VEHICLE SAFETY DETECTION USING IOT

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Abstract: As the usage of vehicles is increasing drastically, the hazards due to vehicles is also increased. The main cause for accidents happing while driving a bike or car driver tries to speak diverting minds, over stress and due to electronic gadgets. This paper deals with accident prevention system that occurs due to carelessness of the person who is driving the vehicle. This introduces accident alerting system which alerts the person who is driving the vehicle. Mobile phone use while driving is common but it is widely considered dangerous due to its potential for causing distracted driving and crashes. The objective of this paper is to detect the accident of an automobile. Where the module is integrated inside the automobile to detect the accident and reduce the major injuries and loose of life. The accelerometer sensor detects the accident. If an automobile is met with an accident, then, sensor will be activated and the location of the accident will be sent to emergency stations.

Keywords —IoT Vehicle Safety, Security, Sensor Networks, Real-time Monitoring, Emergency Response**.**

I.INTRODUCTION

In today's world as the population increases, day by day the number of vehicles also increases on the roads and highways. This result in more accident that interns lead to traffic jams and the public get help instantaneously. This module provides information about the accident to the hospital and police station. As a result, sudden help public life may save and the traffic jams are reduced. To improve the level of supervision and management for cargo transport vehicles, especially trucks carrying coal it is important to develop transport vehicles remote monitoring module. A server computer at the (remote) monitoring station that is continuously waiting for data from the system should record the actions of the vehicle into a database. This contains information regarding Vehicle velocity, position, identity, and temperature in two fashions. Accident rates are on a rise across the world and commuters on vehicles often have it worse for them as compared to others. Vehicle accidents lead to the majority of deaths in India and often times there is a delay in the victim getting medical attention which puts his life in danger. In order to prevent this from happening the smart intelligent accident system is designed which automatically intimates the hospitals nearby saving time and reducing the probability of death. Also, in this age of "smart devices", the vehicle commuters seem to have been forgotten. There is little to no progress observed in data delivery to the riders which includes location information, entertainment availability and inefficient communication. One more facility is provided for critical time in case of heat attacks or other health problems if the person requires help, he can press the single switch provided in the system through Bluetooth module the location of vehicle accident message is transmitted through the modem. In the modern world, as the population grows, so do the number of vehicles on the streets and highways. More accidents followed, causing traffic bottlenecks and prompt assistance for the public. The hospital and police station are informed about the accident using this module. As a result, the public may receive immediate assistance, and the amount of traffic is decreased. The development of a transport vehicle remote monitoring module is crucial for raising the standard of management and supervision for cargo transport vehicles, particularly for trucks hauling coal. The activities of the vehicle should be recorded into a database by a server computer at the (remote) monitoring station that is continuously waiting for data from the system. Worldwide, accident rates are rising, and commuters who use vehicles frequently experience more accidents than other groups of people. The bulk of fatalities in India are caused by motor vehicle accidents, and frequently, the victim is not treated right away, endangering his life. Additionally, commuters who use cars to get to work seem to have been overlooked in this era of "smart devices." Data transmission to the riders, including location information, entertainment options, ineffective communication, has made little to no progress. Another convenience is offered for emergencies. If someone needs assistance due to a heat stroke or other health issue, they only need to press a single switch on the system, and the Bluetooth module will use the modem to send the location of the accident.

II. LITERATURE REVIEW

Yogita Jadhav et al. has proposed a survey–security layer for smartphone–to–vehicle communication over GSM. Developed a enhances security by implementing a novel authentication and encryption mechanism. It provides a robust solution to safeguard the communication between smartphones and vehicles, ensuring data integrity and confidentiality.[1]

Zhang Wen et al Design of Vehicle positioning System Based on ARM Zhang Wen has shown in their study about the position of the vehicle, the owner sends a request through an SMS. This is received by a GSM modem in the device and processed by the Spartan processor and the processor sends a command to a GPS module in the device. The GPS module responds with the coordinate position of the vehicle. This position is sent to the user as an SMS to the user with date, time, latitude, and longitude positions.[2]

Zhao, Y et has proposed Mobile phone location determination and its impact on intelligent transportation systems. Notification for portable devices presents an early crash notification system that can be implemented in handheld and aftermarket devices. This system features a crash detector, which can be connected over a wired or wireless link. Systems and services are increasingly developed to improve the quality of service, safety, and environmental impact of the road traffic system.[3]

Ravi Nandu and Kuldeep Singh proposed a smart accident detection idea focused upon prevention of casualties by ensuring the safety. The system built is such that in the case of the drunken, the ignition in the combustion chamber wouldn't occur. The system is directly connected to the two-wheeler ignition system by electronics. The system has the main components as stated – a proximity sensor, alcohol sensor, accelerometer and a keypad. At the receiver end, on the two-wheeler, a microcontroller controls the ignition. The ignition system is incorporated with a diode acting as cut off and on region connector. Upon the reception of the signal from the system, the microcontroller takes care of the ignition starting the vehicle. While the idea of this system is noble and very much the need of the hour, the implementation would be completely infeasible because of the ignition system having to be tampered with, in every single model of every single two-wheeler manufacturer for this idea to come to function.[4]

III. PROPOSED SYSTEM

The sensors are attached onto a vehicle's embedded system. Vibration sensors (accelerometer) are installed on the module in areas most probable to have an impact, to detect an accident. The readings from the sensor are fed into the Arduino board. When the accelerometer reading exceeds a threshold value, a timer is set off for 45/90 seconds to ensure that the impact is not a false alarm. Once the timer runs out, the Arduino send alerts to the mobile application with the details of the reading. The application now extracts the latitude and the longitude from the preloaded GPS values and sends this data to emergency vehicles/hospitals in the vicinity. Simple Embedded C is used to program the Arduino board.

BLOCK DIAGRAM
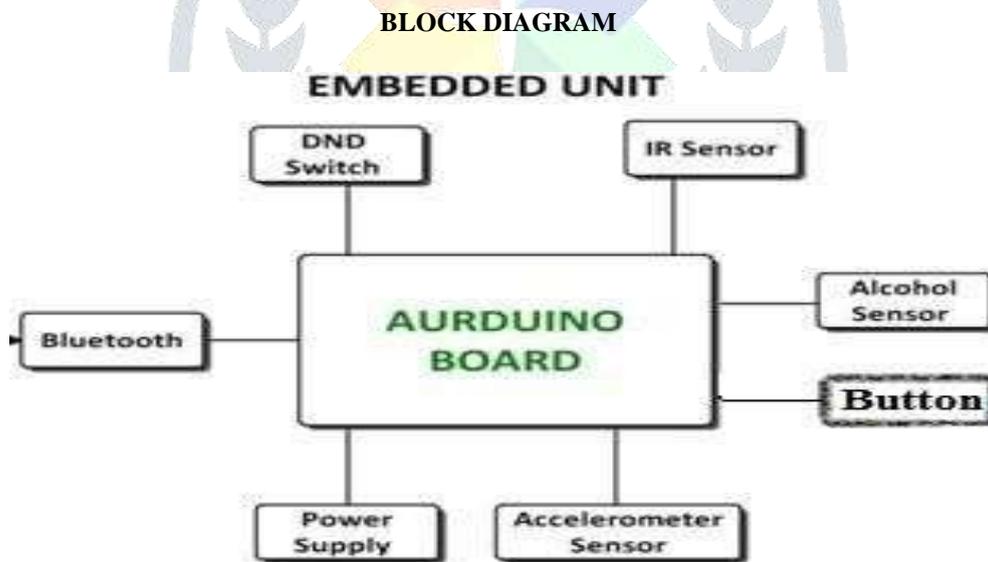
LED Display Module:

LED Display Module is an integral part of vehicle safety detection , providing real-time visual feedback. It serves as a crucial interface, conveying information such as warnings, alerts, and status updates to the driver. By leveraging IoT technology, it enhances safety by delivering timely and accurate information to the driver, improving situational awareness on the road.

Bluetooth connection showing terminal:

It is a key component of vehicle safety detection using IoT, providing a direct interface for real-time data exchange. It facilitates the transmission of critical information between the vehicle's sensors and the driver's smartphone. By utilizing IoT, it enhances safety by delivering instant alerts and warnings to the driver, improving overall situational awareness on the road.

Arduino UNO:

An Arduino Uno can be used in vehicle safety detection. Here's how it works:

- Arduino Uno collects data from sensors in the vehicle.
- Sensors monitor parameters like distance, speed, and environmental conditions.
- The Uno processes this data and communicates it to the IoT platform for real-time analysis, providing alerts to enhance driver safety.

AT MEGA MICROCONTROLLE:

Atmega328 Pinout

- ATmega microcontroller gathers data from sensors in the vehicle.
- Sensors monitor parameters like distance, speed, and environmental conditions.
- The ATmega microcontroller processes this data, transmitting it to the IoT platform for real-time analysis, facilitating timely alerts to enhance driver safety.

BLUETOOTH MODULE:

Bluetooth module enhances vehicle safety detection using IoT by enabling direct communication with the driver's smartphone. It collects data from various vehicle sensors, monitoring parameters like distance, speed, and

environmental conditions. Through the IoT platform, the Bluetooth module facilitates real-time analysis, providing instant alerts to enhance driver safety.

ACCELEROMETER-ADXL335

The ADXL335 accelerometer is crucial in vehicle safety detection using IoT, monitoring vehicle movement and orientation. Integrated with IoT, it collects real-time data on acceleration, enabling the detection of sudden changes in speed or direction. This data is then processed to provide timely alerts, enhancing driver safety by detecting potential hazards.

IV. WORKING FLOW
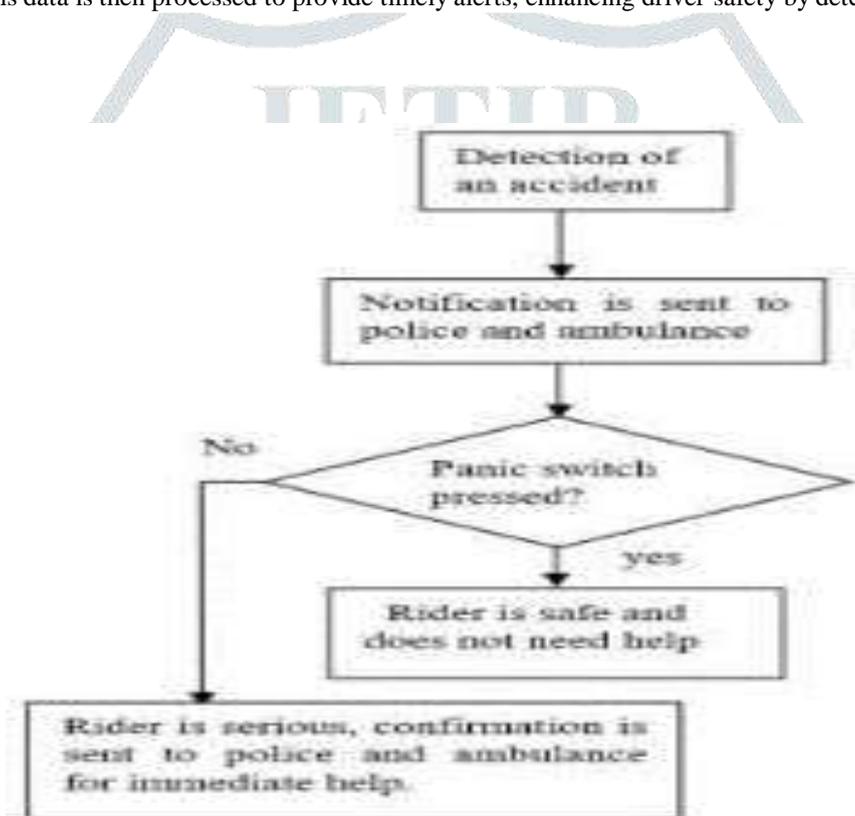
Working flow of vehicle accident system

V. Result

Working of vehicle safety detection System

Vehicle safety detection involves the use of sensors and technologies to identify and mitigate potential risks and hazards to ensure the safety of vehicles, passengers.

VI. CONCLUSION

This project presents vehicle accident detection and alert system with SMS to the user defined mobile numbers. The proposed vehicle accident detection system can track geographical information automatically and sends an alert SMS regarding accident. This vehicle accident detection and alert systems provide emergency responders with crucial information at the earliest possible time. Reducing the time between when an accident takes place and when it is detected can reduce mortality rates. Conventional in vehicle accident detection and notification systems are effective in reducing the time gap before first responders are sent to the scene. These systems, however are expensive and not available in all vehicles. To further increase the usage of automatic accident detection and notification systems, this system can be used to indirectly detect accidents through sensors such as accelerometers.

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