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IOT BASED VEHICLE MONITORING AND ACCIEDENT ALERT SYSTEM

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ABSTRACT-
Today, the Internet of Things is most helpful for connecting objects (things) to one another over the internet. The majority of IoT-connected sensor devices have grown in popularity in recent years.
In this study, an IoTbased approach is proposed with the goal reducing accidents caused by drunk driving and driver fatigue. features alcohol content measurement, eyeblinking rate monitoring, vehicle tracking, coordinates, and a alert system that enables the car to recognise a drunk or sleepy state and take appropriate protective action, such as sounding an alarm or notifying family members.

Index Terms- Accident detection; Drowsiness; Alcohol; GSM Modem; GPS Modem; speed; fuel; Temperature

I. INTRODUCTION

The demands for vehicles are increasing rapidly as the population increases. The percentage of road accidents has grown extremely in the last few years, which is an alarming situation for everyone. According to a detailed analysis undertaken by the WHO, Sustainability 2022,14, 7701. 2 of 24 road accidents claim the lives of millions of people each year and are the world's eighth largest cause of death. Road accidents are expected to become the fifth greatest cause of death in the future, according to the Association for Safe International Road Travel (ASIRT) [1]. In urban areas accidents are most common phenomena where many of such accidents can be occurs easily but some accidents occur during night time when the visibility is quite less , in such cases it will be difficult for an ambulance driver to identify the accident location with the help of phone calls made by citizens. If the driving force knows the accurate spot of the accident the time period between the spot and the hospital is going to be decreased. The main motive of this paper is to help reduce the time factor in case of accidents . There are many cases where an accident occurs at night and the person met with the accident is unconscious then it would take hours for someone to find out location and inform the authorities about it.

Therefore, saving such crucial time will actually save lives.An experimental setup is created in relation to this idea that can detect accidents automatically and without assistance from humans.
The same system will communicate accident coordinates to the ambulance to assist quickly locating the scene

upon accident detection. following the victim's transferred into the ambulance a second setup is connected to the patient which will continuously monitor the information of the patient to keep him stable [2] - [8].

Drunk driving is a very dangerous behavior because excessive consumption of alcohol causes distortion in thought pattern of drivers. The investigation conducted by the World Health Organization in 2008 shows that about 50%–60% of traffic accidents are related to drunk driving [9].

Another crucial aspect is sleeping on the wheel. A drowsy driver who falls in sleep and fails to drive a car, it is not possible to catch the situation and handle the position and consequences of an accident. It is important to prevent these types of accidents and detects the sleepiness of the driver. It is an important challenge to solve this type of problem. To avoid accidents it is crucial to develop a system. There are preventive methods that need to be developed. It is mandatory to alert the driver to stop road accidents for this we require a set of up setup of alcohol detection if the driver consumes alcohol means firstly it will lock the engine of car mean car does not start and it will send the SMS to the relatives of the driver and it will also send the SMS to the local police as well fine will be charged against driver. This all process is happening through the IOT. [10]-[12]

II. METHODOLOGY

A. BLOCK DIAGRAM

In this proposed system does not depend on external inputs to detect accidents, it is a self-accident detection technique. In this system, there is a setup that contains an accident-detection sensor, GPS receiver, ESP 32 that work collectively to detect accidents instantly and will send location coordinates to an ambulance/Relatives When an accident occurs the first buzzer will be "on" for 5 seconds message will be sent to . Owner/ police/ hospital or nearby roaming ambulance. In our proposed system which includes another setup is for drowsiness ways by turning on the buzzer and sending the message to relatives and additional authorities by detecting the sign of sleep using an eye blink sensor or an IR sensor system. Additionally, there is an alcohol detecting system that, if activated, locks the car's engine so that it won't start, sends SMS messages to the driver's family members, as well as the local police, and charges the driver with a fine. The Internet of Things is used for the entire process. Our technology uses IOT to track the location of the car and monitor other vehicle parameters .

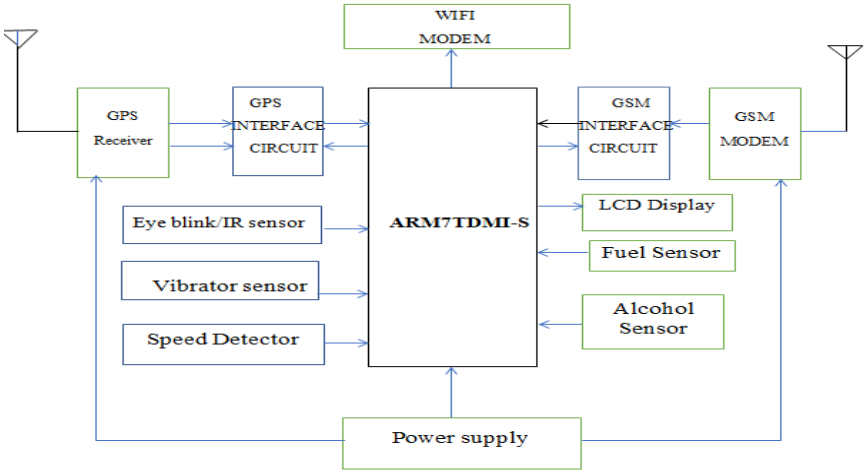

Fig.1: Block Diagram

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B. HARDWARE IMPLEMENTATION

1. ARM7TDMI-S

The LPC2131/32/34/36/38 microcontrollers are actually based on 16/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine the microcontroller having 32 kb, 64 kb, 128 kb, 256 kb, and 512 kb of embedded high-speed flash memory. A 128-bit wide memory interface and a unique accelerator architecture enable 32- bit code execution at a maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with a minimal performance penalty. Due to their very small size and low power consumption, these microcontrollers are ideal for applications where miniaturization is essential, such as access control and point-of-sale. With a wide range of consecutive communications interfaces and on-chip SRAM options of 8 kB, 16 kB, and 32 kB, they are very well suited for communication gateways and soft modems, voice detections, and low-end imaging, providing both large buffer size and high processing power. Many 32-bit timers, single or dual 10-bit 8-channel ADC(s), 10-bit DAC, PWM channels, and 47 GPIO lines with up to nine sides or level-sensitive external interruptions pins make these microcontrollers particularly suitable for industrial control and medical systems

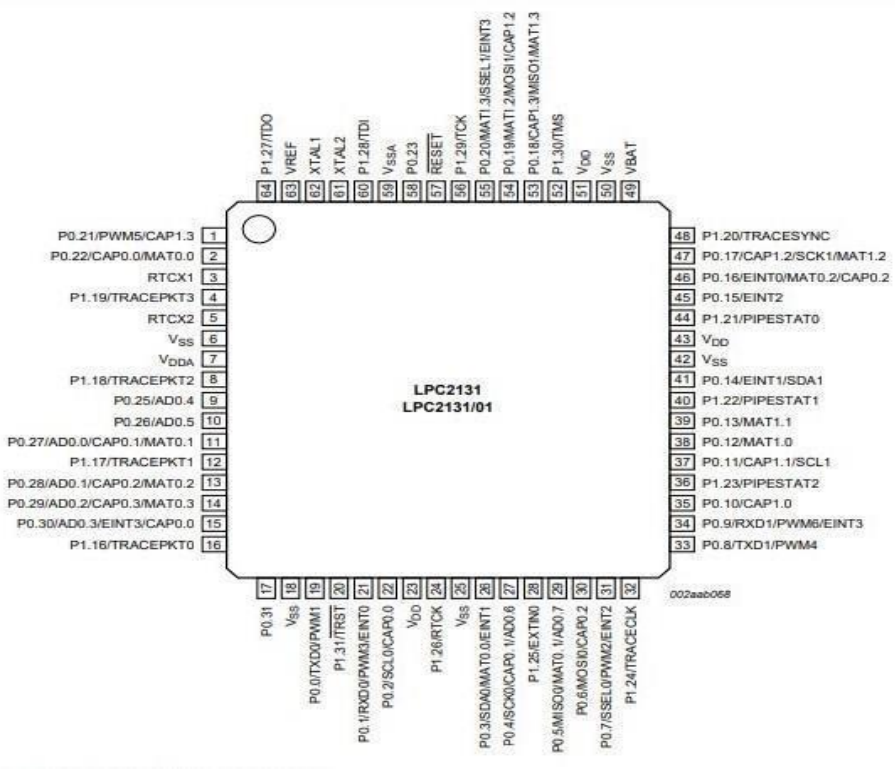

Fig.2: Pin Configuration of ARM7TDMI-S

2. GSM MODEL:

Global System for Mobile Communications (GSM) modems are specialized types of modems that operate over subscription based wireless networks, similar to a mobile phone. A GSM modem accepts a Subscriber Identity

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Module (SIM) card, and basically acts like a mobile phone for a computer. Such a modem can even be a dedicated mobile phone that the computer uses for GSM network capabilities.

Traditional modems are attached to computers to allow dial-up connections to other computer systems. A GSM modem operates in a similar fashion, except that it sends and receives data through radio waves rather than a telephone line.

Fig 3: GSM Model

3. GPS MODEM:

The Global Positioning System (GPS), originally Navstar GPS,[2] is a satellite-based radionavigation system owned by the United States government and operated by the United States Space Force.[3] It is one of the global navigation satellite systems (GNSS) that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.[4] It does not require the user to transmit any data, and operates independently of any telephonic or Internet reception, though these technologies can enhance the usefulness of the GPS positioning.

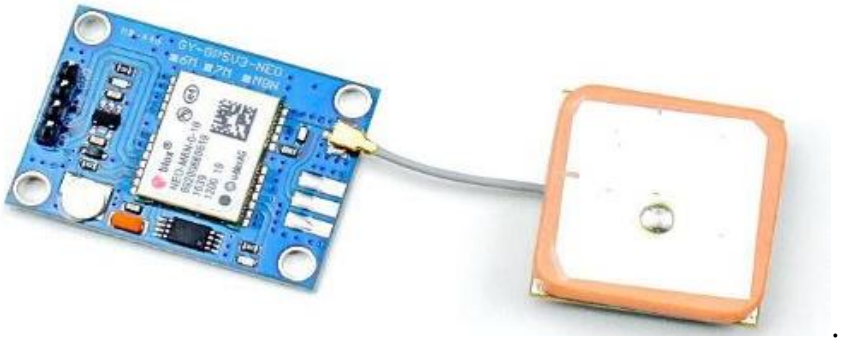

Fig.4: GPS

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4. EYE BLINK SENSOR:

This eye blink sensor is based on IR. It consists of an IR transmitter and IR receiver. The eye blink sensor illuminates the eye with infrared light and monitors the changes in the reflected light. The infrared light reflected from the eye is used to determine the results. The sensor output is active high for Eye close and can be given directly to microcontroller for interfacing application (e.g. buzzer).When this output remains high for a specific time period (threshold), the driver is considered to be drowsy. Consequently a buzzer can be activated in order to wake the driver.

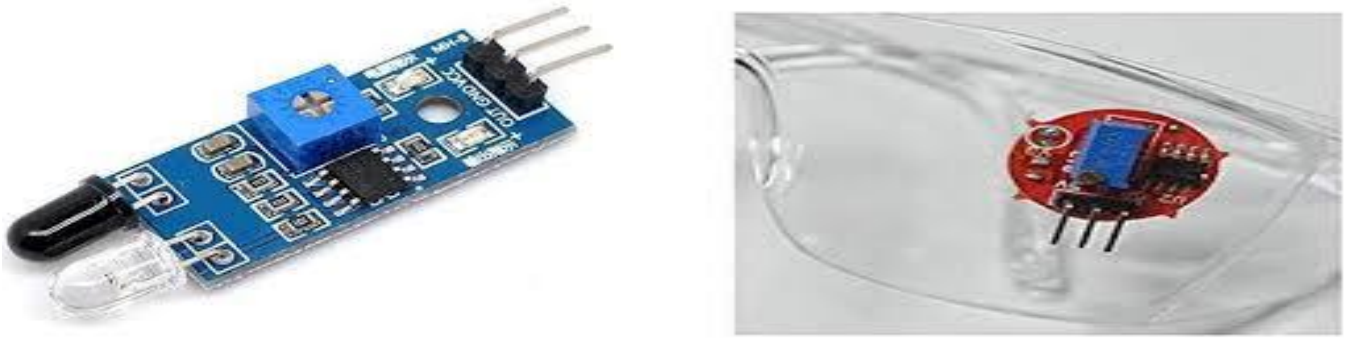

Fig 5 : Eye Blink Sensor

5. ACCELEROMETER SENSOR:

An accelerometer is a tool that measures proper acceleration. Proper acceleration is the acceleration (the rate of change of velocity) of a body in its own instantaneous rest frame;[2] this is different from coordinate acceleration, which is acceleration in a fixed coordinate system.

Single- and multi-axis accelerometers can detect both the magnitude and the direction of the proper acceleration, as a vector quantity, and can be used to sense orientation (because the direction of weight changes), coordinate acceleration, vibration, shock, and falling in a resistive medium (a case in which the proper acceleration changes, increasing from zero)

Fig.6: Accelerometer Sensor

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6. ALCOHOL SENSOR

The MQ3 sensor is one of the most widely used in the MQ sensor series. It is a MOS (Metal Oxide Semiconductor) sensor. Metal oxide sensors are also known as Chemi resistors because sensing is based on the change in resistance of the sensing material when exposed to alcohol. The MQ3 alcohol sensor operates on 5V DC and consumes approximately 800mW. It can detect alcohol concentrations ranging from 25 to 500 ppm. The MQ series of gas sensors utilize a small heater inside with an electrochemical sensor these sensors are sensitive to a range of gasses are used at room temperature. MQ135 alcohol sensor is a Sno2 with a lower conductivity of clean air. When the target explosive gas exists, then the sensor's conductivity increases more increasing more along with the gas concentration rising levels. By using simple electronic circuits, it converts the charge of conductivity to correspond output signal of gas concentration. The MQ135 gas sensor has high sensitivity in ammonia, sulfide, benzene steam, smoke, and in other harmfull gas. It is low cost and suitable for different applications.

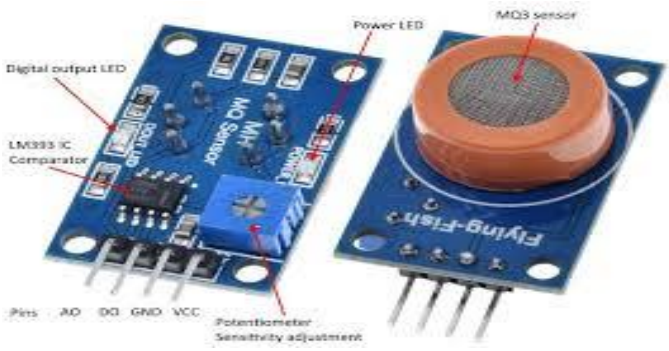

Fig.7: Alcohol Sensor

C. FLOWCHART OF ACCIDENT ALERT

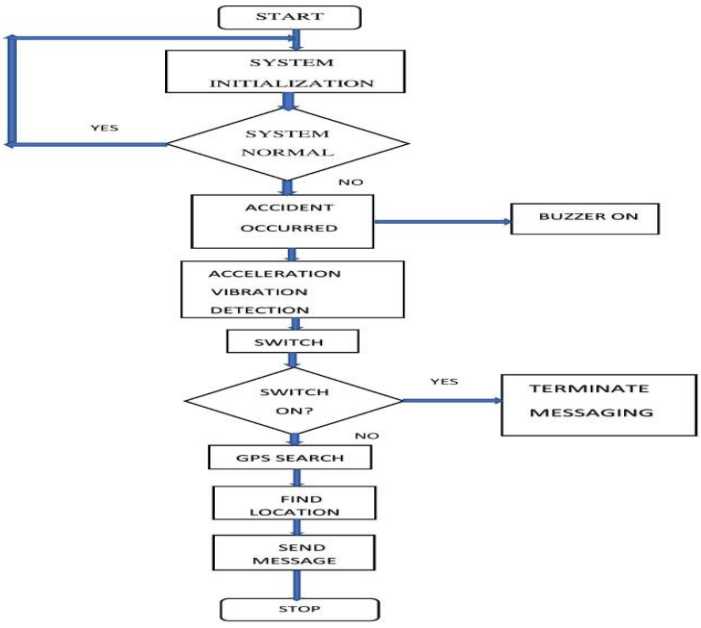

Fig 8: Flowchart of Accident Detection

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III. RESULT

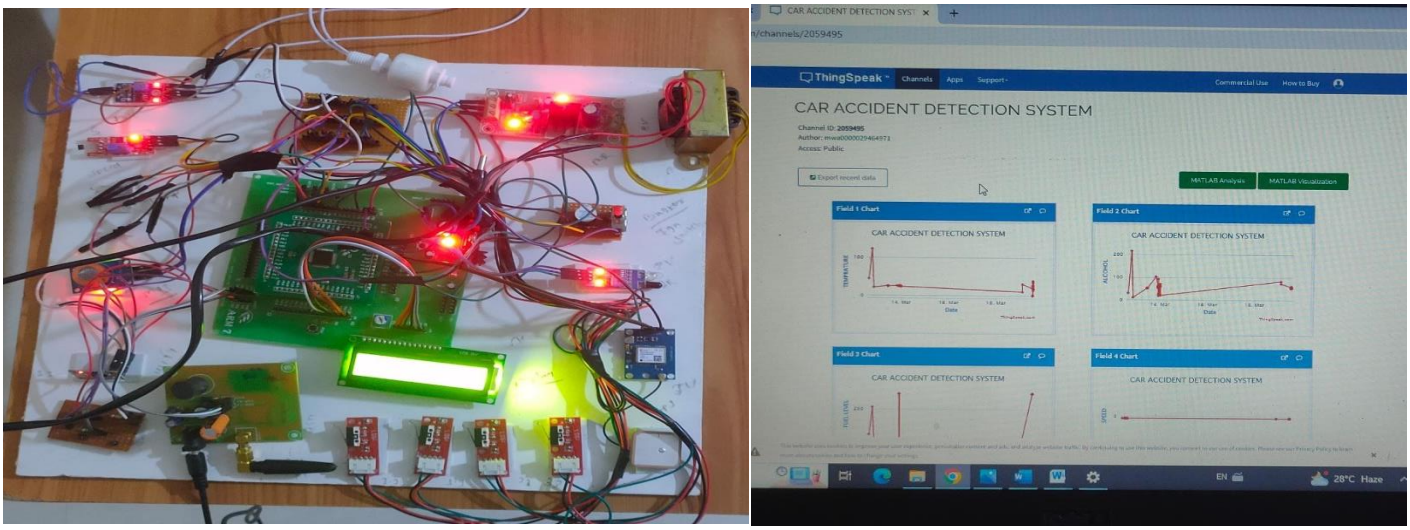

Fig 9: Result of Hardware and Webpage Data

IV. CONCLUSIONS

The proposed system uses the IoT technology for vehicle Monitoring and Accident alert system. Vehicle tracking is created utilising a GPS modem to locate the accident and detect it.It is possible to create an intelligent system for cars that, using a hardware platform, can detect the effects of alcohol and sleepiness on the driver and transm it that information the base unit.This solution will make transportation safer and will lessen the growing number of collisions brought on by inattentive driving.The it also keeps an eye on the car's fuel level, speed, and temperat ure.

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