

Development of a electronic prototype for the car accident alert system for the drivers

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Abstract

In this paper, the design & development of a car accident alert system for the driver is presented. One of the basic reasons for road accidents is speed. Road accidents are rising suddenly today and are one of the key causes of human deaths. Human life is more important than anything else, and timely assistance is more important than lending a helping hand. If emergency service could get accident reports and reach it in time, more lives could have been saved. In saving human lives, the time between the accident and when the ambulance reaches the site of the accident plays an important role. If we reduce the time between when an accident happens and when a medical ambulance is dispatched to the area, we can save human lives by reducing mortality rates. GPS has become an integral part of a vehicle system nowadays. The accelerometer senses a sudden shift in the vehicle's axles. It will be tested by Arduino UNO. The Arduino sends the warning message via the GSM module to the police control room or a rescue team, including the location. So, after receiving the information, the police can automatically track the location via the GPS module. The work presented here is the mini-project work of the second semester engineering students of electronics & communication engineering department of Dayananda Sagar College of Engg., Bangalore, Karnataka.

Keywords – Arduino, GPS, Human, Accident, Life

1. Introduction to the work

In this section, we present the basic introductory concepts to the work. As the world population increases, time is needed for a large [8] number of vehicles. With the rise in transportation rates, road accidents claim an incredibly high number of lives every year. Approximately 3,000 people die in road accidents every year, according to a WHO (World Health Organization) survey, while millions are injured or disabled every year. Road accidents are rising suddenly today and are one of the key causes of human deaths [1]. If emergency service could get accident reports and reach them in time, more lives could have been saved. GPS has become an integral part of a vehicle system nowadays [9]. The accelerometer senses a sudden shift in the vehicle's axles. It will be tested by Arduino. The Arduino sends the warning message via the GSM module to the police control room or a rescue team or your emergency contact, including the location. So, after receiving the information, the police can automatically track the location via the GPS module. Then, the appropriate action will be taken after verifying the venue [2].

2. Problem statement

The primary goal of the accident warning system is to rescue people from crashes. This device helps the owner to observe and find out vehicle activity and its past vehicle movements, the latest such as GPS are highly useful nowadays. The main aim of the project Accident Detection and Messaging

System is to inform the Ambulance and Police of the accident site and arrange for necessary steps to control the situation [3]. Many of them are losing their lives because of this [7]. This device solves the above problem by submitting data directly after an accident to the emergency team [4] [5].

3. Objective

Our objective is to create a prototype which can be implemented in real life which can - To instantly rescue accident victims by sending a message to the rescue team with a MEMS accelerometer [6].

4. Proposed Methodologies Adopted - Hardware & Software tools used in the mini-project

- Arduino Uno
- GSM Module (SIM900A)
- GPS Module (SIM28ML)
- Accelerometer (ADXL335)
- 16x2 LCD
- Power Supply
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5. Methodology

In this project, Arduino is used for controlling whole the process with a GPS Receiver and GSM module. GPS Receiver is used for detecting coordinates of the vehicle, GSM module is used for sending the alert SMS with the coordinates and the link to Google Map. Accelerometer namely ADXL335 is used for detecting accident or sudden change in any axis [10].

6. GPS Module

GPS stands for Global Positioning System and used to detect the Latitude and Longitude of any location on the Earth, with exact UTC time (Universal Time Coordinated). GPS module is used to track the location of accident in our project. This device receives the coordinates from the satellite for each and every second, with time and date [12]

7. GSM Module

The SIM900 is a complete Quad-band GSM/GPRS Module which can be embedded easily used by customer or hobbyist. SIM900 GSM Module provides an industry-standard interface. SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data with low power consumption. It is easily available in the market [13].

8. Software design

The software tool used for the mini-project work is Arduino IDE. The software is installed on the laptop and the settings are changed as per our need. Compilers and other drivers are downloaded from internet. The code required for the functioning of the display is typed on the software using C++ and compiled and uploaded to the Arduino UNO [15].

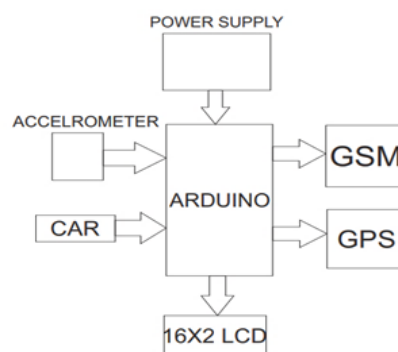


Fig. 1 : Block diagram of the car accident alert system

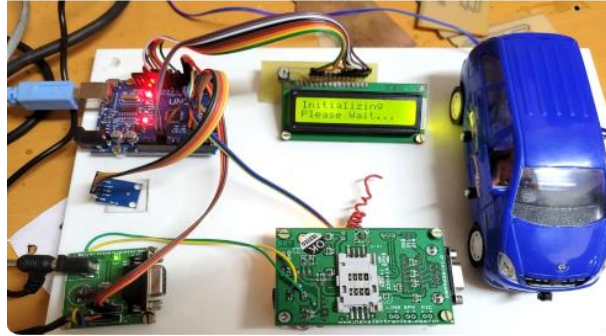


Fig. 2 : Experimental set-up of the car accident alert system

10. Results and discussions

The results and discussions are presented in this paper. Fig. 1 gives the overall block diagram of the car accident alert system. Next, the Fig. 2 gives the overall flow-chart or the data flow diagram of the car accident alert system, pre-finally, the Fig. 3 gives the circuit diagram connection of the car accident alert system, to close the Fig. 4 gives the experimental set-up of the car accident alert system. Finally, the results or the outcome of the mini-project work could be summarized as follows [16]:

- This device offers the most realistic alternative to the inadequate emergency services given to victims of road accidents.
- This prototype can be implemented at a very affordable cost.
- With the aid of this technology, when an accident happens, prompt action can be taken by alerting the appropriate individuals by sending a message.
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11. Conclusions

In this paper, the design & development of a car accident alert system for the driver is presented. The experimental results show the efficacy of the methodology that is being developed by us.

References

- [1]. Lakshmi Bhai, Manjunatha GS, Arathi Pandey, “Car Accident System using GSM”, https://docs.google.com/document/d/1uY-7P0n3c4jE1_40JuihdG8DQla-Ec-o/edit?mode=html
- [2]. D. Shanthi, M. Kiran Kumar, Dr. P Lalitha Surya Kumari, “Alert System”, https://www.researchgate.net/publication/329512652_AUTOMATIC_VEHICLE_ACCIDENT_ALERT_SYSTEM
- [3]. Shaik Abdul, P Subhankar Hegde, “GSM and GPS Accident Alert System”, GSM and GPS based Vehicle Accident Alert System.pdf
- [4]. Shaomei Wang, Munshi Nurul Islam, “Messaging System using GSM and GPS modules”, https://www.scitechnol.com/peer-review/automatic-vehicle-accident-detection-and-messaging-system-using-gsm-and-gps-modem-wESQ.php?article_id=11452
- [5]. <https://circuitdigest.com/microcontroller-projects/arduino-based-accident-alert-system-using-gps-gsm-accelerometer>
- [6]. <https://create.arduino.cc/projecthub/embeddedlab786/vehicle-accident-alert-system-ed57f0>
- [7]. <https://www.youtube.com/watch?v=vvnSQYEjT8c>
- [8]. <https://www.youtube.com/watch?v=KulmhSVzBug>
- [9]. Fogue, Manuel & Garrido, Piedad & Martinez, Francisco & Cano, Juan-Carlos & Calafate, Carlos & Manzoni, Pietro & López, Miguel. (2011). Prototyping an automatic notification scheme for traffic accidents in vehicular networks. 1. 1-5. 10.1109/WD.2011.6098139.
- [10]. K. B. Hornfeck, “A Customizable Socially Interactive Robot with Wireless Health Monitoring Capability,” Master’s thesis, Case Western Reserve University, Cleveland, OH, USA, 2011.
- [11]. Applus+ IDIADA: Instituto de Investigación Avanzada del Automóvil, “Information and resources,” 2011, available at <http://www.idiada.es>.



- [12]. F. Martinez, C.-K. Toh, J.-C. Cano, C. Calafate, and P. Manzoni, “Emergency services in future intelligent transportation systems based on vehicular communication networks,” *Intelligent Transportation Systems Magazine, IEEE*, vol. 2, no. 2, pp. 6 –20, summer 2010.
- [13]. “Google Maps API Family,” 2011, available at <http://code.google.com/apis/maps>.
- [14]. Pavithra G., Dr. T.C.Manjunath, “Optical Character Recognition using Image Processing”, *Int. Journal of Research Engg. & Tech. (IJERT)*, Journal Paper No. IJERTCONV6IS13003, Impact Factor 7.86 (2018-19), ISSN: 2278-0181, Volume 6, Issue 13, pp. 1-4, Special Issue Apr. 2018.
- [15]. Dr. T.C. Manjunath, Rajashekher Koyyeda, Pavithra G., “Object identification using pattern recognition”, *IOSR Journal of Engineering (IOSR JEN)*, Publisher : International organization of Scientific Research (IOSR), UGC Approved Journal, IF-1.645, ISSN (e): 2250-3021, ISSN (p): 2278-8719, pp. 1-4, 2019.
- [16]. Dr. T.C. Manjunath, Arunkumar K.M., Pavithra G., “Smart Traffic Management System Conceptual View in a Smart City Using Computer Vision Concepts”, *IOSR Journal of Engineering (IOSR JEN)*, Publisher : International organization of Scientific Research (IOSR), UGC Approved Journal, ISSN (e): 2250-3021, ISSN (p): 2278-8719, IF-1.645, pp. 5-9, 2019.