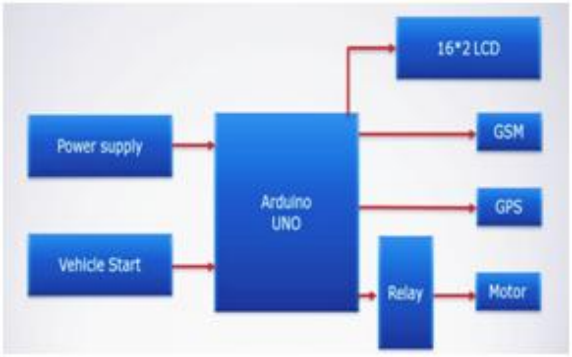

Fig8. Block Diagram of the designed system

Workflow of the proposed System

Step 1: Start

Step 2: Switch ON the power supply.

Step 3: location tracing will take place can be shown in the figure

Fig9. Location tracking on the display

Step 3: When the engine is started, data is sent to the Arduino UNO, which subsequently sends data to the GPS.

Step 4: If GPS receives the signal, it will begin calculating the vehicle's current latitude and longitude data and sending them through SMS to the registered mobile number.

Fig10SMS sent to the registered mobile number

Step 5: The vehicle owner must then reply in accordance with the alert.

Step 6: If the vehicle is detected and the owner is aware of it, he will either ignore it or employ this technique. He will receive information on the vehicle's location and will be able to manage it by turning off the motor.

When the vehicle is started we receive a message and By using the "@*"and"@#" controls the tracked location is updated and the vehicle can be controlled

Step 7: On the LCD display, all of these actions are presented.

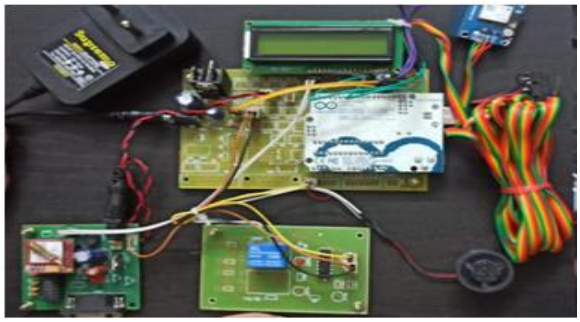

Fig11Designed Hardware System

5. RESULT

When the vehicle begins, the information will be transmitted to the vehicle owner via text, along with a location link. As a result, they can utilize this system to acquire information about the status of the car, whether it is driving or stopped. Furthermore, concerned vehicle owner can defend their vehicle by issuing commands from their smartphone.

By using the "@*" and "@#" controls the tracking location is updated and the vehicle can be controlled

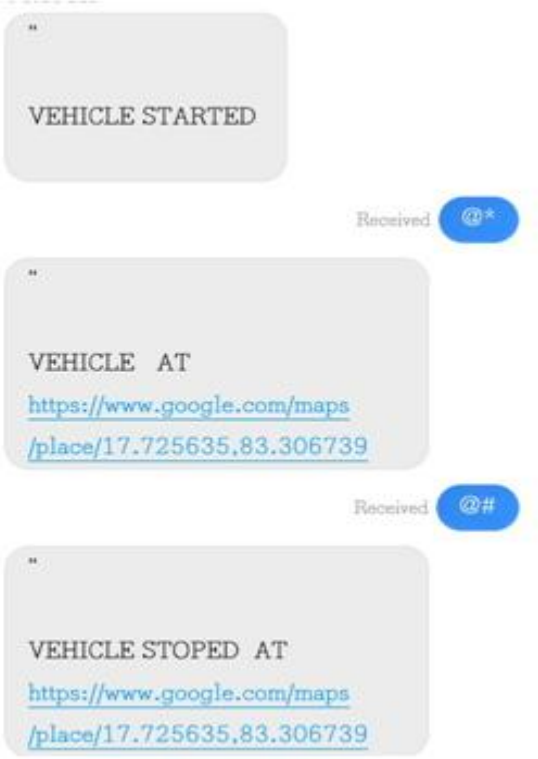

Fig12.SMS alert with GPS location

6. CONCLUSION

The proposed design will address issues that car owners and thieves encounter and will provide solutions using technologically sound equipment and concepts. The value of this work is that it not only gives vehicle information, but it also provides security through a vehicle theft control mechanism. As a result, vehicle owners' difficulties can now be resolved with the help of the proposed model's real-world application.

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