IoT Based Smart Accident Monitoring System

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Abstract: *Car accidents truly can be considered as one of the most disastrous phenomena. Though the reasons can be different for those accidents like the main problem can be driver's unawareness as well as speed. With the help of IoT we can try to prevent as well as reduce the number of accidents. In this project, we are developing a system which will monitor and help to reduce those accidents. The system will also notify you if a driver has been drinking and that the speed limit has been exceeded. And will also notify the person related to the victim if accident has unfortunately occurred.*

Keywords: Global Positioning System, ARDUINO IDE, ESP8266, MPU6050, MQ3 Sensor, etc.

I. INTRODUCTION

We studied on the statistical facts in the real-time world and we found out that total number ofCars in the world are 1.4 billion (Roughly around 140 Crores) & the number of Cars in India is around 30 million (Roughly 3 Crores). The Accidental death rate of the entire world is around 4 Lakhs in 2019 and that of India is around a Lakh in the year 2019. Due to lockdowns since a year andhalf, the Accidental death rate has lowered in these 2 years. But the serious problem involved with Accident death is that the Victims don't get immediate assistance and they are struggling for a few hours before reaching to the hospital. We were confident that we would work on this project theme to build a Product and IoT EcoSystem that would provide immediate assistance to accident victims who could save their lives.

Currently many Big Automotive companies such as BMW, Mercedes Benz etc. have systems in placethat can prevent Accidents in a variety of ways but which can notify Authorities or their relatives in the event of an Accident. In this Project, we are working on the System that can prevent the Accidentas well as Notify and give the Alerts on Mobile App.

By using Embedded Systems sensors along with Internet of Things Algorithms. The Methods we have considered are, detecting Alcohol consumption of the Driver, by using a Sensor and Detecting Sudden change in the Car which will be considered as the Accident. Both these sensors send the data to the IOT Controller (Gateway) which sends the Inform

II. OBJECTIVE

The main objective of the smart accident and monitoring system is giving the notification of alcohol consumed by the driver and movement of the vehicle in terms of acceleration and rotationthrough the app to the family members or friends or relatives or vice versa who are having the related details of the car that can be used to prevent accidents. When an accident occurs, the location as well as the related details are sent through the Blynk app. For this task, each and every vehicle's accelerometer values is sent through this app and it gives the notifications of how much alcohol isconsumed by the driver so it is easier to monitor the vehicles which helps to prevent the accidents.

Based on the survey, many people die every year due to getting late medical assistance afteraccidents, due to roadway and drunk driving accidents. So, this app can save some lives and escape from injury.

III. LITERATURE SURVEY

1.   P. H. Masters, J. K. Lam, and K. Wong have worked on, "**IOT BASED VEHICLE ACCIDENT DETECTION & RESCUE INFORMATION SYSTEM (IVADR)**"

In this paper by IoT based vehicle smash detection and rescue in order system is developed. This is old to discover the vehicle mistake and send out the place in rank of the calamity residence to vehicle owner, nearby sanatorium and police force locate by the use of a network service. The announcement between the web server and hardware trick is customary by way of GSM/GPRS shield, and the place is traced by means of the GPS shield. In this thesis manufactured a novel factor-based vehicle tracking algorithm accordingly make something stand out and footprint a hardly any poignant articles. The hardware use by means of sensors and mass in the mesh server, and fire notification to diverse users by means of

network application. Catalog head waiter and API and fulfils the chuck to be an IoT based framework.

2.   Adnan Bin Faiz, Ahmed Imteaj, Mahfuzulhoq Chowdhury have worked on, "**IOT BASED ACCIDENT IDENTIFICATION**"

In this daily system will employment on if a vehicle meets with an accident, the accelerometer and ultrasonic sensor discover the hint at and sent it to the Arduino. As the mishap occurs, the accelerometer senses the quickening and sends an indication to the Arduino. So therefore, it will fire an alert implication to the predefined number. Followed by the LCD television will exhibit a memorandum as memorandum sent. This programmed vehicle smash identification is the system which tin perceive the accidents in a lesser amount of time and sends the in order to the primary support focal point with user-friendly and reliable. This anticipated style is greatly beneficial to the automotive industry.
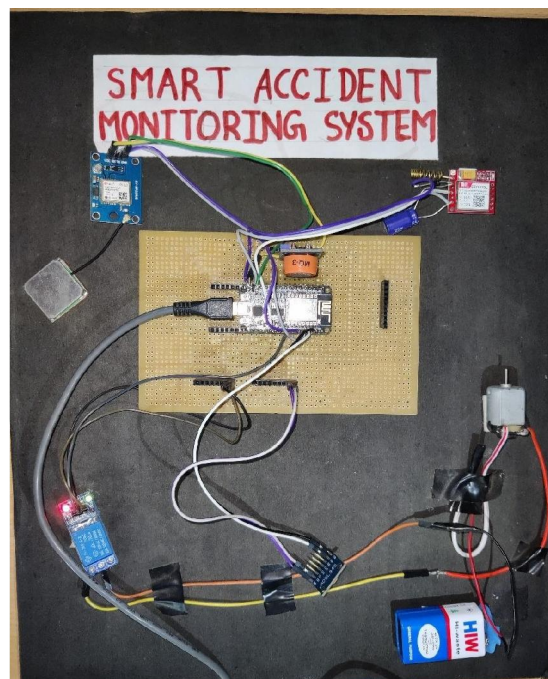
IV. IMPLEMENATION

Figure 1: Constructed Project

Accidents are increasing day by day, in such situations victim doesn't get immediate assistance. So, we have developed a system which will monitor and if the accident has occurred it will directly give the message along with the exact location to the number that is saved by default in the system.

First feature is, The Accident detection sensor, it will first detect the accident and if the accident has occurred then it will give the signal to Wi-Fi controller, the Wi-Fi controller will ask the GPS for the location and tell the relay module to stop the motor. Then the location that is taken from the GPS, willbe then given to the GSM and it will send that in the form of message on the number that is saved in the system.

The second feature is Alcohol detection sensor. It will detect the alcohol consumed by the driver, and if it is beyond a certain limit, it will give signal to the Wi-Fi controller and the Wi-Fi controller will ask the GPS for the location and the repeat the same process again. We will get the data of the Alcohol consumed and the x, y, z, axis from the accident detection sensor on the Blynk Dashboard.
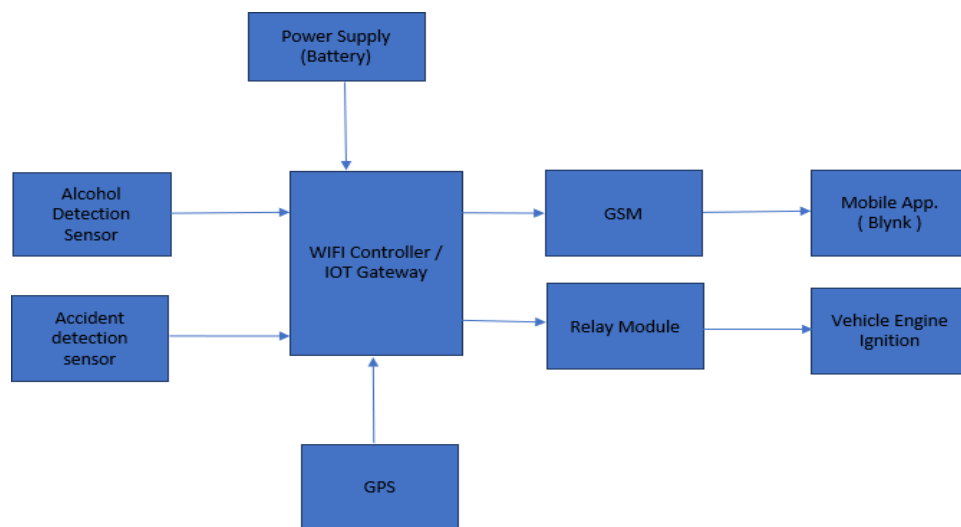
V. BLOCK DIAGRAM

Figure 2: Block Diagram

VI. COMPONENTS

1. ALCOHOL DETECTION SENSOR

This module is made by using the Alcohol Gas Sensor MQ3. This MQ3 Sensor helps us to detect the presence of alcohol gases at concentrations from 300 to 500mm range. SnO_2 sensitive material is used for this sensor. This MQ3 sensor is suitable for detecting alcohol concentration on your breath. Because of its high sensitivity and fast response, the measurements can be taken as soon as possible. The sensor temperature range is from -10 to 50 degree Celsius.

2. ACCIDENT DETECTION SENSOR

MPU6050 is a micro electro mechanical system. It uses the I2C protocol for communicationand transfer of data purpose. It works on 3v-5v power supply. It has a built in 16-built ADC (Analog Digital Converter) which provides a great accuracy. This MPU6050 has a 3-axisgyroscope and accelerometer with a Digital motion processor which is integrated on a single chip.

3. WI-FI CONTROLLER

Wi-Fi controller ESP8266 is a cheap Wi-Fi microchip. ESP8266 is built on TCP / IP communication software and microcontroller capability. The Wi-Fi controller is a self- contained SOC with integrated TCP/IP protocol stack It can give any microcontroller accessto your Wi-Fi networks. It is also known as serial Wi-Fi module. It has 32 KiB instruction RAM with 80 KB user- data RAM.

External QCPL Flash up to 16 MB. GPS: GPS is a Global Positioning System. Uses trilateration calculation method to determine user location,speed, and height. GPS navigators constantly detect and analyze radio signals from GPS satellites, calculating the exact distance (width) to each satellite tracked.

4. RELAY MODULE

The relay board module is an electrical switch that is operated by an electromagnet. They have addition socket for power pack connection. They also have input and output terminals and are designed to control the power supply. Module provides independent, real-time control of each channel transferred to the board. Most transfer board has 2, 4, 8 or 10 channels.

5. GSM

GSM stand for Global System for mobiles. It is basically used to send the message. TheGSM that we are using in our system is Sim. The 800c is a single-board based on the SIM800C module with a built-in tracking note. It also supports quad-band 850/900/1800/1900 Mhz. It can transmit voice, SMS and data through low power consumption. As it supports quad-band, it can be used worldwide.

6. GPS

GPS means Global Positioning System. It is used to get the longitude and latitude to find theexact location. We have used a GPS that is based on NEO-6M. It has high sensitivity for the various indoor applications, which makes it more reliable to use.

VII. RESULT

The system is simulated using Arduino IDE as a tool to generate test results for each sensor byproviding an input value. To use this tool, you need to use a systematic circuit known as a microcontroller which is a key component of this tool. The code is written for the nerves in theEmbedded C language in Arduino IDE and uploaded to the microcontroller flash memory to test the sensor. The data generated by the sensor can be analyzed in the output screen of Blynk dashboard. On the dashboard it gives if the driver has consumed alcohol or not. Acceleration in terms of x, y, zcoordinates in m/s2. And if the alcohol is beyond a certain limit, it will directly give the message on the number that is saved in the system as Alcohol detected along with the location given by the GPS. Same with the accident detection, if the accident is detected, it will again give the message stating"Accident detected" along with the Exact location that is given the Global positioning system.
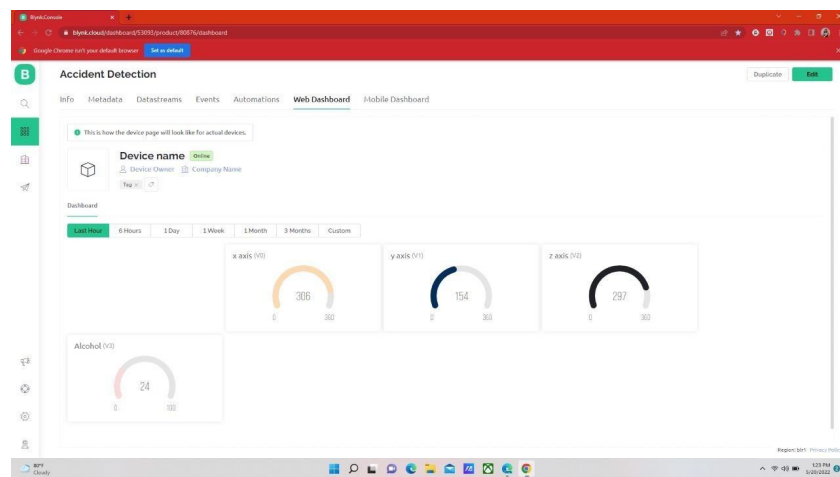
VIII. FUTURE SCOPE

We can add voice announcement system. It will intimate driver that He/She has crossed the over speed condition. We can dial an emergency call if the vehicle goes out of track. We can manage some parameters of vehicles like over heating or LPG gas leakage if the vehicle is LPG based. We can use GSM technology. So that the nearest highway security authorities will be informed about the vehicle which has over speed. As per the survey we all know that, the death ratio due to accident is 50%. In the future, the system may be connected to car airbags so that it cannot hit internal components such as Dashboard, Steering, or Windows and more. This can also be developed by connecting with camera so that it can capture a photo of an accident spot and also to make tracking easier.

IX. CONCLUSION

With our project we conclude that we can use ESP Controller to control the system without any interruption and we can also monitor the program in the Dashboard. The proposed program is designed primarily to avoid accidents and to warn in the event of an accident. An effective solution is to send a message of appreciation to the family and emergency services when a car encounters an accident. So, it is concluded with the above study that the use of Automatic vehicle accident alert system to minimize unwanted risks on a large scale compared to normal behavior.

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