

IoT Based Automatic Vehicle Accident and Rash Driving Alert System

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Abstract - As we all know; a majority of accidents, which happens, are due to rash driving. Reckless driving is the primary cause of most accidents. Rash driving might include sudden variations in speed, a pattern of path changes, and more and more. Individuals or youth generation are most at risk from reckless driving.

The number of accidents is growing continuously due to the increase of cars. Authorities are finding it increasingly impossible to stop or lessen these deadly accidents on the road or highway, and their efforts are futile. Therefore, our plan is to design a module that can identify the car if it is being driven recklessly or faster than the legal limit and provide the information to the appropriate authority. In this article, we suggest a highly effective methodology for early identification. The idea of detecting bike accidents is not new, and the automotive manufacturers have made significant progress to improve the technology. The goal of the article is to contribute in that area of innovation.

Key Words: Accident detection, esp32, alert system, GPS.

1. INTRODUCTION

The growing demand for cars has also led to more traffic congestion and motor accidents. The lives of the people are in grave danger. This is due to the dearth of top emergency facilities in our nation. In this work, a car accident warning system is introduced. This concept is a system that can identify accidents in a lot shorter time and delivers the essential information to a first aid facility in a matter of seconds, including the location, the moment the accident happened, and the angle at which it happened. The rescue crew receives this warning message quickly, which will aid in saving precious lives. Additionally, a switch is available to stop message delivery in the unlikely event that there are no casualties, which can help the medical rescue team save valuable time. The alarm message is immediately transmitted to the police station and the rescue crew when an accident happens. The message is transmitted via a GSM module, and a GPS module is used to locate the accident's position. With the use of both a vibration sensor and a micro electro mechanical system (MEMS) sensor, the accident may be accurately recognized. The

information from the MEMS sensor may also be used to determine the angle at which the automobile flips over. This application offers the best remedy for inadequate emergency facilities. Around the world, the majority of accident fatalities are caused by road accidents. The Insurance Institute for Highway Safety (IIHS) claims that over the past 12 years, auto-related fatalities have decreased because to modern automobiles' cutting-edge safety measures. Even while it gives technology credit for reducing vehicle accidents, the IIHS cannot help but blame reckless driving habits like driving while intoxicated, driving too fast, and not wearing a seatbelt for the majority of traffic fatalities that continue to occur. The automatic vehicle accident detection and messaging system is built into the car as an embedded intelligence.

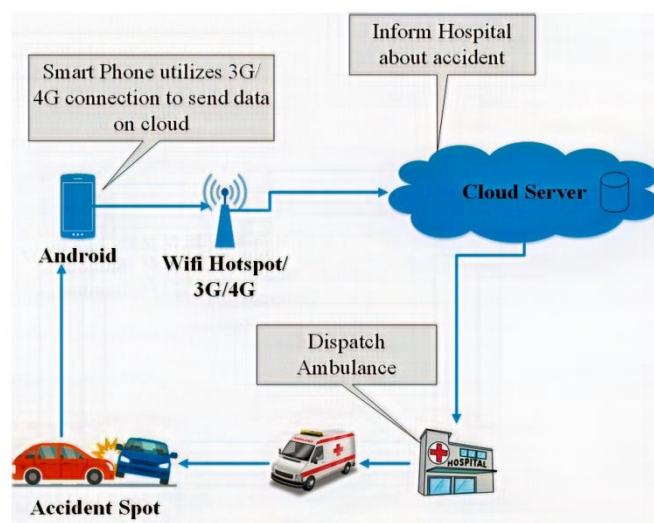


Fig 1.1: Overview of the proposed system

The project's goal is to locate the car by utilizing a technology installed within the vehicle to send a message to the location where the vehicle is. Because we never know where an accident will occur, we frequently cannot pinpoint its location. First, we must determine the location of the accident using location tracking and send a message to a relative or the emergency services in order to provide treatment for the injured. Because it is both affordable and simple to comprehend, we are employing the basic microcontroller ATMEGA328 in our study. Here, we made use of GPS and GSM modules, which make it possible to track the car anywhere in the world, as well as assembly programming for greater precision. Using a GSM

modem, the vehicle's precise location is transmitted to our remote devices (mobile phones).

2. RELATED WORK

Chunxiao Liao, et. al proposed a "Shrewd Traffic Accident Detection System Based on Mobile Edge Computing" in the year 2017. This paper proposes a savvy car crash location framework dependent on Mobile Edge Computing with vicinity, low idleness and processing, and vehicle recognizable proof. Our framework uses basic cell phones to get increasing speed and speed and distinguishes pictures indicating mishap scenes primarily at servers if there should arise an occurrence of bogus positives, acknowledging computerization of mishap identification and advising environmental factors and divisions like clinics and branches of transportation progressively.

Sanjana. K.R, et. al proposed "An Approach on Automated Rescue System with Intelligent Traffic Lights for Emergency Service" in the year 2015. They proposed a framework which will naturally identify street mishaps utilizing sensors, advise them to close by crisis administrations and family members through GSM. It is completely computerized, finds the mishap spot utilizing Google guide, and controls the traffic lights, assisting with arriving at the emergency clinic in time. This framework can be viably executed in high populated nations like India.

Bankar Sanket Anil, Kale Aniket Vilas, Prof. S. R. Jagtap proposed an "Intelligent System for Vehicular Accident Detection and Notification" in the year 2014. This paper presents a system which gives an idea about what can be done to provide medical help and other facilities after the accident as soon as possible. A flex sensor and accelerometer can be used to detect an accident, while the location of the accident will be told to desired persons, such as the nearest hospital, police, and owner of the vehicle through SMS sent using GSM modem containing coordinates obtained from GPS along with the time of the accident and vehicle number. The camera located inside the vehicle will transmit real-time video to see the current situation of passengers inside the vehicle. Thus this paper emphasizes the post-accident system for detecting and informing about it. Simulation result on the hyper terminal is also presented in this paper.

NajiTaaib Said Al Wadhahi, et. al proposed "Mishaps Detection and Prevention System to decrease Traffic Hazards utilizing IR Sensors" in the year 2018. This paper is utilizing IR sensors and Arduino Uno innovation. The framework has two stages Accident Detection and Accident Prevention. The recognition eliminate is conveyed utilizing IR sensors that could recognize and alarm the individuals by sending SMS utilizing GSM module that contains predefined numbers and mishap area utilizing GPS 11 module. Second Phase, Accident counteraction is done utilizing IR

sensors by notice the driver about the neighboring vehicles when the separation between them is past the edge esteem. Reenactment results and Prototype is introduced in this paper.

Nicky Kattukkaran et. al proposed an " Intelligent Accident Detection and Alert System for Emergency Medical Assistance" in the year 2017. This system aims to alert the nearby centre about the accident to supply immediate medical care. The attached accelerometer within the vehicle senses the lean of the vehicle and therefore the heartbeat sensor on the user's body senses the abnormality of the heartbeat to know the seriousness of the accident. Thus the systems will make the choice and send the knowledge to the Smartphone, connected to the accelerometer and heartbeat sensor, through Bluetooth. The Android application on the mobile phone will be sent a text message to the nearest medical center and friends. The application also shares the exact location of the accident that can save time.

Arif Shaik et. al proposed "Keen Car: An IoT Based Accident Detection System" in the year 2018. This paper portrays the plausibility of furnishing a vehicle with innovation which will recognize a mishap and promptly ready crisis staff. When there is an auto collision somebody needs to effectively look for help, for example, calling 911 for crisis administrations. There is no programmed warning to the police, emergency vehicle, companions, or family. The Internet of Things (IoT) are frequently wont to deliver a programmed notice and reaction to the scene. A sign from an accelerometer and a GPS sensor is consequently sent to the cloud and from that point, an alarm message will be gotten by whoever is bought in to that vehicle. The sign will show the seriousness of the mishap and the GPS area. The rescue vehicle will utilize the GPS directions to get to the scene rapidly.

3. PROPOSED METHOD

The main system of the project is the detection and alert management. The system is on and initialization. If vehicle is normal, no messages have been sent to rescue team. And the temperature level of the driver is monitored in all the time, if it reaches the threshold level then the action has been taken automatically. Whenever accident occurred, the MEMS sensor, tilt sensor and fire sensor detects the accident happened with vehicle. The controller get the input from sensors and send the accident alert information to road side unit and then message is send to the rescue team and also WIFI and GPS finds location of the vehicle and that also send to the rescue team. It will facilitate connectivity to the nearest hospital and provide medical help through IOT technology.

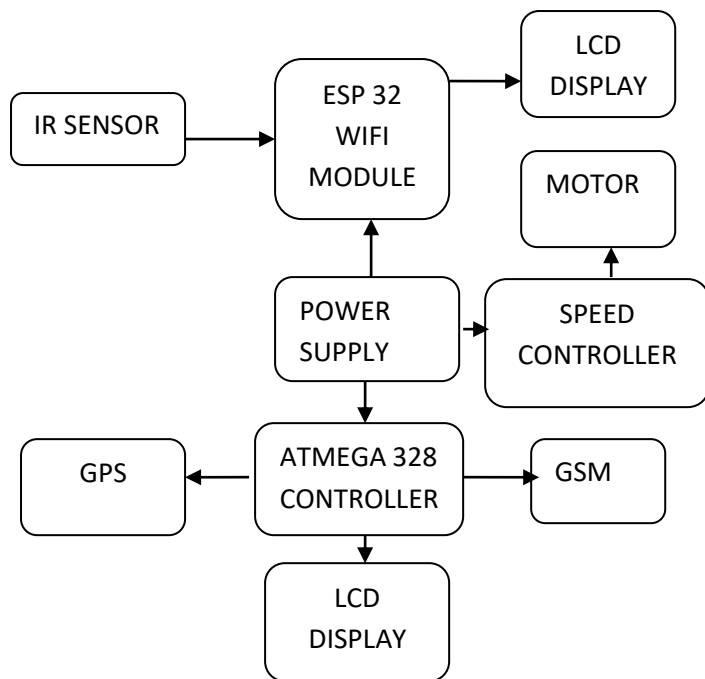


Fig 3.1 Block Diagram Of The System

It contains ESP32, GPS receiver, limit switches, and potentiometer. If any accident occurs then the car may be tilted in XY directions and the buzzer starts beep sound and by using the wifi module ESP32 and GPS module will send the location to the nearest ambulance or the defined person by using the cloud server web app. By this ambulance can reach the accident location and can save a life by taking the victim to the nearest hospital. If there is any minor accident by using the kill switch it can stop the entire rescue operation.

3.1. FUTURE SCOPE

The proposed program deals with detecting incidents and warning paramedics to reach the specific location by taking them to the nearest hospital and providing the medical services to the person affected by the incident. This can be extended through providing the victim with medication at the spot of the accident. We can also avoid accidents by increasing the technology and using warning systems that could really stop the vehicle to conquer them.

3.2. RESULTS

The system helps in detecting the possibilities of the accident based on the limit switch sensor that is connected and send message with the help of GSM module. The GPS module tracks the location in which the accident has occurred and helps communicate to the rescue system using GSM module. The system is more efficient and is very much helpful in detecting the accidents at the earliest and reduces the rate of deaths that occurs due to accident. Since the severity is measured the rescue team can arrive to the accident spot with all medical aid and rescue the victim at the earliest.

Thus, this system rescues the victim at the earliest and help in reducing the rate of deaths to a greater extent.

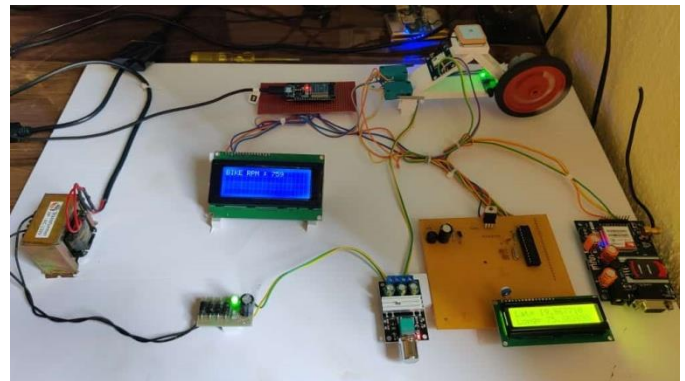


Fig 4.1: Proposed Hardware System

In Fig.4.1, the SMS sub-system of the framework has been shown. The SMS is sent via the GSM module to the number that is already stored in the database. The message will contain detailed information on the accident location. GSM (Global System for Mobile Communication) is an architecture used for mobile communication in almost all of the countries now a day.

When a user clicks on the link of the point of accident, the location will be displayed on Google map. By knowing the location, any user or the rescue team can dynamically take the shortest route to reach the destination, an ambulance will also head towards the accident location to provide emergency medical assistance. The result and testing part is divided into two sections which represent the uniqueness of the framework and accuracy of the results.

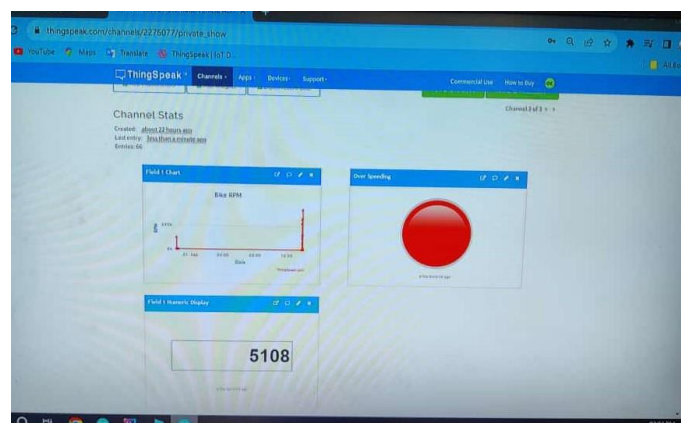


Fig 4.2: Overview of Cloud Server Data

System testing of software or hardware is conducted in a complete and integrated environment to evaluate its compliance with the specified requirements. System testing takes all integrated modules that have passed integrated testing as its input.

4. CONCLUSIONS

This project offers a car accident as well as the rash driving and detection system that sends SMS messages to user-defined cell phone phones and on cloud server also. The ATMEGA328 MCU is used in the embedded system arena to create and implement the GPS tracking and GSM alert based algorithm. The suggested Vehicle Accident Detection System may automatically track geographic information and deliver an accident alarm SMS. The experimental work has been meticulously done.

The outcome demonstrates that this project does in fact produce improved sensitivity and accuracy. The mobile numbers are permanently stored via an EEPROM interface. This improved the project's dependability and user-friendliness. It has been demonstrated that the suggested strategy is quite advantageous to the automobile sector.

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