

IoT Enabled Accident Monitoring and Preventing System

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Abstract

This paper describes a real-time forestallment and machine discovery system via These days, accidents happen frequently, people drive very quickly, and we lose our precious lives when we make small mistakes whendriving(inschoolzones,onhills,andonhighways).Thehighway department has put up the signs in order to prevent these kinds of accidents, warn drivers, and encourage them to reduce their speed in these kinds of areas. However, there are situations when it might not be possible to view those kinds of signboards, and there could be risk of an accident or drivers who fail to reduce their speed even after seeing the signs. Often, accidents happen in places with high traffic volumes. Drivers disregard the traffic and drive aggressively. Drivers must be informed about speed limits and high-accident zones. With the aid of sensors and embedded systems, automated technology will be used to accomplish that. The goal of this project is to "speed control of vehicles automatically" by identifying areas that are prone to collisions. The major goal is to create a smart display controller that can be used with an embedded system to monitor the zones and control the speed of the vehicle. Intelligent collision-preventing technology that detects whether a driver is wearing an accident prevention seat belt and has non-thermal breath while operating a vehicle. This project's goal is to use RSUs (roadside units) to maintain an ideal traffic speed control system in the roadway. The broadcast system warns approaching cars of traffic and accidents that are ahead on the road. Electric cars do not often come equipped with speed control. A pseudo speed controller is used in many vehicles, but it lacks feedback based on speed sensing. For the comfort and safety of the driver, speed control may be desirable. An instrumented electric vehicle's low-cost feedback speed controller is described in this paper. During the accident, a message was sent to the local police and hospital stations. In order to identify fire hazards in vehicles that are overheating and moving too fast, gyroscope sensor analysis is used to identify unusual vehicle moments. The machine's microcontroller continuously logs all of its parameters in order to prevent and identify accidents.

Keywords:

IOT module, Car Accident, Arduino Microcontroller, Emergency Messages, Multi Sensor

1. INTRODUCTION

Road traffic accidents were the leading cause of injuries in less developed nations, resulting in 11 position of all injuries and missing valuable time from a healthy life. Road widening is not a necessary outcome in the Indian road system to prevent business in such metropolises. There are several approaches to address the issues with state systems for preventing drunk driving. The best will adhere to a number of rules. They will entrust authority and accountability to individuals and groups in all circumstances, from private to public, because incompetent driving control necessitates action in all circumstances. They will function in the public eye, utilizing the media to report on issues and outcomes, since the public's final say on policies and precedents pertaining to the prevention of drunk driving must be garnered. Instead of making quick promises based on a single action, they will gradually improve things over the long run. Additionally, rather than attempting to implement one-size-fits-all approaches, they will set up mechanisms for connecting and solving problems.

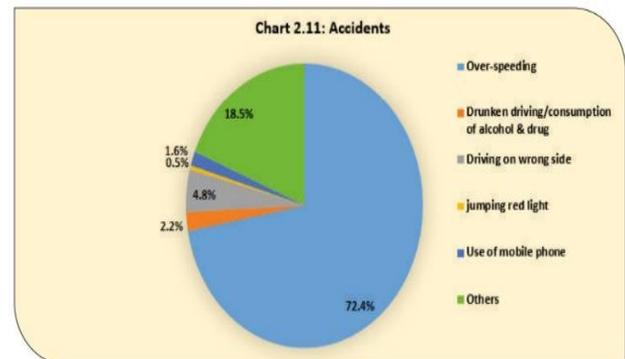


Fig. 1. Accidents chart

Thus, road safety has grown to be a serious concern. They will function in the public eye, utilizing the media to report on issues and outcomes, since the public's final say on policies and precedents pertaining to the prevention of drunk driving must be garnered. Instead of making quick promises based on a single action, they will gradually improve things over the long run. Additionally, rather than attempting to implement one-size-fits-all approaches, they will set up mechanisms for connecting and solving problems. Thus, road safety has grown to be a serious concern.

1.1. WIRELESS SENSOR NETWORK:

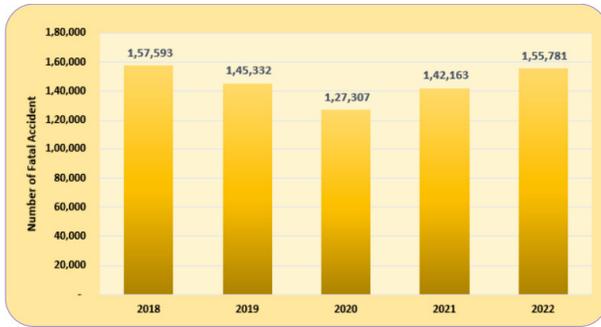


Fig.2.Accidentschart

The primary objective of automotive trajectory monitoring systems is to precisely identify the position and condition of a vehicle. Additionally, the high demand for car crashes has led to rise in traffic dangers and auto accidents. This is a result of our nation's deficiency in the best emergency facilities. This design is a system that can identify collisions in a lot less time and transmits the essential data, including the location, time, and angle of the collision, to a first aid center in a matter of seconds. This alert message is quickly forwarded to the rescue team, helping to preserve the precious lives. Several hybrid techniques are used in the implementation of these systems, including embedded applications, wireless communication, and geographic positioning. 1 GSM and GPS-based Automatic Accident Detection and Reporting System: These days, traffic has grown in importance as a national event. We observe that many lives are lost in every accident due to the usually lengthy response times for receiving the necessary care, which may be accessible if alerted in advance. The implementation of this project has the potential to greatly reduce accident response times. This emergency rescue platform will function at peak efficiency to shorten the window of opportunity for rescuer arrival times in traffic accidents, where every microsecond matters. Our assignment goal is to exist a hardware monitoring gadget based totally on GSM/GPS technological know-how that can realize accidents mechanically and furnish sufficient statistics to file an accident at the time it occurs, consisting of its particular location. Through this project, a verbal exchange channel will be installed between the vehicle's hooked up unit and the manipulate station. The monitoring modules mounted in automobiles will be GPS/GSM enabled, enabling real-time monitoring with the aid of cell networks. By analyzing the vibration sensor's waveform, the microcontroller's software will regulate the device's different functions. In the event of an accident, the device will use the GSM network to send a warning message and the GPS module's location data to the control station. It is a thorough and practical remedy for the inadequate rescue reaction in the event of an accident. The traffic accident reporting system is capable of automatically locating accidents on the road, locating the scene, and providing the rescue agency with basic information about the location, time, and circumstances of the traffic accident. Relevant records will be extracted by using a manage characteristic at the server quit and saved in a database to which accident statistics from prototypes will be polled in actual time. Our system is a small, dependable package that integrates sophisticated control technology with advanced hardware design.

2. MOTIVATION BEHIND THIS STUDY

According to the World Health Organization (WHO) report, nearly 1.35 million mortal beings failed in road accidents, making avenue webrunner business accidents the eight important cause of demise glob-supporter (20). The vary of losses associated with avenue accidents is particularly high, therefore, measures ought to be taken to be deck roads safety. utmost accidents incurred through way of accidents are now not serious, and the victim's life can be saved if saved timely. still, it takes lesser protract to manually notify the emergency companies due to bad verbal change mechanisms, therefore, victims are left unattended for a prolonged time, preceding in an prolonged death rate. The penalties of avenue accidents are no longer truly constrained to the loss of mortal lives yet, also incorporate the destruction of property, webrunner business blockages, and vast economic loss. therefore motorized accident discovery structures are the prefero time, which can't empouph the deliverance operations and limit the antecedents after the mishap and several lives can be saved. This paper rudiments ultramodern mechanisms to find out accidents, its working, and limitations. likewise, accident forestallment methodologies, accident contributing factors are stressed as well. This detect out about oppressively opinions contemporary literature on accident discovery and forestallment ways, with the end that wise constructions can be developed with extended delicacy and lesser strategies to manipulate accident inflicting factors indeed as looking at out for the lice-edge challenges in the current constructions

3. EXISTING SYSTEM

Our device operates entirely on its own. It does not make use of the car's internal satellite route. Its own receiving wire and GPS module are included. We built the device with the intention of it being plug-and-play, low power consumption, and workable with the vast majority of cars paying little attention to make and show simultaneously be reasonably evaluated so it very well may be widely conveyed. One of the trigger events is actual vehicle damage. In the unlikely event that a car has damaged a crucial area, it will act as a trigger. It functions essentially as a squeezed press button. It is positioned with a few bolts of security between the edge of the vehicle.

4. PROPOSED SYSTEM

The portion of the forestallment system that involves Smart Accident Prevention automatically determines whether the driver is wearing accident prevention and has non-thermerature-induced breath. If neither of these two requirements is met, there lay does not turn the machine on. The ignition is thus controlled by the microcontroller, which also manages the relay's operation. Additionally, the system allows for the discovery of accidents anywhere and reports them to predetermined figures via an IOT and GPS module. The machine's microcontroller continuously logs all of its parameters in order to prevent and identify accidents. have utilized communication modules, temperature sensors, vibration detectors, LIDAR detectors, and infrared detectors in addition to microcontrollers for alert purposes. Next, we

developed a system that verifies the two requirements before turning the bike's engine on. An infrared detector and an accident prevention sensor are part of the system. To determine if a biker is wearing an accident prevention gear, a switch is utilized. The MCU receives the information that the biker is intoxicated thanks to the use of a temperature detector. The temperature detector and switch are both installed for accident prevention. The machine will not turn on if either of the two requirements is not met and the temperature attention contained in the driver's breath is then detected using the temperature detector MQ3. An analog resistive affair based on temperature attention is provided by the detector. The microcontroller unit, or MCU, is in charge of all the other system blocks' operations. The MCU manipulates the data it receives from the detector to control every aspect of the system. An interface circuit connects the temperature detector to the MCU, while a direct connection is made between the MCU and accident prevention switch. These detectors provide data to the MCU, which only provides the encoder with digital data related to the detector affair when both requirements are met. Utilizing a MEMS, an Arduino regulator for accident prevention, an Atmel regulator for vehicle ignition, a gas detector (MQ2), and other components to meet the requirements for intelligent design. The locations may be ascertained through the joint use of GPS and GSM (global system for mobile) in the design, and equivalents are communicated via text books to a predetermined number. Using RF technology, wireless communication is enforced between the vehicle's ignition and accident prevention systems to stop the car automatically.

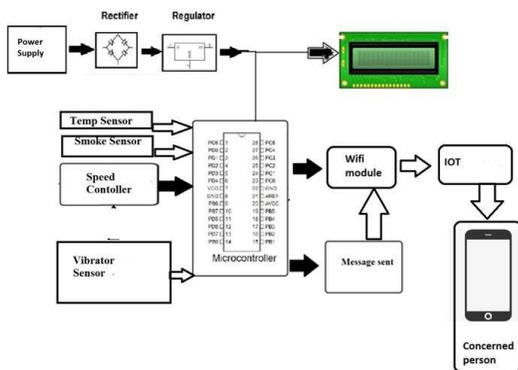


Fig.3. Block Diagram

5. SYSTEM REQUIREMENTS

5.1 HARDWARE DESCRIPTION

5.1.1 NODE MCU

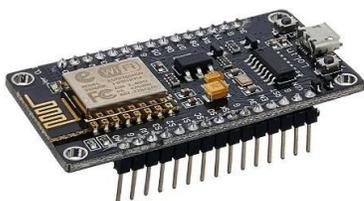


Fig.4. NodeMCU

Node MCU is an open-source, Lua-based firmware and enhancement board that is notably structured for Internet of Things applications. It retains reminiscence for units that count on the Module of esp-12 and firmware for the Espress Systems (ESP8266) Wi-Fi SoC.

ARDUINO UNO R3 MICROCONTROLLER



Fig.5. Arduino UNO

It's a microcontroller, the Arduino Uno R3. It points six primary statistics sources, a 16 MHz valuable stone oscillator, a USB association, a energy jack, an ICSP header, a reset button, and 14 computerized input/output pins, six of which can be used as PWM yields. It comes with the whole thing wanted to assist the microcontroller; all you want to do is join it to a PC by a USB connection or provide energy to a battery or an AC-to-DC connector.

POWER SUPPLY



Fig.6. Power Supply

The 12V advanced down transformer receives power from the AC source. By using diode span, the 12V AC transformer yield is corrected. Capacitors are used to divide the 12V DC Diode Bridge result.

5.1.4 GPS



Fig.7. GPS

The Global Positioning System GPS aids with navigation as that as following. Global positioning systems are used to track the car without the driver's assistance. Nevertheless, a route framework instructs the driver to reach the destination with minimal delays. Following and route both make use of the same design. As an accident occurs, the following stem identifies the awkward car, and an SMS message is delivered to the salvage group.

5.1.3 LCDDISPLAY

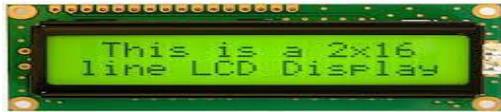


Fig.8.LCDDisplay

LCD displays characters, numbers, and designs. The microcontroller's (P0.0–P0.7) I/O port is interacting with the presentation. The presentation is multiplexed, meaning that, for instance, only one show continues to air at a time. The next presentation starts in 1/tenth of a second. By the reason of steadiness of vision, a series of shows in succession will result in a consistent presentation of count.

5.1.4 BUZZER



Fig.9.Buzzer

A device which signals sound, such as a buzzer or beeper, can be piezoelectric, mechanical, or electromechanical. Common uses for beepers and ringers include clocks, warning devices, and customer information verification.

5.1.5 GASSENSOR



Fig.10.GasSensor

A device which finds the existence of gas in the area is called a gas locator, and it is often used for the security system purpose. This kind of useful equipment helps to determine gas spills or other discharges and can talk by a control system to allow an interaction to end automatically. Administrators in an area where the hole is occurring may hear a warning sound from a gas locator and be given evacuating opportunity. This kind of device is important because a lot of gases can be harmful to living things, including humans and other animals.

5.1.6 VIBRATIONSENSOR

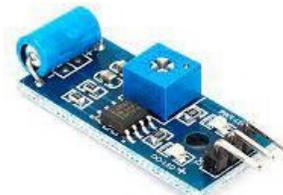


Fig.11.VibrationSensor

It should be feasible to measure vibrations using a variety of sensor types. Despite the lack of direct vibration sensors, vibrations can be approximated indirectly by calculating values from representative mechanical or optical quantities. Certain highlights are contrasted by these sensors. Those can be isolated based on latent and dynamic conduct besides other factors. Some sensors act in an outright manner, while others act relative to other things. Recurrence range, signal components, and the type of estimation information are additional noteworthy aspects. The auxiliary sensors that are on show here were initially arranged in two groups: one for reaching and the other for non-reaching objects. Within these groups, the sub-objects were speed and speed increase measurement.

5.1.7 TEMPERATURESENSOR

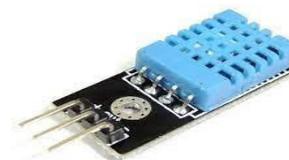


Fig.12.TemperatureSensor

Another way to describe a temperature sensor is as a straightforward device that gauges temperature in degrees and converts it to a readable unit. To measure the temperature of the earth, large concrete dams, buildings, and boreholes, specialized temperature sensors are employed.

5.2 SOFTWARE DESCRIPTION

5.2.1 ARDUINO IDE

The Arduino is a magnificent single-board microcontroller answer for many DIY projects, in this blog, we will appear at the Integrated Development Environment, or IDE, that is used to application. First, you ought to down load the IDE and set up it. Start with the aid of touring Arduino’s software program page. The IDE is accessible for most frequent running systems, inclusive of Windows, Mac OS X, and Linux, so be certain to down load theright model for your OS. The IDE environment on the entire consists of two essential parts: Editor and Compiler. The vicinity former is used for writing the required code and later is used for compiling and importing the code into the given Arduino Module. This environment helps every C and C++ languages Libraries are really useful for inclusive of higher overall performance into the Arduino Module. It’s additionally vital to pick out the appropriate serial port to which the Arduino board is connected. Otherwise, you won’t be capable to add the code to the board. To do that click on on “Tools” -> “Port” And pick out the right COM port. If there are a couple of COM ports and you are now not positive which one to select, disconnect the Arduino board from the USB port and reopen the menu. The COM port entry that disappeared will be the right COM port. Reconnect the Board to the identical USB port and choose that port. A new window with the instance blink code will be open. In the code area, you can see two functions, void setup() and void loop(). The void setup() characteristic is the first characteristic that will run when the Arduino is powered on.

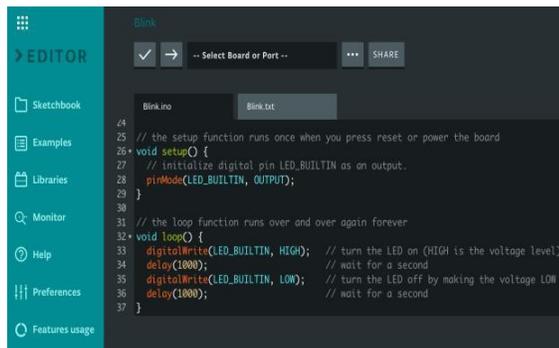


Fig.13. Arduino IDE

PROTEUS

A proprietary software tool suite called Proteus Design Suite is mainly used for electronic design automation. Electronic design engineers and technicians use the software primarily to create electronic prints and schematics for printed circuit board manufacturing.

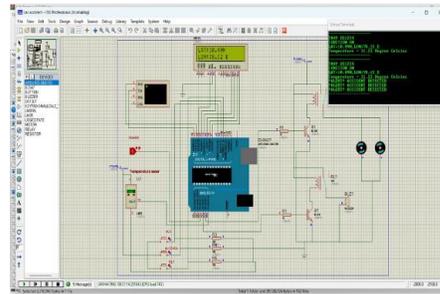


Fig.14. Simulation using proteus

6. OVERVIEW AND RESULTS

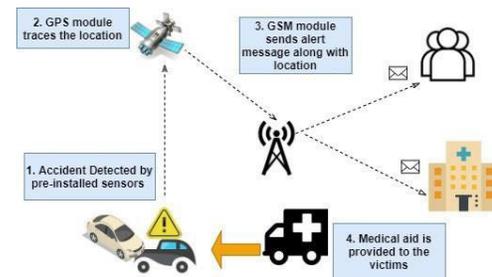


Fig.15. Flow Diagram

| ID | CarName | CarNo | Owner Name | Owner ContactNo |
|----|---------------|-------------|-------------|-----------------|
| 1 | Maruthi Alto | TN46AJ 5879 | Ms. Saranya | 9834268439 |
| 2 | Hyundai Venue | TN46AB 4864 | Mr. Sathish | 7658923567 |
| 3 | Honda Jazz | TN49 BC7698 | Mr. Britto | 9840665981 |

I. Table..CarDatabase

| ID | HName | H_NUMBER |
|----|---|---------------|
| 1 | Perambalur Government Hospital | 04328277128 |
| 2 | Sanjeev Hospital | +917397797471 |
| 3 | Dhanalakshmi Srinivasan Medical College | 04328254600 |

II. Table.HospitalDatabase

| P_ID | PNAME | P_NUMBER |
|------|----------------------------|--------------|
| 1 | Perambalur Police Station | 04328-277120 |
| 2 | Arumbavur Police Station | 04328-277888 |
| 3 | Kaikalathur Police Station | 04328-261226 |

III. Table..PolicestationDatabase

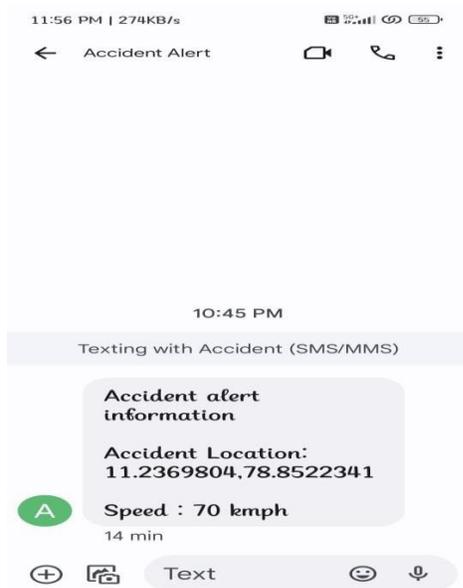


Fig.16.AlertMessage

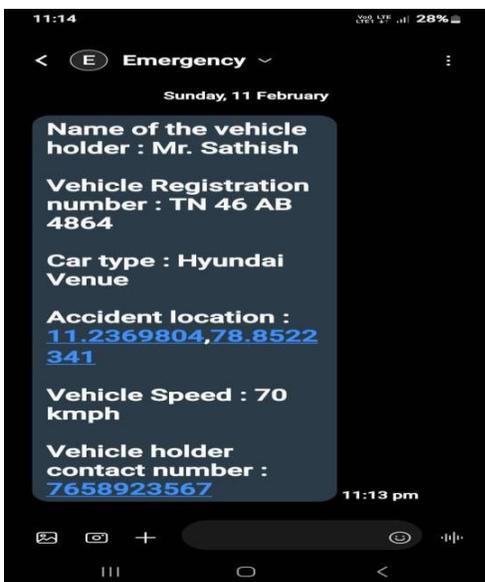


Fig.17.AlertMessage

7. CONCLUSION

Our clever system, Smart Accident Prevention, will contribute to safer driving. There is no substitute for intelligent accident preventions when it comes to ensuring the safety of motorcycle riders in light of the state of our roads, the high frequency of accidents, the numerous infractions of traffic laws, and the inadequate regulatory framework. It is essential to wear an accident prevention helmet when riding a motorcycle because, in the event of an accident, it can protect the rider's head from serious

injury. It is the point at which the sharp infrared sensor will be useful. It will guarantee that in order to start the bike, the rider must wear the accident prevention gear. These days, driving is a significant factor to take into account. Because reckless driving increases the risk of bike accidents than cars. Since abnormal driving is more likely to result in bike accidents than car accidents.

Thus, the temperature sensor will determine whether or not the driver is experiencing abnormalities. Although the concept of smart accident prevention is relatively new in roadside units, it is highly popular in Western and European countries. We plan to mass produce our design if we can strengthen its resilience and secure funding. Although smart accident prevention may be slightly more expensive than traditional accident prevention, the advantages clearly outweigh the disadvantages. In order to support the nation's rescue services, it will also help save lives, improve data collection, and develop an infrastructure solution using Emergency Crash Reporting Software.

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