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Accident Detection and Alert System

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Abstract: *One of the primary causes of car accidents is speed. Many lives could have been saved if emergency personnel had received accident information in time and arrived. This project is about an accident detection system that uses several components and alerts the Rescue team for assistance when an accident occurs. An efficient automatic accident detection system with automatic reporting of the accident location to emergency services is critical for saving valuable human life. The suggested system is concerned with accident detection and alerting. It determines the precise latitude and longitude of the vehicle involved in the collision and transmits this information to the nearest emergency response provider. The project's purpose is to detect accidents and warn the rescue crew in real time.*

Keywords: Aurdino UNO, GSM, GPS

I. INTRODUCTION

The invention of a transport system has provided the generating power for humans to have the highest civilization above all other creatures on the planet. The automobile is quite important in our daily lives. We use it to get to work, communicate with friends and family, and distribute our goods. However, it can also cause disaster and even death through accidents. One of the most essential and fundamental risk factors in driving is speed. It not only influences the severity of a crash, but it also raises the likelihood of being involved in one.

Despite numerous efforts made by various governmental and non-governmental organisations all over the world through various programmes to raise awareness about irresponsible driving, accidents continue to occurare occurring on a regular basis. Many lives, however, could have been saved if the emergency services had received the crash information in time. According to Virtanen et al., 4.6% of fatalities in accidents may have been avoided if emergency services had been available at the scene of the accident at the appropriate time. As a result, efficient automatic accident detection with automatic transmission of the accident location to emergency services is a critical requirement for saving precious human life.

1.1 Arduino uno

The Arduino UNO is a popular open-source microcontroller board designed by Arduino.cc that is based on the ATmega328P microcontroller. When an accident occurs, the Arduino is the primary control unit that detects or alerts the user. It takes data from vibration sensors, GPRS, and GSM modules and displays the results in the display system or via a message. The vibration sensor is crucial in this case. This vibration sensor will detect vehicle vibrations and operate as an accident detection module. Arduino collects data from the other modules and sends it to the receiver via the GSM module.

Fig. Arduino UNO

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II. METHODOLOGY

Fig. Block Diagram

- Monitoring the vehicle's speed and identifying any unexpected drops in the vehicle's speed.
- The Arduino UNO serves as the controlling unit, reading values from the accelerometer. The accelerometer detects any axis shift.
- If Arduino notices a significant change in the vehicle's speed. It reads the current location from the GPS module and sends it through SMS to the mobile number using the GSM module.
- Before sending the SMS, Arduino triggers the buzzer, which goes off after thirty seconds of beeping and the SMS is sent.
- However, if the passenger is not in danger, he can push the "IAM OKAY" button. This is done to avoid circumstances where it could lead to erroneous results.

2.1 Proposed Work

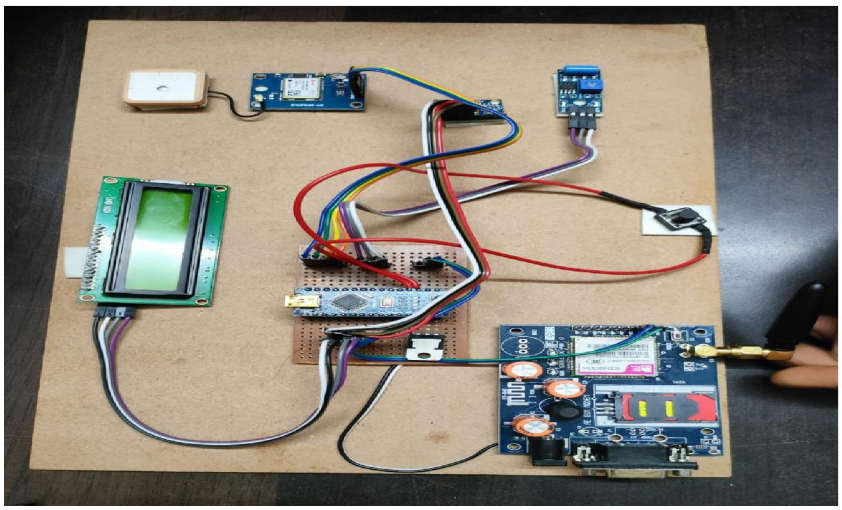

Fig. Schematic Diagram

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The Arduino Nano serves as the controlling unit, interacting between modules to improve information transformation over time. The collision direction can be determined using an accelerometer based on tri-lateral axis motions. After a certain threshold of roll and pitch values, a gyroscope can be utilised to detect rollover crashes. The weight and centre of gravity of the vehicle also play crucial roles in rollover. The device additionally confirms the impact via vibration sensors that detect it after a threshold voltage increase. The passenger is then given a buzzer to prevent the false detection of an accident. Within a short period of time after the buzzer signal, the GPS module obtains coordinates from the Google Module.

These coordinates alert local hospitals to an emergency rescue call for a passenger. The hospital validates the accident and approves it.accident in the stated place, and confirms the accident. The GSM module informs the saved intimate members of the family about the accident.

III. RESULT

The implementation of an accident detection and alarm system project can have a number of good effects, including:

1. Improved Road Safety: The system's primary purpose is to improve road safety. It can help reduce reaction time by identifying incidents quickly and transmitting alarms, resulting in speedier medical aid and less danger of further damage or injuries.
2. Rapid Emergency Response: The system's alerts can be directly connected to emergency response services, allowing them to dispatch assistance as soon as possible. This quick response has the ability to save lives and lessen the severity of injuries.
3. Reduced Fatality Rates: By shortening response times and facilitating quick medical assistance, the system can help to reduce accident fatality rates. In critical situations, timely interventions can be vital.

IV. CONCLUSION

A mechanism for detecting an accident event has been developed. The suggested system is concerned with accident detection and alerting. It determines the precise latitude and longitude of the vehicle involved in the collision and transmits this information to the nearest emergency response provider. Arduino aids in the transmission of messages to various components in the system. The accelerometer measures the direction of the accident, while the gyroscope determines vehicle rollover. The data is sent to the registered phone number via the GSM module. The location can be supplied through a tracking system using GPS to cover the geographical coordinates of the area.

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