IOT BASED AUTOMATIC VEHICLE ACCIDENT DETECTIONANDRESCUE INFORMATION SYSTEM

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ABSRACT:

The Paper includes an IOT based vehicle accident detection and rescue information system, which sends information of the vehicle accident occurred location and time to the vehicle owner, nearest ambulance services and police station through web services. GSM/GPRS modules are used to establish the communication between the web server and hardware device in the vehicle, and GPS module is used for tracing the location. Vibration sensor is used for detecting the accident. This idea is developed based on real time data fetching from hardware device using sensors, simultaneous storage of data in web server and sending of notification to the rescue team through SMS, web application or android mobile application.

***Keywords:****Accident, Arduino mega2560, GPS, GSM, Sensors.*

I.INTRODUCTION

In day-to-day life, usage ofvehicles are more and therefore chance of road accidents are increasing, hence people lives are under risk. This maybe because of lack of real time information capture and communication. An IOT based automatic accident detection and rescue information system is introduced here. The proposed design of the system can detect accidents in significantly lesser time duration and sends the relative information like accurate time and exact location of vehicle accident to the rescue team, which will help in saving precious lives.

II.RELATED WORK

1. **GPS:** In many IOT based researches, vehicle tracking system used to find the vehicle location. In [1], GPS and GSM network were developed for hardware and software use. In [2], Vehicle tracking system installed in a vehicle which is an electronic device to enable the owner or authorized third party to track the vehicle's place.

2. **GSM:**In [3], the SMS and GSM were implemented based on remote monitoring system. The hardware and software design of the GSM is a medium for transmitting the remote signals. In [4], the tracking system proposed is based on cloud computing infrastructure.

3. Wi-Fi Module: In [5], Wi-Fi Module is used for uploading the information fetched from the controller to the IOT.
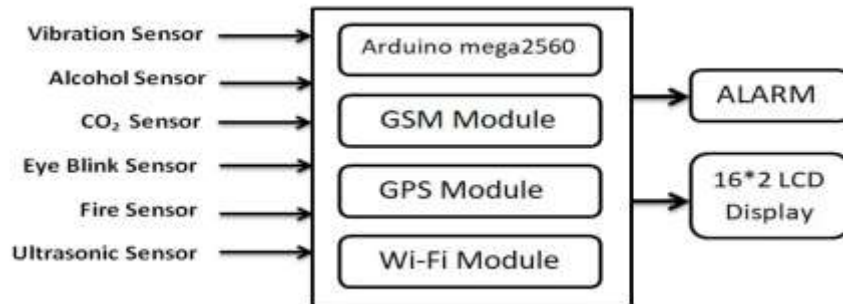
Fig.1.System Block

III.METHODOLOGY

CONTROLLER

The Arduino Mega 2560 is a microcontroller board based on the AT mega 2560. It has 54 digital input/output pins, out of which14 can be used as PWM outputs and 4UART's. Also it has 16 analog inputs, a 16MHz crystal oscillator, a USB connection, a power jack and a reset button. Controller has to be connected to the computer with USB cable and can also be powered with a battery to get started. The operating voltage of the controller is 5V and the input voltage recommended is 7 to 12V.

GPS Module

It stands for Global Positioning System using which we can obtain the position information anywhere in the world. At first, the time signal is sent from a GPS satellite at particular point. The time difference between GPS time and the time at which the GPS receiver receives the time signal can be used to calculate the satellite distance from the receiver. GPS will help in finding the longitudinal and latitudinal distance which is very much important to track the exact location.

GSM Module

It stands for Global System for Mobile Communication. It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services. GSM digitizes and reduces data, then sends it down through a channel.

Vibration Sensor

This sensor used for detecting the accident (vibration) in the vehicle. It contains two piezoelectric materials, whenever an accident occurs they come in contact with each other resulting which current is generated as output.

Eye Blink Sensor

It is an IR based sensor, senses the eye blink using infrared, the variation across the sensor vary as per eye blink. The closing or opening position of an eye can be known by this sensor. This sensor can be used to avoid accident due to unconscious, sleepy etc. The operating voltage of this sensor is 5V.

Alcohol Sensor

It is a semiconductor sensor which can detect presence of alcohol gases. Sensitive material used in this sensor is SnO_2(Tin dioxide), whose conductivity increases with increase in concentration of alcohol gases. It will provide both digital and analog outputs, but here resistive output which is based on alcohol concentration taken in analog outputs. This sensor has high sensitivity and fast response time. The operating voltage of this sensor is 5V.

CO_2 Sensor

It is more sensitive towards CO_2 gas. MQ135 gas sensor used here acts as air quality monitor. This sensor is used to detect the harmful gases in the vehicle. The operating voltage for this sensor is 5V.

Fire Sensor

It is a sensor designed to detect the presence of fire. It can often respond rapidly and more accurately than any smoke sensor. Whenever fire is detected, it will notify by alarming. The operating voltage of this sensor is 5V.

Ultrasonic Sensor

It is a device that can measure distance of an object (obstacle) with the help of sound waves, usually this sensor is fixed in front end of the vehicle. By continuously transmitting a sound wave at a specific frequency and receiving that sound wave back, the device measures the distance of an object, present by recording the time period between transmitted and received sound wave. The operating voltage of this sensor is 5V.

Fig.2. System Flowchart
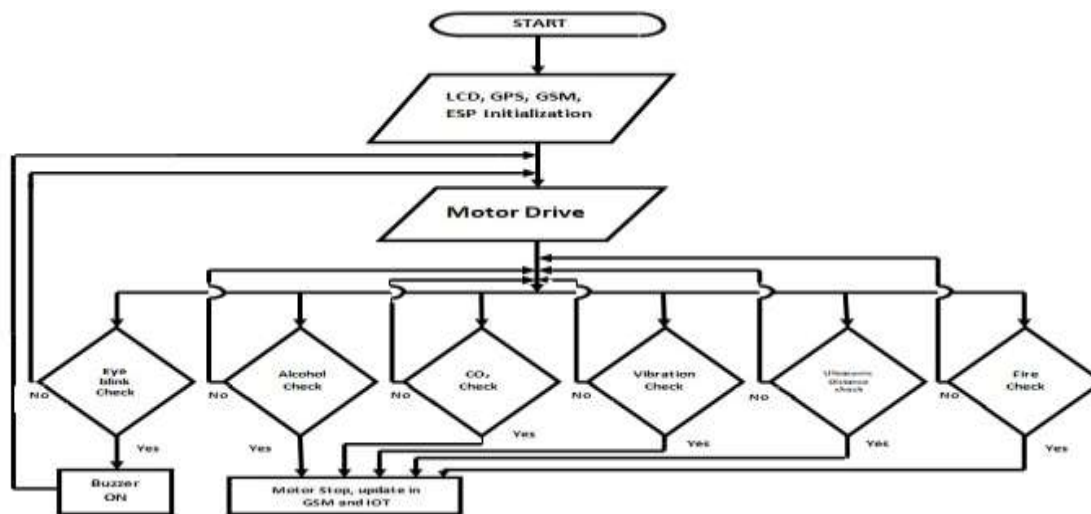
The main objective of the system is to min... occurring all over the world by utilizing the updated technology. The design involves, mainly Arduino Mega 2560 controller, Vibration sensor, GSM module, GPRS module and Wi-Fi module to detect the vehicle accident and update the information to the IOT and also send basic information through SMS and android mobile application. In addition, Fire sensor, CO_2 sensor, Alcohol sensor, Ultrasonic sensor and Eye-blink sensor are also used for purpose like fire detection, excess harmful gas detection, alcohol detection, obstacle detection, etc. All these modules and sensors are interfaced with the controller. When the vehicle is moving the controller continuously checks for vibration and eye blink sensor outputs because these two sensors acts as interrupts. When output is detected from the sensors then vehicle automatically stops and notification is sent to the rescue team.

IV.CONCLUSION

An IoT based vehicle accident detection and rescue system is successfully designed using which vehicle accidents can be minimized. This system is capable of accessing the required data and securely sends to the server. It can continuously tracks the vehicle's geographical location and can also with the nearest ambulance services, vehicle owner and police station to send the basic information whenever an accident occurs using which the rescue team can reach the spot with lesser time duration. Since it is real time data fetching, the system is more convenient to get the accurate information.

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