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Research paper

IOT based Advanced Black Box with Accident Detection and Location Tracing with Engine Auto Engine Turn off

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Abstract

In this system, with the help of the far spread Black Box we are able to gather the information on the subject of the accidents and also the safety information. In past if the information is required after the accidents takes place investigators try to find out the accident related clues non-systematically. A systematic black box method is proposed which collects and stores the information while driving. In addition, whenever the vehicle meets with accident, the accident switch attached to the controller gates pressed and immediately sends location of the vehicle with longitude and latitude to the registered phone numbers of family which are feed in the system. This helps in taking immediate action when accident occurs. The location of the vehicle traced through GPS and the traced data is saved in the SD card where this system acts as block box for a vehicle as well as. A user can find his vehicle location just by sending SMS to it if it got theft, the user can turn off the engine anywhere from the world just by sending SMS using preferred match word. This Entire data can be monitored using NODEMCU on the webpage.

Keywords: *AVR , GSM, GPS, LCD, SD card, Accident switch, Node MC.*

1. Introduction

Accidents and stealing of vehicles are advanced comparing to the earlier; now it is the time to maintain a proper security for the vehicles. For traffic accidents, knowing about the accountable part in recent times to a enormous extent the black box method is adopting by the cars. The conventional black box system is mostly tranquil of the reflection confine and video indication compression engine. Plenty of data collected and saved in black box is frightened away when the accident is not frankly associated with the car still supposing that in sequence can restrain the decisive data. GPS engine is furthermore included to documentation the occasion and lashing path data, which is utilized to equivalent the saved data with that requested [1]. By using the Black Box device in cars will help us to take the history of driving record, This record information will be used for the investigation purpose (forensics) if any crimes or accidents happens.[2]

The purpose of the case study shows that to communicate with the vehicle after the theft has been done will be processed by using the GSM (Global System for Mobile) and by using the GPS (Global Position System) there will be controllability on the system which helps the location of the vehicle to display. When the vehicle is in movement and motionless in the city and village then the scheme which is prepared to check the accuracy of the location will send to the user. [3]

The GSM and SMS knowledge is a familiar attribute with all mobile services. Contributors in wireless data transporting. With high consistency data receiving and easy to get to transferring, expedient and also inexpensive by using the SMS technology which become very popular. [4] On the Google Earth graphically monitoring the location can be done by the users because the anticipated system is having GPS receiver, GSM Modems, controller in vehicle. Also, they can observe other appropriate information of each automobile in the fleet. The engine halt, emergency services and also safety related various parameters can be used by the tracking system which is implemented. [5]

2. Literature Survey

In real-time to track their vehicles and to provide security from equipped theft and accident occurrences will be done by the inter-city transport companies with the help of the system which is emergent and exploitation of (GPS) / (GSM) base Alert System.[6]

Through the (SMS) or (GPRS) the data will be send to supervised centers when, the positions of the vehicle obtain passing through GPS receiver by the system. In conclusion, it will display the position of the mobile vehicle on the Google maps. Meanwhile the techniques of GSM i.e. WMP100 belongs to the company waveform will get the support from the kit developed which will comprises from the supervised center. [7]

A new anti-theft system was proposed which uses to track a vehicle fixed with the projected device in it. As well as it is worn in wildlife tracking, asset tracking and also when the vehicle is stolen it helps to recuperate. In future the devices like sensors in a vehicle can be incorporated. The information of the vehicle and the path of that vehicle can be seen by creating a server and can also be saved as a path of it. The intelligent tracking system is shaped by the information of the vehicle to our server gets the details by the sensors which are installed in our vehicles. [8]

In the field of real-time vehicle tracking system lots of researchers are very much fascinated towards anti theft modules, performance of the real time tracking system, identification of the client and their main objective is to utilize various latest technologies to

minimize the cost of the vehicle tracking system. In this paper vehicle tracking system comprising of the modules such as GM862 module which is used as GPS modem for the purpose of giving the real time position of the vehicle and the GPRS wireless data communication system provided by cell phone users. Microsoft SQL server 2003 is enhanced to monitor the system and ASP.net is developed for web user interface. Apart from providing the present location of the vehicle at some date, time it also gives the information of the vehicle such as speed, mileage and driver performance. [9]

The extensive black box system was used to accumulate the accident or security information which an intellectual method. By hand investigators try to find for possible clues non-thoroughly after an accident or offense happened conventionally, for the information needed. We put forward a organized scheme of congregation that data utilizing an smart black box arrangement that analyze and assembles data of next-door vehicles during journey. [1]

3. Metehodology

In this paper, the method which we used is based on the trilateration method. Usually, the landmark place can be estimated by using the trilateration method. At certain point the precise position measurement is done by using the GPS in the real time kinematics [10] [11]. Basically the trilateration method works in this way: Generally the satellites will receive the signal of exact location of an object with the help of GPS for example if we consider three satellites which is represented in terms if x, y, z axis in the below figure. Each satellite having their respective co-ordinates (x1,y1,z1), (x2,y2,z2), (x3,y3,y3) along with the clock bias 'b'. Each satellite will receive the signal through the GPS receiver, that GPS receiver can be anywhere after receiving the signals it forms a position which is denoted as "O" in the following figure. Now by calculating the angle distance from the position "O" to the respective co-ordinates (x1,y1,z1,b), (x2,y2,z2,b), (x3,y3,y3,b) we will know the exact location of the object.

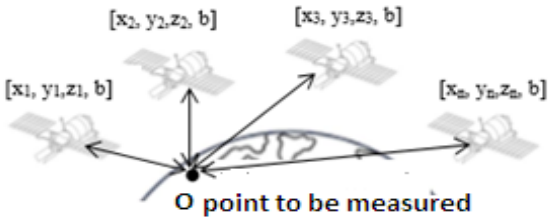

Figure 1: GSM System with satellite

In our project whenever the switch gets enable then the exact location of the vehicle will be send as a message to the number set in it, through GSM module. When the robbery happens the location of the vehicle can be known by sending the message with the code#a0 and if we want to stop the engine of the vehicle we need to send the code as #a1.All these exact locations which the receiver receives is done by using the basic operation of the trilateration method.

4. Proposed Technique

4.1. Block Diagram

This section shows the entire block diagram of our system, based upon the controller which behaves as the main module in the system with the power supply, an accident switch, GPS which is used for tracking purpose, SD Card where the data will be stored and send through the GSM, Relay & Motor, Node MCU, and An LCD for the display.

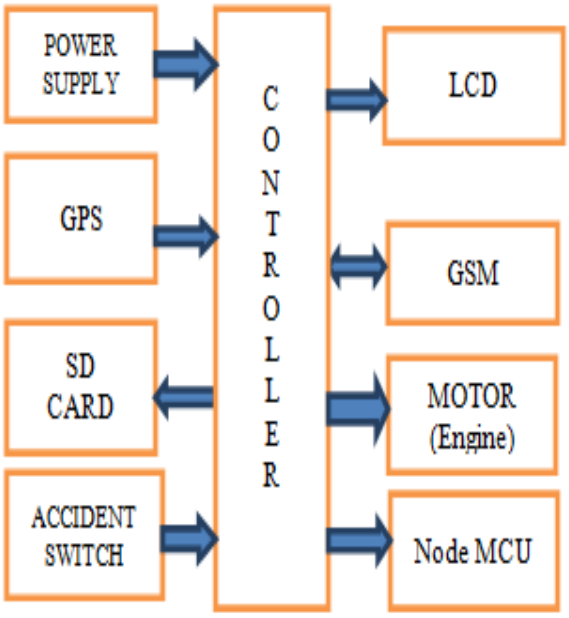

Figure 2: Block Diagram

The entire system is based is on the controller Whenever the vehicle gets start through GPS the vehicle location data will be stored in the SD Card, that GPS will get the location through the satellite. When the vehicle met with an accident then up to that location it will store in the SD Card. After the vehicle gets hit then the switch at the engine gets pressed through the micro controller and a message will be send to the number which is already fixed in it that accident happen. That message will be send through the GSM.

The node MCU has a chip called ESPA8266. By using this chip ESPA8266 the data gets accessed and an IP address will be there in built in it which is having a user id and a password, if we login using the user id and password by the url we will get the location information. The information of the location of the vehicle will be stored in that IP address through the Wi-Fi spread spectrum.

4.2. Process Flow

The process flow includes the flow chart of the proposed system

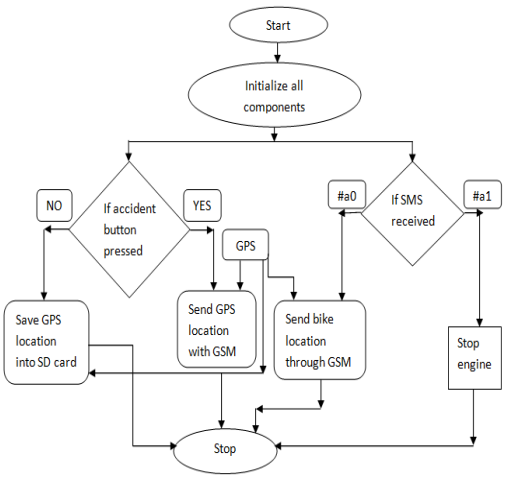

Figure 3: Flow Chart

Whenever the vehicle engine gets start then all the components will get initialized, after that if the vehicle met with an accident then if the accident switch gets pressed then by using the GPS i.e. Global positioning system the location will be send to the number which is already fixed in that through GSM i.e. Global system for mobile communications. If the switch is not get pressed the GPS location will be saved into the SD Card. If the vehicle has been theft then we need to send a message to the number which is fixed in the GSM module that message has code called #a1 then it will send us the GPS location of the vehicle through the GSM, so we can go to that location. If we want to stop the vehicle then we need to send a message with the code #a0 then vehicle gets stop or the vehicle engine will stop.

4.3. Hardware Components

1.GPS Technology: The GPS technology here used for tracking the location of the vehicle and also whenever the engine of the vehicle starts from that onwards the location data where the car or a vehicle has been started and where it is travelling all the location information will be tracked by the GPS.

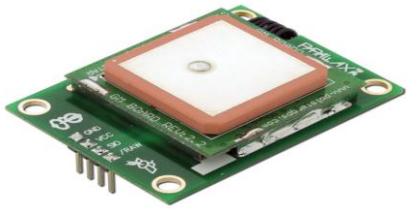

Figure 4: GPS Receiver

2. GSM Technology: Whenever the accident or crime happen we can get the vehicle location by using the user name and password of the IP address, where the IP address present in the Modem and also by using the GSM Technology we can send the message as #ai and #a0 to get the vehicle location and to stop the vehicle.

Figure 5: GSM Modem

3. SD Card: In this SD Card the data of the vehicle location will be stored through the GPS Technology.

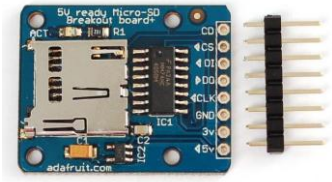

Figure 6: Micro SD Card breakout Board

4. DC Motor: Here the DC Motor we are using to know the speed of the vehicle

Figure7: DC Motor

5. Node MCU: In node MCU we are having a chip ESPA8266 which is used to access the data easily and also by the WIFI module of GPS

Figure8: Node MCU

6. Display: LCD is used here to see the out retort which is stored in the Web Server of Node MCU and the message of vehicle location can also see in the LCD screen by the black box.

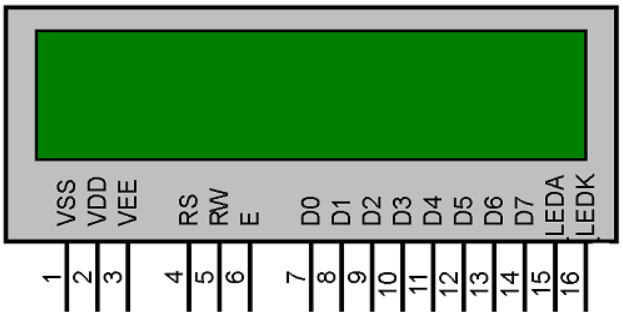

Figure 9: LCD

5. Results

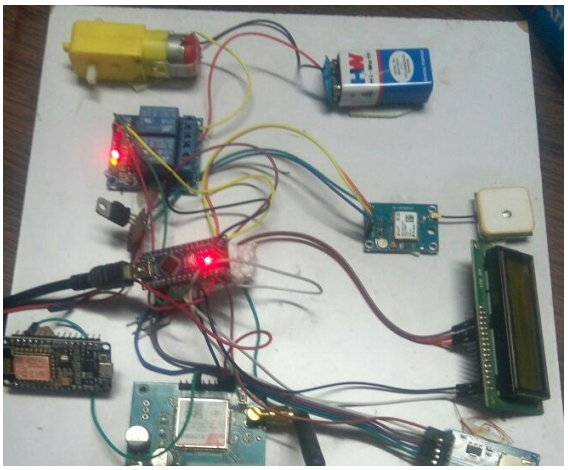

Figure 10: Result after the message has been sent

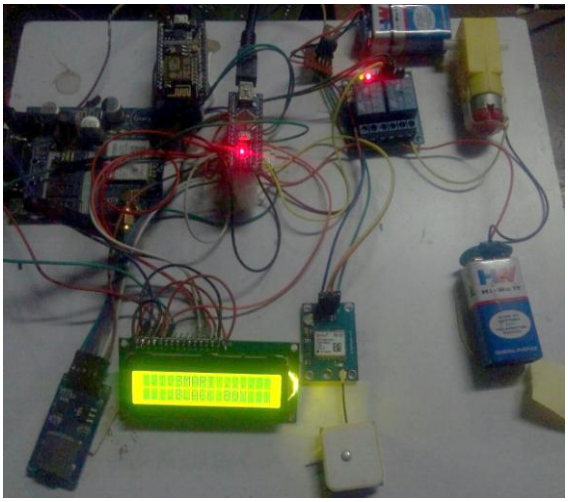

Figure11: Result after the message has been sent with display

6 . Conclusion and Future Work

In this project switch is placed near the engine so whenever the engine got hit then the vehicle location will be send as a message (SMS) to the phone number which is already set in it and even in the case of robbery the above mentioned conditions has been achieved. This project can be extended as; if any object hits the car from any side then we can use some more switches and sensor. Also this can be improved by the use of camera application to get the real time vision of the vehicle on the mobile phone, which would be more convenient for the user to track the target.

References

[1] Chanjin Kang and Seo Weon Heo, "Intelligent Safety Information Gathering System Using a Smart Black box". IEEE International Conference on Consumer Electronics (ICCE) 978-1-5090-5544-9/17/$31.00 ©2017.

[2] Chuhwa Hong, Truong Le, Kangsuk Chae and Souhwan Jung, "Evidence Collection From Car Black Boxes Using Smartphones".ISSN:2331-9852,2331-9860,9-12.Jan. 2011.

[3] M.F. Saaid, M.A. Kamaludin, M.S.A. Megat Ali, "Vehicle Location Finder Using Global Position System and Global System for Mobile", 2014 IEEE 5th Control and System Graduate Research Colloquium, Aug. 11 - 12, 978-1-4799-5692-0/14/$31.00 ©2014.

[4] Hsiao, W.C.M., and S.K.J. Chang, "The Optimal Location Update Strategy of Cellular Network Based Traffic Information System", Intelligent Transportation Systems Conference,ISSN:2153-009,2153-0017, 17-20.sep.2006.

[5] Mohammad A. Al-Khedher, "Hybrid GPS-GSM Localization of Automobile Tracking System", International Journal of Computer Science & Information Technology (IJCSIT) Vol 3, No 6, Dec 2011.

[6] Fleischer, P.B.; Nelson, A.Y.; Sowah, R.A.; Bremang, A., "Design and development of GPS/GSM based vehicle tracking and alert system for commercial inter-city buses," Adaptive Science & Technology (ICAST), International Conference on , vol., no., pp.1,6, 25-27 Oct. 2012.

[7] Pankaj Verma, J.S Bhatia "Design and development of gps-GSM based tracking system with google map based monitoring". International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.3, No.3, June 2013.

[8] Kunal Maury, Mandeep Singh, Neelu Jain"Real Time Vehicle Tracking System using GSM and GPS Technology- An Anti-theft Tracking System". https://www.researchgate.net/publication/266412980. June 2012. vol: 3.

[9] Le-Tien, T.; Vu Phung_The, "Routing and Tracking for Mobile vehicles in Large Area," Electronic Design,Test and Application, 2010.Fifth IEEE International Symposium on , vol.,no., pp.297,300, 13-15 Jan. 2010.

[10] Hyun Chul Roh, Yungeum Choe, Jinyong Jung,Hyunjun Na, Younggun Cho and Myungjin Chung, "Position Estimation of Landmark Using 3D Point Cloud and Trilateration Method".ISBN: 978-1-4799-5333-2 (URAI) ,12-15.Nov.2014.

[11] J.L.Blanco, F.A.Moreno, and J.Gonzalez, "A Collection of Outdoor Robatic Datasets With Centimeter Acurrancy Ground Truth,"Automomous Robotics, vol.27,no. 4,pp.327-351,nov.2009.