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IOT Based Smart Accident Monitoring System

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IOT BASED SMART ACCIDENT MONITORING SYSTEM

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Abstract - Car accidents truly can be considered as one of the most disastrous phenomenon. Though the reasons can be different for those accidents like the main problem can be drivers 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--IoT , ARDUINO IDE , ESP8266 , MPU6050 , MQ3 Sensor , GPS .

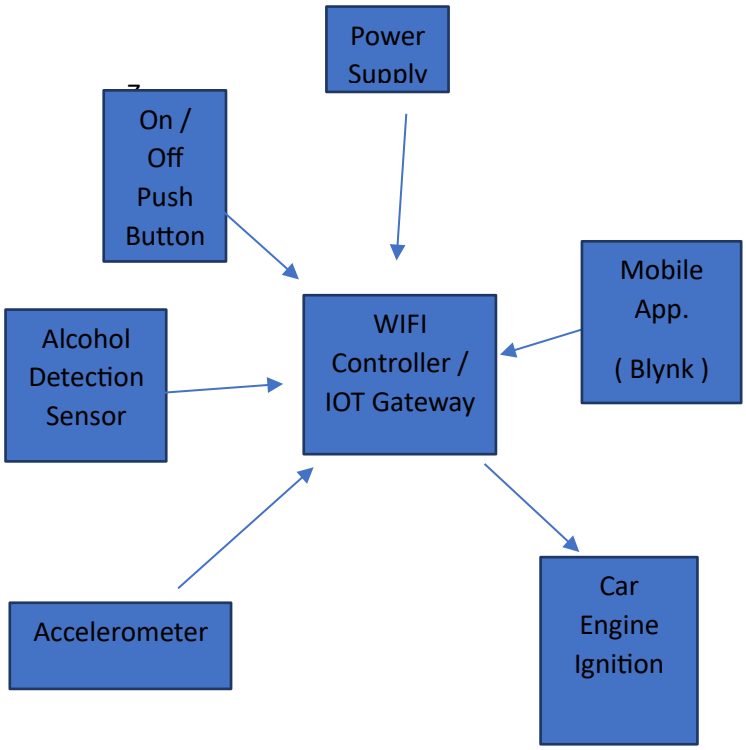
1.INTRODUCTION

- We studied on the statistical facts in the real-time world and we found out that total number of Cars 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 and half, 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 Eco System 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 place that 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 Accident as 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 Informative Alerts to the Mobile Application.

3. BLOCK DIAGRAM



2.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 rotation through 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 is consumed 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 after accidents, due to roadway and drunk driving accidents. So, this app can save some lives and escape from injury.

2.EASE OF USE

- Indifference of one person may result damage to many people. In every region there are some a road facing traffic jams during the year.
- There is a certain limit on car speed running a simple car.
- These places are schools, universities, hospital, disaster areas etc. Statistically 30% of cases have been fatal, 27% serious injuries, 36% minor injuries and 7% injury risks are disclosed.
- The incidence of fatal crashes was even higher twice as much in rural areas as in cities as expectations. This is mainly due to injuries and sudden death. And few are because of driver drinking alcohol, so we come up with an idea for this project.
- There are many people who need health care assistance for road accidents instantly. But there is delay in providing medical emergency due to a poor network.
- This system is also using an alcohol sensor in the car that senses the amount of alcohol consumed. This process is useful for a specific purpose, not to detect and prevent total risk.
- Using the Accident and Reporting System using GPS, alcohol sensor and accelerometer

and gyroscope Technology [5] and the Wi-Fi module, this paper proposes a powerful risk-based monitoring system for driver alcohol consumption and sends a warning to those who are given it. access to track that. Movement.

- The car will be monitored and compared using GPS. This app does not have any warning features that can prevent accidents.

3.COMPONENTS

(A)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. SnO2 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.

(B)ACCIDENT DETECTION SENSOR:

MPU6050 is a micro electro mechanical system.

- It uses the I2C protocol for communication and 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-axis gyroscope and accelerometer with a Digital motion processor which is integrated on a single chip.

(C)WI-FI CONTROLLER:

- • Wifi controller ESP8266 is a cheap wifi microchip. ESP8266 is built on TCP / IP communication software and microcontroller capability.
- The wifi controller is a self contained SOC with integrated TCP/IP protocol stack
- It can give any microcontroller access to your wifi networks.
- It is also known as serial wifi 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.

(D)IGNITION MODULE :

- The sewing module is part of an electrical wiring system that acts as a coil connector or coils.
- In most basic terms, a sewing module is to replace electronic components such as sewing points.
- These components are also called “combustion control units” and “ignitors,” and their main purpose is to interrupt the flow of energy through the main coil of the ignition coil and create high voltage in the second windows.
- As these modules are an example of a strong electronic state, they do not fall under the same type of aging and stress points, and therefore tend to have a longer service life.

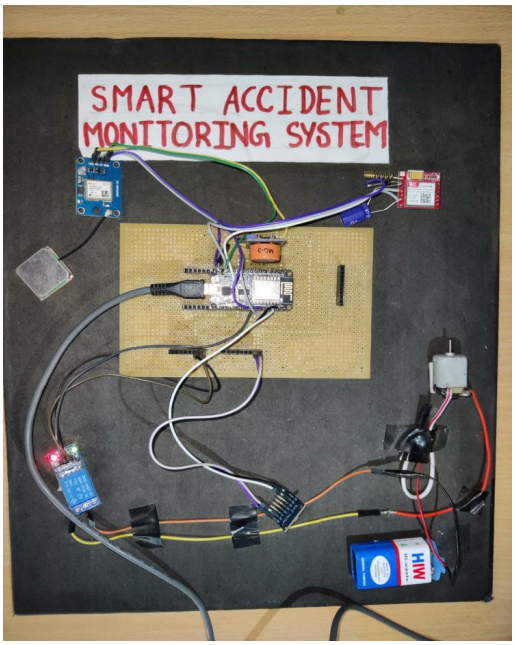
(E)RELAY BOARD :

- The relay board module is an electrical switch that is operated by an eletromagnet.
- 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.

(F) GPS

Sim 800c gsm gps module is the sensor which we are using in our project. 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, can transmit voice, sms and data through low power consumption.

(G)Systematic representation of our final project



4. ABBREVIATIONS USED

UART-Universal asynchronous receiver transmitter ,SPI -Serial peripheral interface, I2C - Inter integrated circuit, IDE-Integrated development environment, IOT-Internet of things, GPS - Global Positioning system , RTOS - Real-Time operationing system, RAM - Random access memory,USB - Universal serial bus ,CPU - Central processing unit, ADC - Analog to digital converter, DMP - Digital motion processor, MQTT - Message queuing telemetry transport.

5.UNITS

- m/s2-Acceleration
- rad/s-Rotation
- degC-Temperature

6.FUTURE SCOPE

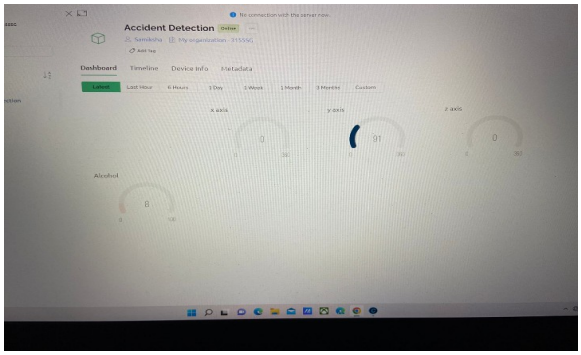
- We can add voice announcement system. It will intimate driver that He/She has crossed the over speed condition.
- We can dial an emergency call if the vehicle goes out of track. We can manage some parameters of vehicles like over heating or LPG gas leakage if the vehicle is LPG based . We can use GSM 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 a accident spot and also to make tracking easier.
- If Driver consumes an alcohol so the vehicle won't be able to work so It will help people from Drunk and Driving or Rash driving and It will also give alarm to be in safe mode. From this device we can also have a conscious driving.

7. RESULT

- The system is simulated using Arduino IDE as a tool to generate test results for each sensor by providing 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 the C system language in Arduino IDE and uploaded to the microcontroller flash memory to test the sensor.
- The data generated by the sensor can be analysed in the output screen of the Arduino IDE. * On the app it gives if the driver has consumed alcohol or not.

- *The location of driver in terms of x,y,z coordinates. *Acceleration in terms of x,y,z coordinates in m/s2. *And temperature in terms of degC.

Alcohol sensor(Ro)	Acceleration(m/s^2)			Rotation(rad/s)			Temperature (degC)
	x	y	z	x	y	z	
35.35	-4.34	0.85	1.07	-0.05	-0.01	0.04	32.99
35.21	-4.35	0.86	1.06	-0.05	-0.01	0.04	33.02
35.35	-4.34	0.86	1.07	-0.05	-0.01	0.04	32.98



8.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 behaviour.

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