Juni Khyat ISSN: 2278-4632 (UGC Care Group I Listed Journal) Vol-13, Issue-06, No.01, June : 2023 ESP 32 CAMERA, GSM, GPS BASED VEHICLE ACCIDENT DETECTION AND THEFT CONTROL SYSTEM

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Abstract. Vehicle accidents and theft pose substantial risks to the safety and security of drivers and passengers. To overcome these challenges, an innovative system that combines GPS and GSM technology, as well as Arduino microcontroller has been designed with necessary sensors. The GPS module continuously records the vehicle's location and these sensors provide data in real time to the Arduino microcontroller for analysis and decision-making. When an accident is detected, the system immediately activates the GSM module, which sends an alert message to the selected emergency contacts. This message comprises crucial information such as the vehicle's GPS coordinates and the time of the occurrence. This rapid alert enables for a speedy response and help.Furthermore, the device has a remote interface via which automobile owners may interact. Users may monitor their vehicle's real-time position, get alarms, and handle different activities by using a specialised mobile application or sending specific commands through SMS to the system's GSM module.Finally, the proposed automobile accident and theft detection sytem based on GPS, GSM, and Arduino technology is a viable solution for boosting vehicle safety and security. By merging real-time data analysis, rapid alert signals, and remote monitoring capabilities, this technology significantly reduces reaction time, aids in the recovery of stolen vehicles, and provides peace of mind to vehicle owners and authorities alike.

Keywords: Accidents, Theft Control, GPS, GSM modem, ESP 32 Camera module.

1. Introduction

Any technique or device intended to stop or discourage the unlawful taking of priceless items is considered an anti-theft system. High levels of machine-machine and human-machine communication are expected to be made possible by the Internet of Things.

In today's world of comfort and luxury, a variety of pricey cars are readily available. Many of these vehicles have been introduced with security systems already installed.Car theft is on the rise despite significant expenditures being made in vehicle security. To stop automobile theft, this situation calls for the examination of new security measures. Recent years have seen a significant increase in vehicle theft, which has to be found and stopped. The car's security and safety are essential. Although there are several contemporary approaches, they are pricey and have certain limitations. Consequently, a strong security mechanism is needed. This initiative looks for auto theft.

The idea of detecting automotive accidents is not new, and the automobile manufacturers have made great strides in optimising the technology. Manufacturing in the automotive industry has advanced significantly during the past few years. It may be claimed that as technology develops, so does the rate of car production, and as a result, accidents happen more frequently.Traffic collisions endanger people's lives. This is due to the fact that our nation doesn't have the best emergency services. An automated system for vehicle accident identification and notification is presented in this paper.

This technology helps in identifying accidents in a matter of seconds or less, typically, by sending a message to the first aid facility that provides the accident's timing and location. The alert message helps to identify the location so that timely medical aid may be provided, perhaps saving precious lives. You can use the switch on the gadget to halt message sending if there are no casualties and no one needs assistance. The GSM module is used to send the message, and the GPS module is used to locate the accident.

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ISSN: 2278-4632

Vol-13, Issue-06, No.01, June : 2023

It may take hours for someone to find the accident and call the police when a person is involved in a nighttime accident and is unconscious. Saved lives as a result of saving such priceless time. In light of this idea, a testing setup is created that can detect accidents without human intervention. The same arrangement will alert the ambulance to the accident's location when it is detected, helping the ambulance to find the scene. In order to maintain the patient's stability after he is placed into the ambulance, a second setup is attached to him. This second setup will continuously monitor the patient's vital signs.

PROBLEM STATEMENTS

Statement 1: Theft of vehicles is a major problem across the world, costing owners money and suffering them mental misery. An efficient and trustworthy car theft tracking system is required to deal with this problem. The system must be able to quickly identify unapproved vehicle entry or movement and notify the owner or proper authorities so they may take the necessary action. The issue statement centres on creating a system for detecting vehicle theft that makes use of cutting-edge technology in order to improve security precautions and reduce the danger of vehicle theft.

Statement 2:The goal of this problem statement is to design and create an automobile collision detection system that makes use of GPS and GSM technologies to quickly identify accidents, locate them, and notify emergency services of the need for immediate help.

2. **GSM Theft Information of Vehicle**

An actual GSM modem having a service code is required to demonstrate the theory in practise. The primary usage of the GSM module is to send an SMS to the authorised mobile phone whenever someone tries to begin operating your car without your permission. It must be placed in the motor vehicle itself and shouldn't be used for any other purposes. The GSM modem that needs to be put in the car, the computerised control circuit with all of its peripherals that interfaces with it, and the complete system need to be set up in the car in a secure location.



A code word might be incorporated into the system to prevent unauthorised users from operating it, allowing only the vehicle's owner to do so. translates to the need to input a pass phrase and hit the enter key to start the car. The car will start if the password matches, which is shown by the operation of the DC motor. Additionally, if the password is entered incorrectly, a message is going to be sent to the cell phone number specified in the controller programme. The GSM (Global The system for Cellular Communications) technology used in the creation of this project work makes it a communication-related topic.

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The benefit of employing the GSM protocol is that the is no range restriction given that it is a worldwide network, allowing the user to send messages to any location where the car is taken. The controller gathers information if someone tries to get in the car and flee, and this information is automatically sent to the concerned cellphone number through the modem that supports GSM. The authorised person may immediately execute the relevant action whenever he receives this communication.

A microcontroller is a true computer on a chip, and its architecture includes all the CPU's registers, program counter, arithmetic logic unit, and stack pointer functions. In addition, functions such as RAM, ROM, serial I/O, clock circuit, and counter are installed.

Like microprocessors, microcontrollers are general-purpose devices, but their purpose is simply to read input, perform computations on that data, and use those computations to control the environment. The best approach to using a microcontroller is with good software that is stored in ROM and controls the machine's behavior without modification during the duration of the system. The microcontroller scheduling approach transfers code and data from internal memory to the ALU with less single and double bytes. The IC package's pins have several instructions linked to them, and depending on the programmer's requirements, the pins can carry out a variety of activities.

2.1 GPS and GSM Based Colloided Vehicle Position Detection

The primary goal of the proposed idea is to locate the wrecked car and to be able to send both its vehicle number and geographic location to adjacent vehicles at suitable distances. The microcontroller serves as the project's beating heart and is utilised to interface with a variety of hardware peripherals. In this approach, the car is not continually followed; instead, once the vehicle crashes, position data is automatically sent to the concerned cellphone. The limit switch that is part of the impact sensor circuit's architecture is a lengthy lever. Due to the flexibility of this sensor, anytime a collision occurs due to the car being bumped, the brake pedal will be depressed. Based on the received signal, the controller gathers both latitude and longitude information from the GPS receiver and sends it through GSM module to the concerned cellphone. The Global Positioning System (GPS) technology is used to pinpoint where the car is.

A GSM modem allows for communication between the car and mobile device. The position of the crashed car may be simply determined using the information provided by GPS regarding factors like longitude and latitude. Using the GSM (or Global System for Cellular) technology has the benefit of having no range restrictions, allowing data to be obtained from anywhere in the globe. The microcontroller stores the user's cellphone number and the vehicle information. When a car crashes, the microcontroller obtains the vehicle's position as determined by the GPS connection and uses the GSM modem to send a message to the same cellphone.

Numerous land, marine, and air applications are possible using GPS, which offers incredibly accurate location data. Since its inception as a military instrument, GPS has found success in a wide range of professional and domestic uses. Vehicle location tracking systems (VLTS) are one example of such applications. The GPS receiver and wireless transmitter used in these tracking systems enable a remote device to track the location of the vehicle.



The position of a GPS tracking device on the globe is determined by receiving signals from GPS from GPS satellites. A wireless receiver with the ability to operate at the L1 spectrum (1575.42 MHz) is necessary to obtain GPS data. The GPS receiver estimates the separation between a minimum of four satellites at once. The receiver's longitude, latitude, and elevation may all be determined via triangulation.

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3. HARDWARE IMPLEMENTATION Block Diagram



Components of Model

DC MOTOR

An electrical device that transforms energy from electricity into mechanical energy is a DC motor. NR-DC-ECO is a top-notch, reasonably priced DC geared motor. In order to assure a longer lifespan and superior wear and tear qualities, it has steel pinions and brass gears. A sintered bushing houses the output shaft and turns it.

START KEYS

The switch that links the power supply to the ignition mechanism and other electrical components is turned by the key in a car. An car is started and stopped using the ignition key. Additionally, it is employed to lock the engine.

RELAY

The relay is an appliance that, when certain conditions are met in the main circuit, opens or shuts an additional circuit. The purpose of a relay is often to function as a kind of electric magnifier, allowing a relatively weak current to operate on a considerably greater current. Between the controlling circuitry and the controlled circuit, it also offers total electrical isolation.

Specifications:

- (1) Resistance range for coils: 100 to 500
- (2) operating voltage: DC from 6 to 24 volts
- (3) Number of contacts: 1 to 4 switches
- (4) Rating of the contact current: 1.5 to 25 Amps

ESP 32 CAMERA MODULE

- Module for WiFi: ESP-32S
- ESP32-D0WD is the processor.
- 32Mbit RAM in the machine: Internally 512KB + Externally 4M PSRAM
- Built-in Flash Inside-the-board PCB antenna

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4. **RESULTS**

The results depict the following images, an alarm message is sent out as soon as the motor begins when the password entered is incorrect along with, the position of the vehicle may also be communicated in a message, and in figure 4 the internet of things (IoT) is also used to publish the car's longitude and latitude readings.



Figure 1: The Proposed Model



Figure 2: SMS Alert Messages for Accident and Theft



Figures 3 & 4: GPS Location of the Vehicle after Theft and Accident Occurance



Figure 5: Accident Location photo and Theft photo using camera ESP 32

Based on the attached ESP 32 camera module and message transmission through GSM module, the system aids in determining the degree of seriousness of the collision. The GPS module keeps track of where the accident happened and uses a GSM module to aid connect with the rescue system. The technique is more effective and greatly beneficial in preventing accident-related deaths by recognising them as soon as possible. The rescue crew can go to the accident scene with all necessary medical supplies and rescue the person as soon as possible since the severity of the accident can be measured. As a result, this approach saves the person as soon as possible and significantly lowers the fatality rate.

ISSN: 2278-4632 Vol-13, Issue-06, No.01,June : 2023

Juni Khyat (UGC Care Group I Listed Journal) 5. CONCLUSION

The project has proved really useful for individuals who own autos. In essence, this type of security system is put in all government vehicles, including those employed on the domestic front. In the present era, GPS monitoring technologies for automobiles are getting more and more prevalent. These GPS-based devices are only seen in government vehicles; anyone else is not allowed to use them owing to security concerns. Another key aspect is that only government cars can afford this extremely pricey equipment. This economical low-cost option is designed for automobile owners with the aim of providing domestic services to the general public.

This effort serves as an early version for a car tracking system that incorporates GPS receivers, GSM modems, Google Maps, and more. The placement is carried out using Google Maps, which also provides the specific position of the point and its latitude and longitude. The system sends an SMS with a specific vehicle's location to users' mobile phones. The automobile is located on Google Maps using the data that was received, and it comes in a format of longitude and latitude coordinates. The identical information will be transferred to the appropriate cell number, and we are able to observe what comes out on the LCD.

6. **REFERENCES**

• [1] Mohanasundaram.S,Krishnan.V,Madhubala.VUsing an open CV, a vehicle theft monitoring, detection, and locking method Advanced Computing and Communication Systems International Conference 2019.

• [2] Md.AkteruzzamanArif,Md.AsifMahmud Vehicle Antitheft Protection Using GSM and GPS and Fingerprint Verification The 2017 IEEE International Conference on Electrical, Computer, and Communication Engineering.

• [3] Abdelrahman AhmedAhmed Abdallah M.E.2 and A.A.Vehicle tracking and theft control system design and implementation, International Conference on Networking, which is Command, Computing, Electronics and Embedded Systems IEEE-2015.

• [4] Li Jie, Hu Jian-ming, and Li Guang-Hui, "Automobile Antitheft Technology Based on Gprs and GPS Module," Fifth International Conference on Intelligent Networks and Systems (ICINIS), 2012, vol., no., pp. 199, 201, 1-3 Nov.

• [5] Arm 7-based theft control, accident detection, and vehicle positioning system, M. S. Joshi and D. V. Mahajan, International Journal of Creative Technology and Innovative Engineering, vol. 4, no. 2, July 2014, pp. 29–31.

• [6]M.A.A.Khedher, "Hybrid GPS-GSM localization of automobile tracking system," International Journal of Computer Sciences and Information Technologies, vol. 3, no. 6, December 2011, pp. 75-85.

• [7] [Internet of things-based vehicle tracking and monitoring system by S. Jawad, H. Munsif, A. Azam, A.H. Ilahi, and S. Zafar in: 2021 15th International Seminar on Open Source Technologies and Technologies (ICOSST), IEEE, pp. 1–5, doi:10.1109/ICOSST53930.2021.9683883.

• [8] N. Kaushik, M. Veralkar, Pranab. P, k. Nandkarny, "Anti-theft vehicle security system", International journal for scientific research and development, vol. 1, no.12, pp. 2845-2848, March 2014.