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Research Article

Detection And Tracking of TheftVehicle

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ABSTRACT
In this paper presents 'Detection and tracking of theft vehicle'. The aim is to design a system that can able to capture the image of an unauthorized person and transmit it to a remote location. This project can be used for the recovery of the automobiles. And the owner can be able to stop the vehicle by sending one message to system. And we can be able to identify the face of the thief also. The microprocessor acts as the controlling head of the system. When the system goes in Theft mode the authorized user gets the alert message and user will Able to stop the vehicle engine immediately via sending SMS to system with 'STOP' Keyword. The system includes a GPS modem that vehicle location in the form of latitude and longitude. This location can be accessed via SMS that is being sent to the user. With the help latitude and longitude information SMS user will able to locate vehicle with Google map. This system proves very beneficial for transport and travel companies as they can now keep track of their vehicles. It will also scan the face through the camera and send the message to the owner. By using GPS and GSM technologies enable the vehicle owners to track and monitor the vehicle at anytime from anywhere. During GPS outage environment, Inertial Navigation Sensor is used that contains 3- axis magnetometer and accelerometer which inform the vehicle positions to the owner.

Keywords: Tracking, Capturing of theft vehicles.

Introduction

The world is at the brink of a new digital revolution and Internet of Things (IoT)-based Cyber Physical Systems(CPS) networks mark the next frontier. This research is focused on two main principles: "adaptive security architecture" and "Internet of Things" both of which are listed on Gartner's 2016 top 10 strategic technology trends. In addition to the services offered by other instantiations of IoT, smart vehicular networks transform vehicles into formidable sense-and-move platforms and assist in safe navigation, pollution control, reducing land used for parking, energy efficiency, lower delay, passenger comfort, and congestion management through smooth traffic flow . The idea of autonomous vehicles dates back to 20th century but it wasn't until last decade when advances in deep learning, computing systems for route
planning, communication standards, and image processing made it a reality. The main benefits of autonomous vehicles include reducing mobility costs by sharing cars, simplifying the introduction of alternative fuels, reducing traffic accidents and fatalities, better road utilization (fewer roads will be needed), reducing climate change (higher passengers per mile per gallon), allowing elderly and physically challenged people to live more independently and improve disaster response among other things . Autonomous vehicles can predict potential accidents and react accordingly, thus reducing the number of traffic deaths in the United States. 93% of the six million vehicular accidents in 2010 were due to human error . 18% of crashes with injuries are attributable to distractions caused by smartphones, an issue that is more prevalent with younger generations.

The implementation of autonomous vehicles would help remedy this issue. Older members of the U.S. population will also benefit from the use of autonomous vehicles as they age and have reduced driving ability. ITS cars use cheap sensors with short range that are capable of sensing, processing data and communicating with other technology. They gather information concerning a car's position, velocity, and the current traffic conditions. This information is processed and sent to their neighbors using Dedicated Short-Range Communications (DSRC). DSRC has a range of around 300 m, allowing cars to communicate with up to eight other vehicles within a highway. This paper focuses on communication and security concerns associated with IoAV. We also demonstrate the feasibility of cyber threats to such archetypes. Congestion occurring at highway intersections or busy roads contribute to much of today's traffic. This is exaggerated when merging is not smooth, causing slowdowns for other drivers, known as the "slinky-type effect". Unlike prior research regarding ITS that

assumes constant velocity, this research avoids this to mimic real traffic scenarios. This paper focuses on methods where cars merge during differing traffic flows. Speed changes are minimized, which reduces fuel consumption as well as air pollution. Cars will attempt to adjust their speeds to fit in a gap at an early time and will hopefully minimize slowdowns on the main road. The purpose of this study is to propose an architecture for Internet of Autonomous Vehicles using emulation and simulation of autonomous vehicles. The SoC-based car will be run using a Raspberry Pi 3 alongside various sensors. Sensors and sensor-based technologies aim to assist the driver or allow the computer to take over in response to a problem in the environment .

This vehicle will be a part of an Intelligent Transport System (ITS), a system that communicates data bidirectional using DSRC from Vehicle to Vehicle (V2V), Vehicle to Infrastructure (V2I) and Vehicle to Anything (V2X) to make driving safer and improve roadefficiency.

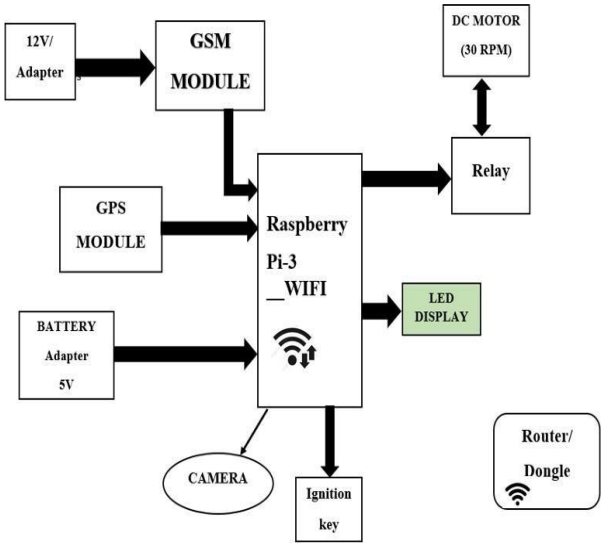


Fig.1.1: Block diagram of the system

A brief explanation of the function of each block in Fig 1:

The power supply whole system. Three voltage levels for the system which comprises the microcontroller, GPS module, GSM modem, immobilizer and the camera would be designed. The microcontroller and camera are separate and use 5.0V each. The GSM and GPS modules are combined on one board (called MG2639 shield) hence they use the same voltage level which is 3.8V. The immobilizer (which consists basically a relay) operates at 12V, hence the three voltage levels are 3.8V,5.0V and 12V.

The GPS module

The GPS module shall be used to pick the coordinates of the vehicle. The command to do so shall come from the microcontroller by means of the program written.

The Camera

The camera shall be used to acquire the image of the 'thief'. It is to be hidden on the dashboard with a clear line of sight in order to be able to capture the 'driver-thief'. The image captured shall be stored in the microcontroller for onward transmission. Since microcontrollers generally come with low memory, a very low-resolution camera shall be used in order to reduce the memory requirement.

The GSM module

The GSM module is to be used to transmit the coordinate acquired by the GPS module. Similarly, the image acquired by the camera shall be sent to the remote location using the GSM module. This implies that the GSM module to be used shall have GPRS (General Packet Radio Service) or 3G network capability.

Methodology

The basic idea for this project is such that when the vehicle is started, a time window of about five minutes is given for the user to authenticate. If there is no authentication after five minutes, then the camera will snap the thief and send his picture to the owners E-mail address or Telegram a server while the GPS will pick the coordinate of the vehicle and send it to the owner's number via SMS or E- mail or Telegram. The switching off of the engine, snapping of the thief and picking of the coordinates are done almost simultaneously. In summary; A signal should

then be sent to the camera snap the thief and save it on the microcontroller memory temporarily. The microprocesses then sends the image via Multimedia Messaging Service (MMS) to the owner (which is his registered phone number on the system) or a server via the Global System of Mobile (GSM) telecommunication module using GPRS.

iii. The Global Positioning System (GPS) module should also pick the co-ordinate of the vehicle and store it on the microcontroller; hence the microcontroller should send it to the owner's number (which is registered on the system) via Short Message Service (SMS) using the GSM module. iv. The microcontroller should then send a signal to a relay (vehicle immobilizer) which shuts down the engine of the vehicle. The vehicle should not restart until the secret button is pressed.

This shall be achieved by interfacing the GSM module, GPS module, camera, secret button and immobilizer devices to the microcontroller (raspberry pi). They shall all be programmed in 'python' language in order for them to interact effectively with the microcontroller for proper functionality.

Review Of Similar Works

Vehicle tracking has become necessary in this modern age due to the fact that several vehicles have been stolen and are still being stolen. The owners of these vehicles often find it very challenging to locate and recover their vehicles. But with the advent of vehicle tracking technologies, it has become quite easier to locate these vehicles. It is not just enough to recover the stolen vehicle but there is a need to ensure that the identity of the thief is also captured by a camera so that he can be arrested and penalized. This act will serve as a deterrent to many vehicle thieves. Some of the anti-vehicle theft control systems that have been designed include presents a GPS–GSM Based Tracking System.. The system uses the global positioning system to determine the precise location of an object, person or other asset to which it is attached and using GSM modem this information could then be transmitted to a remote user. It provides tele-monitoring system for inter-cities transportation vehicles such as taxis and buses. This system contains single-board embedded system that is equipped with GPS and GSM modems along with microprocessor that is installed in the vehicle. During object motion, its location can be reported by SMS message. This system finds its application in real time traffic surveillance. The result achieved by this project is the fact that positional data (in terms of latitude and longitude) of objects carrying the system can easily be retrieved. Also a stolen vehicle could be immobilised remotely by sending an SMS to the SIM number in the GSM module. However this is not without limitations. There is no way the thief can be identified so that he could be arrested after he had stolen the vehicle. In, a GSM and GPS based vehicle location and tracking system

using raspberry pi was developed. In a GPS-GSM based tracking system with Google map based monitoring' a tracking system that could give information about the location and route travelled by a vehicle was designed In , 'Real Time Vehicle Locking and Tracking System using GSM and GPS Technology- was developed. Thepaper deals with the design and development of an anti- theft control system for an automobile, which is used to prevent/control the theft of a vehicle. The developed system made use of an embedded system based on GSM technology. The system is installed in a vehicle. When the vehicle is stolen, an SMS is sent as 'data' to the GSM number. The GSM forwards this message to the microcontroller. The microcontroller verifies whether the received message is from user or not (the mobile number is already fed in the microcontroller). At the same time the GPS receiver continuously calculates its location where it is on the earth with the help of satellite signals from the space and sends this information to microcontroller in the form of longitude and latitude. After seeking this information microcontroller sends this to the user via GSM. When the location is detected then user sends this message as 'lock' to lock the engine of the vehicle. This message is forwarded to microcontroller through GSM. Then the microcontroller locks the vehicle engine with the help of relay by applying breaks.. When the user finds the vehicle, he sends the message 'unlock' to the GSM. Then the microcontroller unlocks the engine of the vehicle. The locking and unlocking of the engine is indicated by the switching of the LED. The limitations of this work include; firstly, if the thief is able to vandalize the windscreen etc., he could get away without his identity known. Secondly, the owner is the determinant that the vehicle has been stolen and as such if he is not aware the thief could go far to a place where there may be no network for the 'lock' SMS to be received in order to shut down the vehicle. In a Remote Vehicle Tracking and Driver Health Monitoring System Using GSM Modem and Google Maps was developed. The GSM modem at the control centre receives the coordinates through Short Message Service (SMS) and updates the main database.

The information then is accessed through the website and the position of the vehicle is displayed through the Google Maps application. In Cloud Computing Based Vehicle Tracking Information was developed. The system basically provided information such as fuel level and alcohol status of the driver. This was achieved by integrating GPS systems, GSM

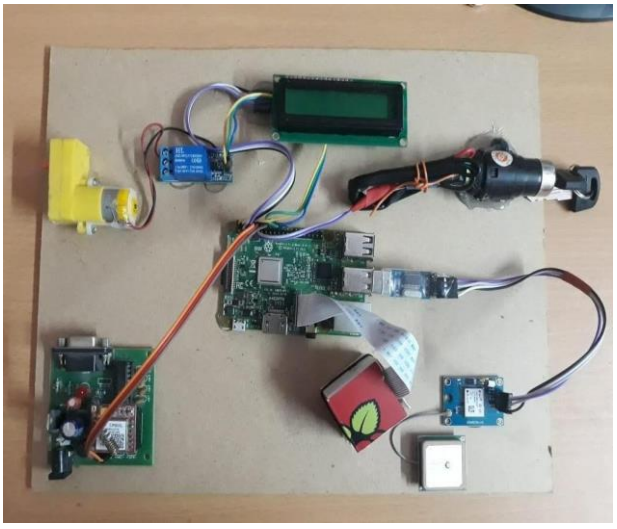
and sensors. All mentioned systems were integrated together and the received data were transferred to a server which is maintained in cloud infrastructures. These are GPS (Global Positioning System) and GSM (Global System for Mobile Communication). The main application of this system in this context is tracking the vehicle to which the GPS is connected and giving the information about its position whenever required. This was done with the help of the GPS satellite and the GSM module attached to the vehicle which needs to be tracked. The work was further enhanced by interfacing various sensors such as IR sensor, accelerometer, fingerprint, temperature, ultrasonic, camera and microphone to capture more data on the vehicle such as accident detection, dynamic acceleration, driver authentication, engine/cabin temperature etc. Though a camera is incorporated into this work, its sole aim is to capture an overview of the vehicle but not the identity of the driver. In, 'Real Time Web based Vehicle Tracking using GPS' was done to determine the location, ignition status, door open/close status and transmit the information in real timeto web server

i. The in-vehicle unit and
ii. Tracking server or monitoring station.

In , 'Vehicle tracking system with GPS GSM Interface and Self-Created Map' was carried out basically to provide remote monitoring capabilities by the owner or company manager. The Geographical Information system (GIS) was incorporated into the design to give exact or nearby location of vehicle on a map that was self-created. In order to get the position on Google map, Google API was used. In , a GSM and GPS based system for Vehicle Tracking and Employee Security System was proposed.

Hardware Design

In vehicle tracking system, GPS receiver receives the location data like latitude and longitude of a vehicle and send them by using a HTTP request to web server. Then browser is used to load the PHP webpage which contain Google maps to show the location of the vehicle in real time. At the initial stage, SIM908 module has been powered up by using 12V battery rather than using 5V from. There by snapping the driver, stopping the engine, getting the GPS coordinates and sending the picture and coordinates to a remote location such as a mobile phone or server.



Results

The tracking/transmission section consists of the GPS modem and GSM modem. The GPS modem is used to acquire the coordinates of the vehicle while the GSM modem is used to send the image to a remote location such as an e-mail address, phone number (via MMS) or webserver. In order to illustrate this image transmission, an application was developed to transmit the image and coordinates to an e-mail address which can be easily accessed through a smartphone.

The vehicle plate number is also transmitted along with the coordinate and image for easier identification of the burglar of the vehicle.

Fig. sending image to telegram

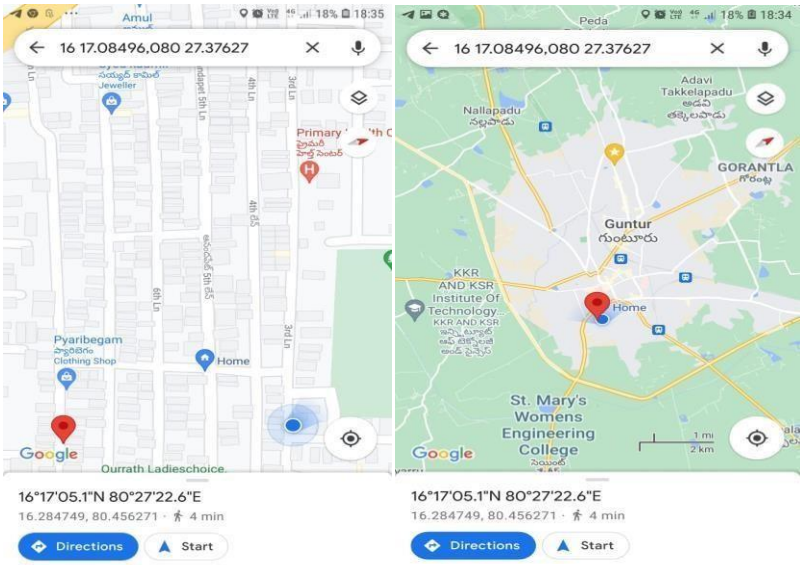


Fig. Location Tracking on Google Maps

Conclusion

By the end of the paper we have developed a vehicle tracking system that is flexible, customizable and accurate. The GSM modem was configured and we tested and implemented the tracking system to monitor the vehicle's location via SMS and online on Google map. To display the position on Google map we have used Google map API. The raspberry ip is the brain of the system and the GSM modem is controlled by AT commands that enable data transmission over GSM network while the GPS provide the location data. Whenever the GPS receives a new data it is updated in the database and hence we are able to see the location on the Google map.

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