

Accident Detection System

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Abstract - This project aims to propose a solution to the issue of road accidents in India caused by over-speeding, drowsy driving, and drunken driving. The proposed system incorporates various sensors, such as GPS, vibration sensor, and drowsiness detector, to identify the occurrence of an accident, detect the driver's level of drowsiness, and track the location of the vehicle. The system utilizes GPS to automatically identify the precise location of the accident, and then sends the relevant data to nearby ambulance vehicles, police stations, and family members of the person involved via GSM. A vibration sensor is used to detect the occurrence of an accident, while a drowsiness detector measures the percentage of eyelid closure over time to detect the driver's level of drowsiness. To alert the driver of their drowsy state, a buzzer sound is used. Furthermore, the GPS location can be monitored through mobile SMS to detect theft. The data collected can be processed in a microcontroller, making it a cost-effective and efficient solution with low power consumption, improved accuracy, and a reduced probability of human error. Overall, this system offers an affordable and efficient approach to life-saving measures and precautionary measures to reduce accidents, ensuring prompt victim rescue and minimized human error.

Key Words: GPS, GSM, Microcontroller, Vibration sensor, Drowsiness sensor, SMS, Buzzer.

1. INTRODUCTION

India has one of the highest rates of road accidents in the world, with an average of over 400 deaths per day due to road accidents. According to the Ministry of Road Transport and Highways, there were over 4.5 lakh road accidents in India in 2019, resulting in over 1.5 lakh deaths and several lakhs of injuries. The major causes of accidents in India include reckless driving, over-speeding, drunk driving, distracted driving. Two-wheeler riders and pedestrians are the most vulnerable road users, accounting for a significant proportion of road accident fatalities. Automatic

accident detection and alert systems are introduced. An accident detection system is a technology that uses various sensors and algorithms to detect accidents, such as collisions, falls, and other hazardous situations. The purpose of an accident detection system is to alert emergency responders about the incident so that they can quickly respond to the situation. The proposed automatic accident detection and alert system can help reduce the response time of emergency services. By notifying medical centers and police stations in real-time, the proposed system can potentially save lives and reduce the severity of injuries. GSM and GPS technologies are used to ensure the quick and accurate transmission of accident location information. The vibration sensor is an essential component of the system, as it can detect accidents even in noisy environments. Additionally, a drowsiness sensor is used to detect the drowsiness of a person based on eyelid movements. The use of arduino as the central processing unit of the system ensures that the system is cost-effective and easy to maintain. The proposed system has the potential to reduce the burden on emergency services and improve the overall efficiency of accident management.

1.1 Existing System

There are several ways to detect accidents. But obtaining immediate attention and helping the affected person is not possible. In the existing system, each of the functions is offered separately like detection of the accident, the detection of drowsiness, etc. These systems mainly focus on the safety of the passenger but not offering help after an accident has occurred. There is no indication of any of the emergency services or their family member regarding the accident that occurred.

The main disadvantages of the existing system are:

1. In case of any accident, immediate attention and help are not given to the victim.
2. As each system offers each functionality, the cost of implementing these systems is high.
3. Systems have to be maintained frequently for accurate and reliable results.

1.2 Proposed System

The need of introducing this system is to reduce the time required by emergency services to reach the spot which in turn can reduce the death rate. The main purpose of this proposal is to reduce the death rates that are being occurred due to ignorance. GPS and GSM are used to find the accidents correct place and intimate the same to the nearby police station, hospital and family member of the victim. The same GPS locations are used in case of theft detection method. This methods are used to overcome the disadvantages of the existing system. In order to prevent the accidents taking place we have use a drowsiness sensor to detect the drowsiness of the passenger whose riding the vehicle. If this sensor detects that the driver is drowsy, it alerts the driver by giving a beeping alarm sound. By this alarm sound the driver becomes conscious and avoids the accident. The accident can be detected by using the vibration sensor, which measures the frequency of vibration occurred in the accident.

The main advantage of the proposed system are:

1. It is completely automated.
2. It saves the victims life as soon as possible.
3. It produces accurate results.
4. Reduces the chance of human errors

HARDWARE REQUIREMENTS

1. Arduino Mega
2. GPS Module
3. GSM module
4. Vibration Sensor
5. Drowsiness Sensor
6. Buzzer
7. Spectacles

SOFTWARE REQUIREMENTS

1. Operating System: Windows/Linux
2. Language: C
3. IDE/tool: Arduino IDE, Proteus

2. Methodology and Algorithm

Methodology

This system is designed to prevent and detect vehicle accidents and thefts. It is installed in the vehicle and uses sensors and communication technologies such as a vibration sensor, eye blink sensor, GPS module, GSM module, and buzzer, all controlled by a central microcontroller (Arduino Mega) unit. The vibration sensor detects accidents and sends a signal to the microcontroller, which sends an SMS to emergency services and family members with the accident location. The eye blink sensor detects driver fatigue and warns the driver with the buzzer. If theft is detected, the system sends an alert to the owner's mobile device via the GSM module. Overall, the system aims to save lives by quickly alerting emergency responders in the event of an accident and providing added security to the vehicle by detecting theft.

Algorithm

1. Start
2. Power the system with the right power supply
3. Use eye blink sensors to detect if the driver is drowsy
4. If the driver is asleep, sound an alarm and beep
5. Use vibration sensors to detect any accidents
6. Send signal to microcontroller for further functioning
7. Use GPS module to find the location.
8. Use GSM module to send messages with latitude, longitude and link of Google map to emergency numbers of ambulance, police and family member
9. Continuously check all the sensors with the help of microcontroller (Arduino Mega)
10. End

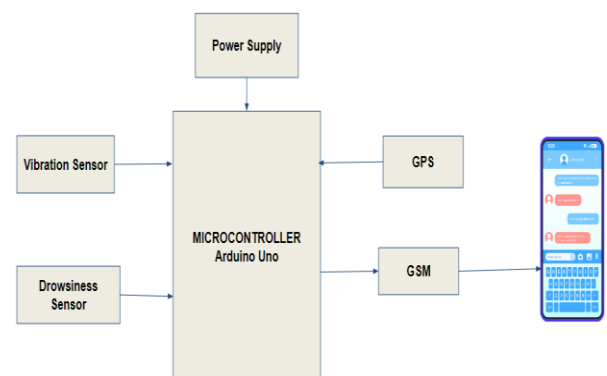


Fig -1: Block Diagram

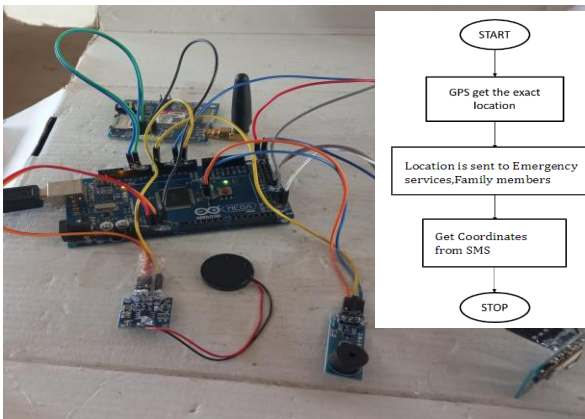


Fig -2: Implementation

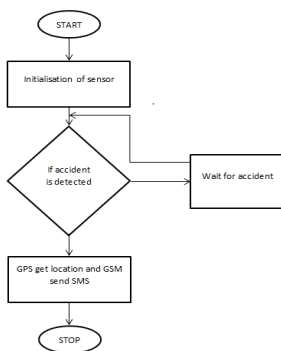


Fig-3: Flow chart

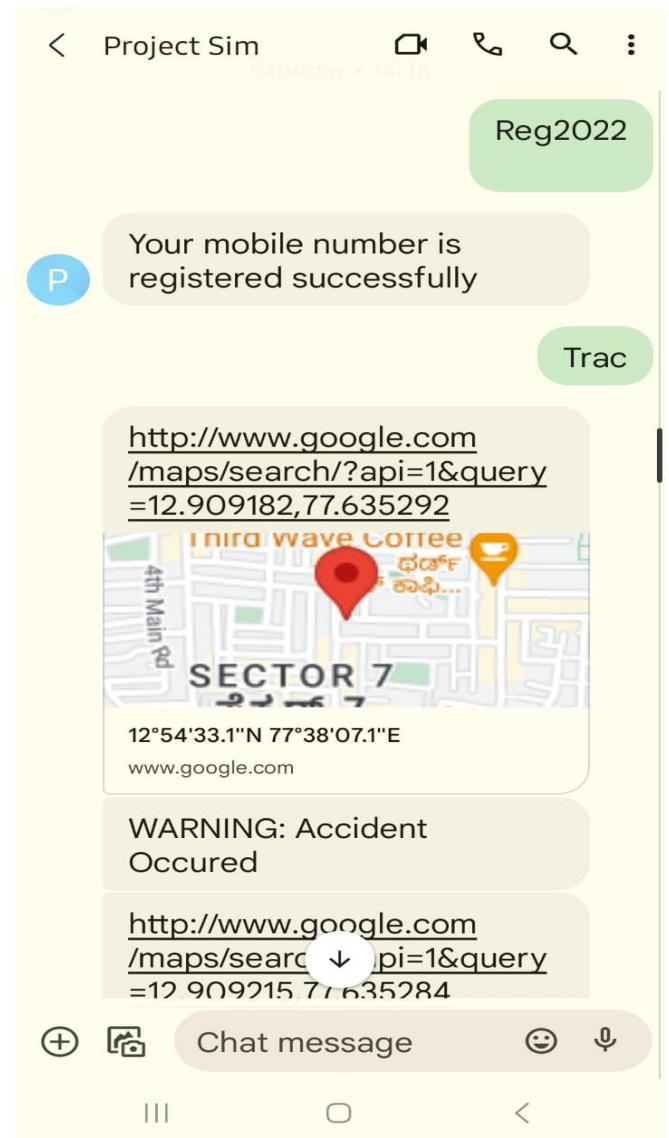


Fig-4: Sample SMS

3. CONCLUSIONS

To overcome the problem faced by the existing system, we have designed the device on Embedded system. So, the outcome of our system are as follows

Immediate safety attention is given to the victim at the time of crash.

Intimating the nearby emergency services and to the family member at the time of crash. Alerting the Driver based on their drowsiness through alarm sound. In addition to the above outcomes, our system also includes theft detection capabilities the system sends an alert to the owner's mobile device this helps in preventing the theft from happening or informing the authorities to take appropriate action.

4. REFERENCES

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