Electric Vehicle Automation Tracking ,Anti–theft System And Adoptive Headlight System

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Abstract

Each and every person must utilize a car. Similarly, protecting the car against theft is quite important and is accomplished by using vehicle tracking systems and other tools. Vehicle tracking systems have their origins in the maritime sector. They needed some kind of mechanism to track each vehicle's location and distance travelled at any given moment. GPS and active vehicle tracking are both used in modern car tracking. With the help of this technology, you may review your driver's route on two separate screens. The bottom pane shows speed statistics as well as stop and transit times. By just clicking the stop number on the track detail pane, it is simple to switch between stops, and the system can record whether the engine is running or not by detecting if the ignition is on or off. The fingerprint sensor takes pictures of the fingerprints, verifies that each print it reads is unique, and compares those prints to those in the modules or the local system database. A GPS and GSM-based car tracking system would be the most affordable option for tracking vehicles and serving as an anti-theft system. It is an embedded system that uses the Global Positioning System (GPS) and the Global System for Mobile Communication (GSM) to monitor and locate any vehicle. Automotive manufacturers have been concentrating on incorporating cutting-edge technology into their cars in response to the growing demand for increased road safety and enhanced driving experiences. Adaptive headlights, a technology that dynamically modifies the direction and intensity of a vehicle's headlights in response to shifting driving circumstances, are one such invention.

Keywords: *Vehicle tracking, GPS technology, fingerprint sensor, GSMtechnology, anti-theft system*

I.   INTRODUCTION

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 thebeginning 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 alarmsystem will be turned on. For theft prevention, we can also trace the four-wheeler by givinga call to the GSM modem which is embedded on the system. Then real time tracking beginsand the GPS location of the vehicle is sent to the owner by SMS. The ignition of the vehiclecan 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 of9600 bps. We are using two serial ports. One, for the GSM modem and another one for theGPS modem. The coding is written in embedded c language and Arduino IDE was used toprogram 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 dedicatedsim 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. .Adaptive headlights utilize a combination of sensors, cameras, and intelligent control systems to continuously monitor the road ahead and detect various parameters, such as vehicle speed, steering angle, weather conditions, and ambient light levels. This data is then processed in real-time to determine the optimal lighting pattern for the current situation. By dynamically adjusting the direction and intensity of the headlight beams, adaptive headlights improve visibility for the driver while minimizing glare for oncoming traffic, pedestrians, and nearby vehicles.

Driving at night is very different than driving during the day. Without access to natural light, the field of Naturally, the human eyes will become smaller. During nighttime driving, the driver is less at ease with the illumination circumstances. Up until the vehicle reaches its destination, the headlight systems are in charge of delivering lighting .its final position. Contrarily, car front illumination systems are a primary cause of nighttime accidents, which is a serious issue for drivers. Conventional headlights illuminate the road ahead, but they may not be enough while driving around some bends or curves, creating blind spots that can cause accidents. Low visibility and the difficulty of seeing an obstruction at a bend or corner of the road are the main causes of accidents at night. The implementation of adaptive headlights has several advantages, including increased driver comfort, reduced driver fatigue, and improved response time to potential hazards. By providing better visibility, these headlights enable drivers to react more effectively to unexpected situations, such as sudden obstacles or pedestrians on the road. Furthermore, their ability to adapt to different road and weather conditions enhances overall driving confidence and reduces the risk of accidents So for the understanding of the whole operation of this vehicle automation system is distributed in three parts:

- Tracking the position of vehicle.
- To provide security to vehicle.
- Adaptive Headlights

II. LITERATURE SURVEY

This gives a detailed and thorough review of the literature in the area of EV automation problems on safety and security. The literature includes technical papers from IEEE journals and few other sources.

Preventing car theft using microcontrollers and GSM modules. We are generating the results with better accuracy and proficiency. It can be helpful to those people who want better andmore advanced security in their vehicle[1][7]. In case of theft, this system would provide effectivetracking of vehicle through which owner can track the vehicle easily as it instantly prompts user about theft after very next second of theft. Also, after theft it starts providing location co-ordinatesto user immediately after theft and continues to send these co-ordinates after prescribed time intervals through which owner can easily track the vehicle and get It back by getting help from law enforcing agencies[2]. The GPS, GSM based tracking system is explored by developing the various applications to overcome the problems of surveillance, tracking and monitoring of theft vehicle. This is most reliable, efficient and cost effective system in order to provide the vehicle security and tracking [2][4][6].There is sos button that can be used in the event of emergency. Despite the fact of these excited previously , they were not used in conjunction with an accident detection system [3] . we have proposed an open source GPS tracking system, Goo-Tracking system, using commodity hardware and open source software. The Goo-tracking system has shown the feasibility of using it for fleet management[5].

To properly address this issue and help those in need, several individuals are investigating anti-theft measures for automobiles. However, even with these present important improvements may constantly be made in the field of locating and managing stolen vehicles. A contemporary tool called GPS provides precise position information in the form of latitude and longitude coordinates. A microcontroller could help with the entire process and connect GPS and GSM so they could recognize the person. A GPS, RFID, and GSM-based security system is also a powerful vehicle security system that can be created by connecting all three modules to a microcontroller. Using this method, the car is secured.

This technology uses an area location service to secure the car. A business can employ this method by providing each of its drivers with a unique RFID card. Anytime a driver presents this card to a computer with a unique identification, the machine will get the driver's information from a database, if any. If the driver's information matches that in the system, an SMS with the driver's information, the vehicle the driver is using, and the vehicle's position coordinates will be sent to the system. Any user with a valid login can access this data at any time on the web.

Although this technique is efficient, it lacks effectiveness and was rejected for deployment because of its latency.

According to previously conducted study, a significant number of car theft incidents are currently reported. Numerous researchers and other individuals have offered numerous solutions to this issue. There are numerous products on the market that have been developed with user identification and real-time monitoring, such as door locking systems, anti-theft alarm systems, steering locking equipment, network tracking systems, and electronic alarms. These products could prevent car robberies. [1]

Global System for Mobile Communication (GSM) and Global Positioning System (GPS) ideas were used to design software and hardware. The suggested system is composed of two primary components: a mobile or mobile unit and a constant or controlled component. The system's ideas are all functioning correctly. Every interaction between the moveable and constant parts, including connections, data transfers, and interfaces, is in good working order. The outcomes are all compatible with GPS technology. [2]

Another research claims that a created system is an electronic gadget that can be fitted in a car to enable the owner properly track the vehicle. A comprehensive vehicle tracking system that was developed employing the principles of cutting-edge technologies like GPS and GSM has been offered by this research. The foundation of this system is an embedded system that uses the Global Positioning System (GPS) and the Global System for Mobile Communications (GSM) to effectively track and precisely position a vehicle. The adaptive headlight systems were also designed system with the help of a stepper motor that provides stepwise turns of the headlamps [13][14] .The stepper motor, which enables sequential rotations of the headlights on each side, was also used in the creation of the adaptive headlight systems. The maximum turn that may be made with the left headlight is 20 degrees, whereas the greatest turn with the right headlamp is 30 degrees [12]. The glare that causes pain . Many pedestrian accidents resulted from the lack of a method to reduce these uncomfortable glares, according to reviews of various adaptive driving headlamp systems [15]. An effort is made in this work to design and construct an adaptive headlamp system that is more cost-effective than the current systems. The planned AHS offers adequate lighting over all surfaces to help the driver when driving at night. The range of lighting methods that are accessible.

III. OBJECTIVES OF THE PROJECT

The objective of our project is to develop a tracking and locking system which is used to ensure that the vehicle is not used by any unauthorized person and in case of theft, it could be easily tracked. In future, we develop and design our project to meet different challenges that it must ensure the authorized use of vehicle and vehicle could be tracked out using GPS and GSM in case of theft occurs.
Car headlights rotate in direction of car view.
Following are the main objectives of our project:

- It would be cost-effective design i-e it should be affordable.
- It should be reliable.
- It would be simple in design.
- Tracking by SMS.

IV.   METHODOLOGY

The ability to adapt to different road and weather conditions enhances overall driving confidence and reduces the risk of accidents So for the understanding of the whole operation of this vehicle automation system is distributed in three parts:

- Tracking the position of vehicle.
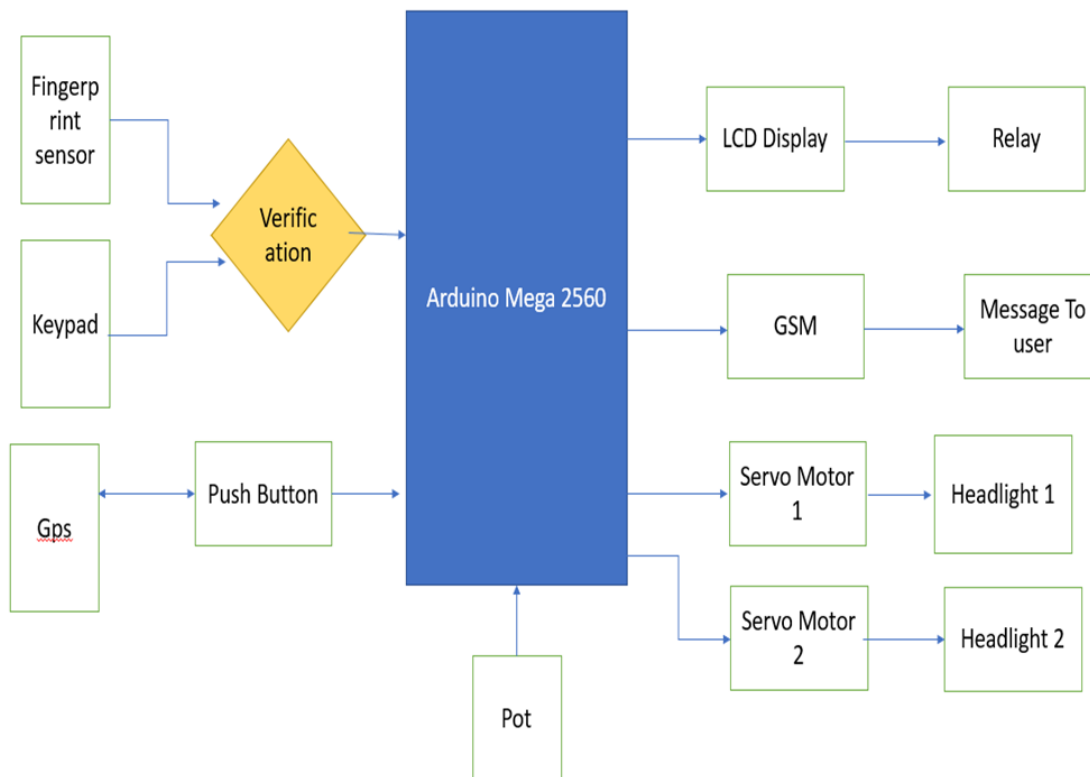- To provide security to vehicle.
- Adaptive Headlights

Fig:1. Block Diagram For Connection Of Project

The block diagram consists of power supply, Arduino Mega 2560 board, keypad ,Finger Print, LCD, GPS, GSM , relays ,Servo motors ,Pot ,LCD. GSM have a SIM (Subscriber Identity Module) card with some balance to send some messages when needed

➢   **Project Design:**

  The following goals must be accomplished for this project to be successful:
- **It will outlaw the usage of any vehicle without permission.**
- **In the event of theft, the project's design will SMS the user to notify them of the theft and provide GPS coordinates.**

If the car is in regular usage, the owner may SMS the position of the vehicle at any time.
The project concept that we are putting out combines a locking and tracking system for a vehicle. This design guarantees to prevent any unauthorised usage of the vehicle and also offers efficient tracking. The following elements are used in this design to accomplish the necessary

goals:
- **GPS,**
- **GSM,**
- **Arduino Mega 2560 modules.**
- **Relay,**
- **44 Membrane Keypad,**
- **162 LCD,**
- DC Servo Motors (sg90)
- Potentiometer
- LEDS

To connect the components in the provided code to an Arduino Mega 2560, we need to make the following connections:

1.Fingerprint Sensor:

- Connect the fingerprint sensor's TX pin to the Arduino Mega's pin 19.
- Connect the fingerprint sensor's RX pin to the Arduino Mega's pin 18.

2.Keypad:

- Connect the keypad's row pins (9, 8, 7, 6) to the Arduino Mega's pins 9, 8, 7, and 6.
- Connect the keypad's column pins (5, 4, 3) to the Arduino Mega's pins 5, 4, and 3.

3.LCD Display:

- Connect the LCD's RS pin to the Arduino Mega's pin 12.
- Connect the LCD's EN pin to the Arduino Mega's pin 11.
- Connect the LCD's D4, D5, D6, and D7 pins to the Arduino Mega's pins 25, 22, 23, and 24, respectively.

4.Servo Motors:

- Connect the first servo motor's signal pin to the Arduino Mega's pin 52.
- Connect the second servo motor's signal pin to the Arduino Mega's pin 53.

5.Relay:

- Connect the relay's control pin to the Arduino Mega's pin 26.

6.GSM Module:

- Connect the GSM module's RX pin to the Arduino Mega's pin 17.
- Connect the GSM module's TX pin to the Arduino Mega's pin 16.

7.Push Button:

- Connect the push button to the Arduino Mega's pin 40.

Please note that the Arduino Mega 2560 has multiple hardware serial ports, so you don't need to use Software Serial for the fingerprint sensor and GSM module. You can directly use the hardware serial ports (Serial1, Serial2, Serial3) by connecting the respective RX and TX pins.

Additionally, make sure to power the components appropriately and follow any additional requirements specified by the component datasheets.

Once the connections are made, you can upload the code to your Arduino Mega 2560 and it should work as expected.
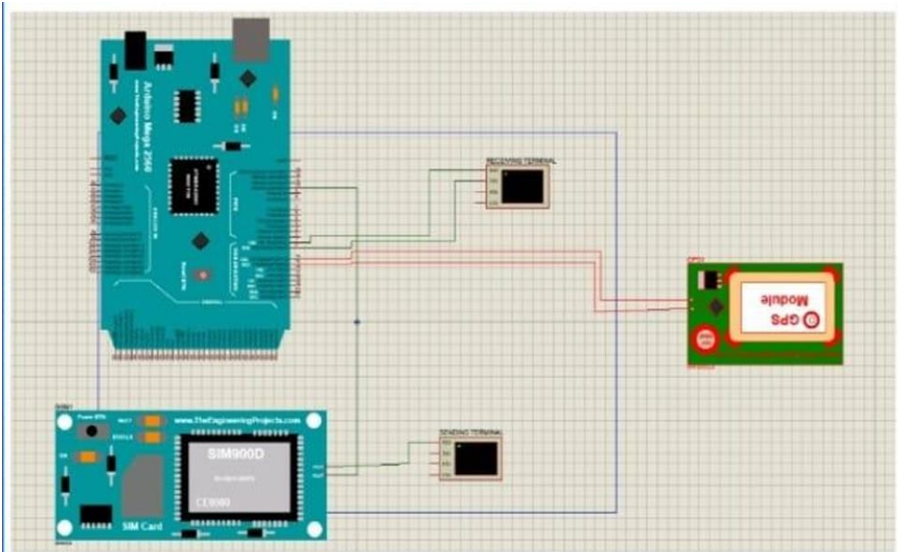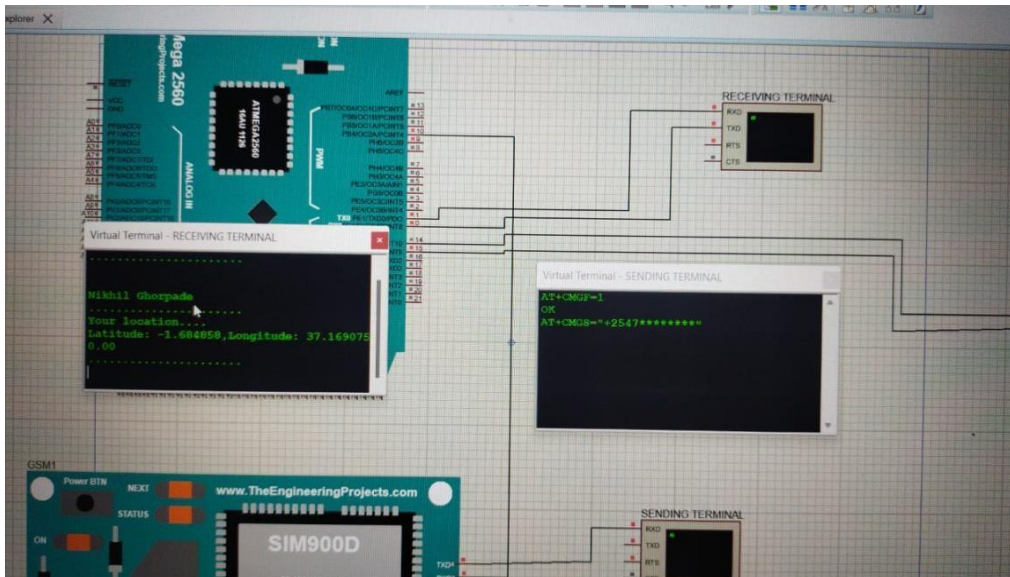
Fig .2: Simulation
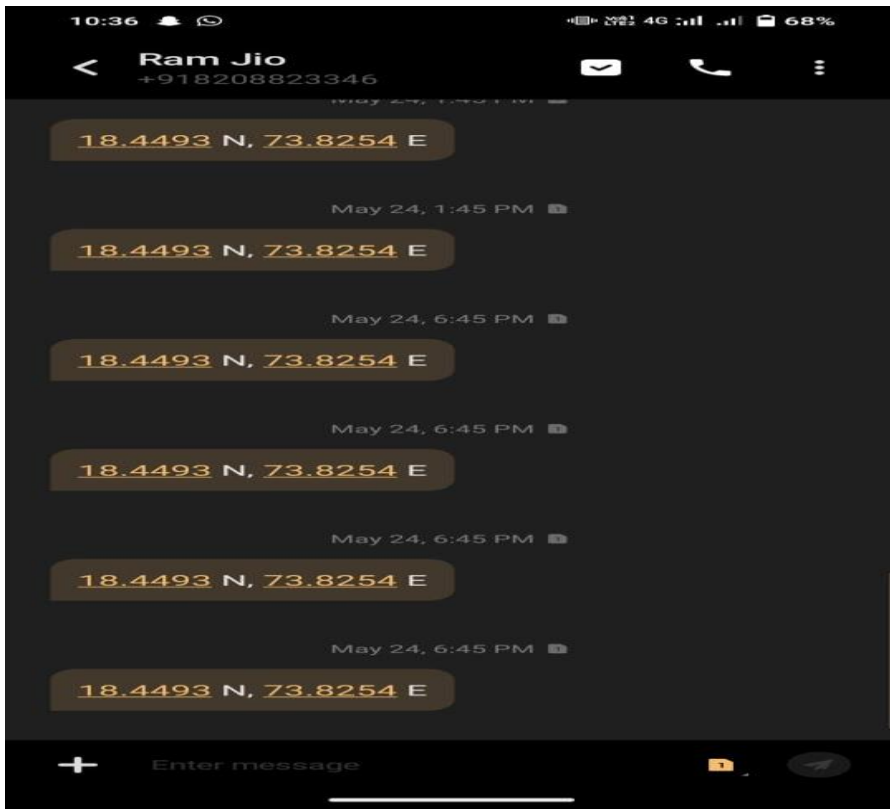

Fig.3: Output of Simulation
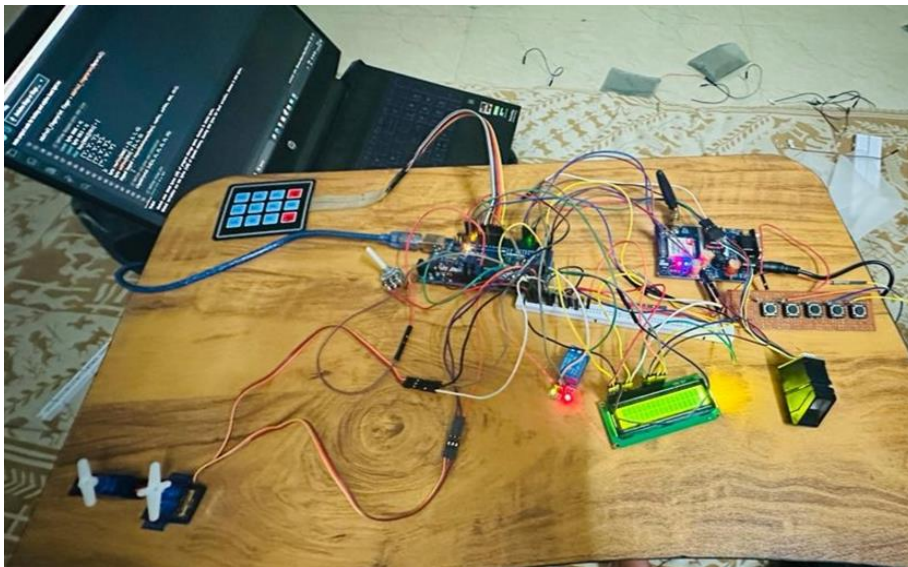
Fig.4: Sms Send By GSM and Location by GPS

Fig.5: Execution Of Project

V.   CONCLUSION

In this paper an alternative approach for device switching which combines fingerprint identification technique with GSM and GPS functionalities has been proposed. This approach allows more than one person to control the device functionality and the authentication facility provided by the fingerprint sensor helps to reduce the fault correction time. The Arduino board used in this model is least expensive and can be implemented in various applications. The application of device switching is not limited to control device from a long distance, but it can also be used in automobile applications. The proposed design not only provides switching functionality, but also provides the exact location of the device. Hence theft of the device can easily be detected. It gives complete knowledge of designing microcontroller based system and developing embedded software .In the future work cloud computing can be included to this project so that every activity performed on the device can be closely monitored. This reduces the need for storing all the log-in information in the computer storage. In adaptive headlights represent a significant advancement in automotive safety technology. By dynamically adjusting the direction of the headlight beams, these systems provide improved visibility, reduce glare for oncoming traffic, and enhance overall driving experiences. With their ability to adapt to changing driving conditions, adaptive headlights contribute to reducing accidents, enhancing road safety, and making driving safer and more enjoyable for all road us

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