

Accident Finding System with Crash Detection and GPS Notification Using Embedded System

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Abstract - The fastest growth of technology has made our lifestyle Comfort. The technology also increased the traffic risks and the road accidents take place frequently which causes huge loss of life because inadequate of emergency facility our project will help this displacement. The project concludes when a vehicle meets with an accident, the Micro Electro Mechanical System (MEMS) sensor will analyze the signal and this signal to Arduino. The notification is sent through GSM module the location of the accident is gathered with the help of GPS module, to notify police control room or a rescue team. So, the police or rescue team can immediately trace the location through the GPS Module, after receiving the information. Then after confirming the location necessary action will be taken Road accidents are a significant issue for everyone. Every day, a considerable number of valuable lives are lost as a result of car collisions. It is the most critical field that requires significant exploration, given the high rates of fatalities related to road crashes. Driver error and delays in emergency department response time are the two most common causes. To rescue wounded people, an efficient road accident identification and information sharing system is needed. A device that communicates information about the crash site to local emergency responders to respond quickly is critical. Numerous scholars have suggested a variety of automatic accident warning systems in the research literature. Among them are smartphone-based accident detection, Global System for Mobile Communications (GSM) and Global Positioning System (GPS) technology, vehicular ad hoc networks, various machine learning algorithms, and mobile apps. Every vehicle should have an automatic road accident detection and information communication system installed. We offer a critical review of numerous emerging methodologies for forecasting and avoiding road crashes in this article, emphasizing their benefits, shortcomings, and problems that must be resolved in order to ensure traffic safety and save lives.

Keywords: Accident Detect System, Accident Avoidance, Real-Time Accident Monitoring, Crash Detection.

I. INTRODUCTION

The high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. An automatic alarm device for vehicle accidents is introduced in this paper. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid center within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team.

When the accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of both Sound detection sensor and vibration sensor. This application provides the optimum solution to poor emergency facilities provided to the road's accidents in the most feasible way. The usage of auto mobiles has improved linearly over the past decade, which increased in the risk of human life. This is because due to the insufficient emergency facilities. Accident detection and vehicle messaging system using GSM modem which helps to detect accident by vibration sensor. Vibration sensor (Piezo elements) comes in handy when you need to detect vibration or a knock. Can use these for tap or knock sensors pretty easily by reading the voltage on the output. Vibration sensor helps to send the signal to Arduino controller.

1.1 Embedded System

An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. By contrast a general-purpose computer, such as a personal computer (PC) is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today. Embedded system contains processing cores that are either microcontrollers, or digital signal processors (DSP).

A processor is an important unit in the embedded system hardware. It is the heart of the embedded system. The key characteristics, however, is being dedicated to handle a particular task. They are also used in automobiles, washing machines, microwave ovens, toys...etc., where automation is needed. The key features of microcontrollers include field programmability, flexibility.

II. LITERATURE SURVEY

[1] Mr. S. Kailasam, Mr. Karthiga, Dr. Kartheeban, R.M. Priyadarshani, K Anithadevi states that due to lack of attention, Drowsiness, and drunk driving are the major causes of road accidents, this paper proposes preparing a system to prevent these circumstances. The proposed system herein aims at preventing and controlling accidents by using a Night Vision Camera. This system monitors the driver's face when the car starts which mainly helps in observing continuously. It uses two functions: One to detect the eye blinking, second is for reading the blinking. Automatic driving and braking systems are WCNC-2021: Workshop on Computer Networks & Communications, May 01, 2021, Chennai, India. Subject's visual location can verify fall and indicate an emergency event also combined with a controlling system using python programming. Speed is automatically reduced until the driver becomes alert and returns to consciousness.

[2] The proposed system alerts the driver depending on his state, and makes sure that he is not drowsy. However, if the driver has a medical condition or blinks at an abnormal rate despite not being drowsy, the system will give a false alarm. In the worst-case scenario, the driver happens to be in an accident, the system fails to detect the impact and contact the concerned authorities. Lastly the system would constantly consume power and drain the power supply since it monitors the driver continuously. Hence the outcome of not being able to identifying the actual accident scenario made us reject the idea of adding face recognition to our system as it would be costly, power-consuming and inefficient.

III. EXISTING SYSTEM

This idea proposal has been introduced at the start of the modern age of mobile phones. With the introduction of GPS sensors in the mobile, security applications based on GPS were proposed. Then they proposed special hardware devices which can be linked with mobile phones. Though, it had the disadvantage of actually buying extra hardware with more money. With the massive development of mobile phones in the last decade and new sensors added with the development, the extra hardware can be avoided. The present application of this paper is present in a very few countries and providing the information with the relatives and friends with the emergency services the efficiency of the application can be increased massively.

Drawbacks of the Existing System:

The live system can't work if any of the following occur at the time of the crash,

- Automatic or phone is disconnected or damaged.
- No GPS signal at the time of the crash.
- Insufficient cellular signal to upload crash details.

IV. PROPOSED SYSTEM

With the increase e of population, the number of the vehicle le also increases that leads road accident. In the entire world, the number of accidents increases daily, and around 80% of accidents contribute to losing lives. These accidents are the deficiency of substructure, deficiency of traffic control, and the absence of scientific accident management. The most significant crucial cause behind the harm of survives in an accident is the absence of instant service (first aid). In most cases, people lose their lives in a few seconds. In this existing high-tech biosphere, which is growing daily with some new technologies; such problems can be eradicated with these techniques.

V. BLOCK DIAGRAM

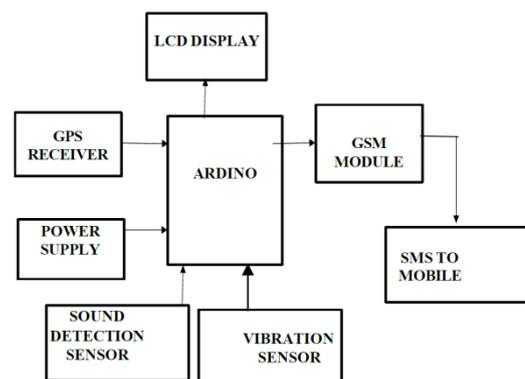


Figure 5.1: Block diagram representation

5.1 Hardware Requirements

1. Arduino
2. Power supply
3. Sound detection sensor
4. Vibration Sensor
5. GPS Receiver
6. GSM Module
7. LCD Display

5.1.1 Arduino

- The Arduino Uno is a microcontroller board based on the ATmega328.
- It has 14 digital input/output pins (of which six can be used as PWM outputs), six analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.
- The Arduino Uno is a microcontroller board it is used to receiving signal from the sensor that signal send to GPS and GSM Module.

5.1.2 Power Supply

- The ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output.
- The power supply gives power to the entire process.

5.1.3 Sound Detection Sensor

- The sound detection sensor used to sense the sound of the passenger if it is ok the said I'm Ok sentence the sound automatically stopped the signal If they are not conscious send the information to the nearby police station and relatives.□

5.1.4 GPS Receiver

- The GPS system operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information.
- In the GPS are crash detection signal getting from the Arduino, that automatically find the exact location of the vehicle.

5.1.5 Vibration Sensor

- A vibration sensor and a LM393.
- Vibration detecting.

- Object Movement detecting.
- It uses Motorcycle alarm.

5.1.6 GSM Module

- A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem.
- In the GSM module collect the data from GPS Receiver and send the information to nearby Police station and SMS send relatives of the passenger.

5.1.7 LCD Display

- Type: Liquid Crystal Display (LCD).
- Interface: Can use parallel or serial communication.
- In the LCD display is used to crash detection 10 sec showing the display if passenger conscious they are disconnect the signal if not conscious the signal automatically sent.

5.2 Software Requirement

1. Embedded C

VI. CONCLUSION

The proposed programmed accident detection system can be a rescuer of life for the people who met with accidents. The proposed system is exceptionally easy to understand and even a non-specialized Person can use it without any problem. The system consists of equipment and programming segments. The equipment unit includes accident detection sensors that are constrained by an Arduino board and is fitted in the vehicle. Then again, the programming part is an Android application introduced in drivers Smartphones which is used to get the point-by-point map. In general, the benefits of this system are low cost, secure and simple to use. The system introduced in this work reduces the casualties due to accidents.

VII. FUTURE ENHANCEMENT

The future development of the Accident finding and Crash Detection System holds immense potential for revolutionizing road safety through advancements in sensor technologies, artificial intelligence (AI) algorithms, and seamless integration with existing infrastructure. Future iterations of the system will focus on enhancing sensor capabilities by integrating advanced sensors for detecting a broader range of intoxicants and more accurate environmental sensors for assessing road conditions.

Additionally, AI-driven analytics will enable the system to analyze sensor data intelligently, predicting accident risks and taking proactive measures to prevent accidents before they

occur. Biometric monitoring sensors will be incorporated to assess the rider's physical condition and alertness levels, while vehicle-to-infrastructure (V2I) integration will enable seamless communication between the passenger, vehicles, and roadside infrastructure for coordinated safety measures. Overall, the future development of the Accident finding and Crash Detection System promises to redefine road safety by providing riders with an intelligent and proactive safety companion, ultimately making roads safer for all use.

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