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IOT Based Vehicular Emergency System: A survey

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***Abstract*— In this paper we have present Internet of Things (IOT) based vehicle tracking and vehicular emergency system, it consists basic flow diagram, algorithms and system architecture used in proposed system. This system proposed alert tool in vehicle motors for preventing accident or it send alert message to registered number. This system can send the important data to emergency management group, it sends information like the time and location of vehicle accident had happened. This concern message is sent to the registered user in a brief span, which will help in careful the important lives.**

***Index Terms*— Infrared Sensor (IR) Amazon web services (AWS), Global Positioning System (GPS), Global System Module (GSM), Microcontroller, Cloud Storage..**

I. INTRODUCTION

Several factors are responsible for the frequent occurrence of road accidents in India. The rapid growth of population has led to an increasing number of vehicles, subsequently resulting in traffic congestion. The poor Indian roads, especially during monsoon season, are an additional contributing factor. These roads are both modern highways, and narrow, unpaved roads which are consistently rebuilt. A mix of high-speed motor vehicles, low speed's NMTs (Non-Motorized Transport) and pedestrians, all gather on the same perilous road infrastructure. In this scenario, the sheer carelessness of a single driver places countless lives at risk. Moreover, it is hard to achieve services that would otherwise work in consistent road conditions. This issue is one of the most contributing factor to the rising rate of accidents and deaths. Therefore, the need of the hour is to provide emergency service's systems that would alert for medical aid at the earliest. The scene of any road accident is confused. The crowd consists of 3 major groups, namely, the passersby, the drivers, and most importantly, the victims. The injured party requires immediate medical attention. Some passersby may try to contact the ambulance and the victims' relatives. A crowd inevitably gathers, which lead to traffic build up around the casualty. There, the ambulance may find it impossible to reach the accident site on time. Slower, inefficient emergency response increases the risk of losing lives.

The IoT (Internet of things) is the expansion of Internet connectivity and physical devices and daily items. Entrenched among electronics, Internet connectivity, and extra forms of hardware (such as sensors), these devices can correspond and in with others over the Internet, and they can be distantly monitored and limited. Conventional fields of embedded systems, wireless sensor networks, control systems, automation (counting residence and house mechanization), and others all contribute to enabling the Internet of things. IoT technology is the majority identical with products pertaining to the theory of the "smart home," cover devices and appliance. It maintain single or extra universal ecosystem, and can be controlled via devices associated with that ecosystem, such as Smartphone's and smart speakers. We are introducing the automatic aware device for motor vehicle accidents. The proposed system detects the accident and sends the information in less time to nearby first aid centers. The track tracking system provides the exact location of the incident that occurred. We are using Atmega in our project. When the system is switched on, led will be ON, indicating that power is supplied to the circuit. The smoke sensors that we are using in, our project sense the obstacle, and then it sends interrupt to Atmega. The GPS receive the location of the vehicle that met with an accident and gives the information back. This information will be sent to a mobile number.

II. LITERATURE SURVEY

In [1], Mane Apurva et al., describe the method for motor vehicle accident discovery and remote alarm mechanism with Arduino. solution of this propose include motor vehicle monitor by transfer its information about location, time, and point of view to the monitor position and to the client mobile that should assist them to acquire medical help but accident, or the theft occur. Also, client has an right to use to get actual position of a vehicle. At whatever time accident occurs, MEMS and tremor sensor detect and send the signal to microcontroller, by via GPS locations where accident has occur is establish, then GSM sends message to allowed members.

In [2], M. Rama Mohan Rao et al., Proposed an accelerometer base method for driver security. The methods have the benefit of tracking or identify vehicle's location just by sending a SMS or email to the authorized person. The ARM11 structure is proposed via Raspberry Pi for fast access to accelerometer for motor accident detection. Is nearby any incident is occurs, the message sent to the allowed person, so they can take instant action to save the lives and decrease the damages. Images captured by the camera on the vehicle are

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emailed to the concerned person (for example the owner of the vehicle) with the type of accident and the time of the accident.

In [3], Suryakala N.et al., projected an Automatic motor vehicle Accident discovery and Messaging System with GPS and GSM Modems. AT89C52 controller is used in this proposed system. Once the system is switched on, LED is ON representing that power is supplied to the circuit. At what time the IR sensors that are used sense any obstacle, it send signal to microcontroller. The GPS accept the location of the motor vehicle that meet with an accident and gives the information back. The information is send to authorized users mobile number to get the situation of accident. This message is received via GSM modem present in the circuit. This data gives the information of location, situation in values. Using this information, the position of the motor vehicle can be estimated.

In [4], Kiran Sawant et al. proposed an accident alert system using GSM and GPS modem and Raspberry Pi. A piezoelectric sensor first senses the occurrence of an accident and gives its output to the microcontroller. The GPS detects the latitude and longitudinal position of a motor vehicle. The latitudes and longitude position of the vehicle is sent as message during the GSM. The static IP address of central emergency transmit server is pre-saved in the EEPROM. Whenever an accident has occur, the position is detected and a message has been sent to the pre-saved static IP address.

III. DATAFLOW DIAGRAM

The Flow Chart of the system is shown in the figure 1.

1. Start
2. Initialize Port (PC) as output for LCD.
3. Display “Project name” on LCD (IOT based vehicular emergency system).
4. Initialize UART at baud rate 9600, 8-N-1 for Wi-Fi at (PD0 & PD1) ports of AT mega 32.
5. Initialize GPS at Baud rate 9600, 8-N-1 at port (PD7) of AT mega 32.
6. Initialize GSM at Baud rate 9600, 8-N-1 at port (PD6) of AT mega 32.
7. Connect hotspot (for GPS activation).
8. Read the GPS readings that are in form of longitude and latitude.
9. Interface smoke sensor to (AD 2) of AT mega-32 and check whether smoke is detected.
10. If smoke is detected send location to user (SMS).
11. If Dash switch=1 then send GPS reading to user (SMS).
12. END

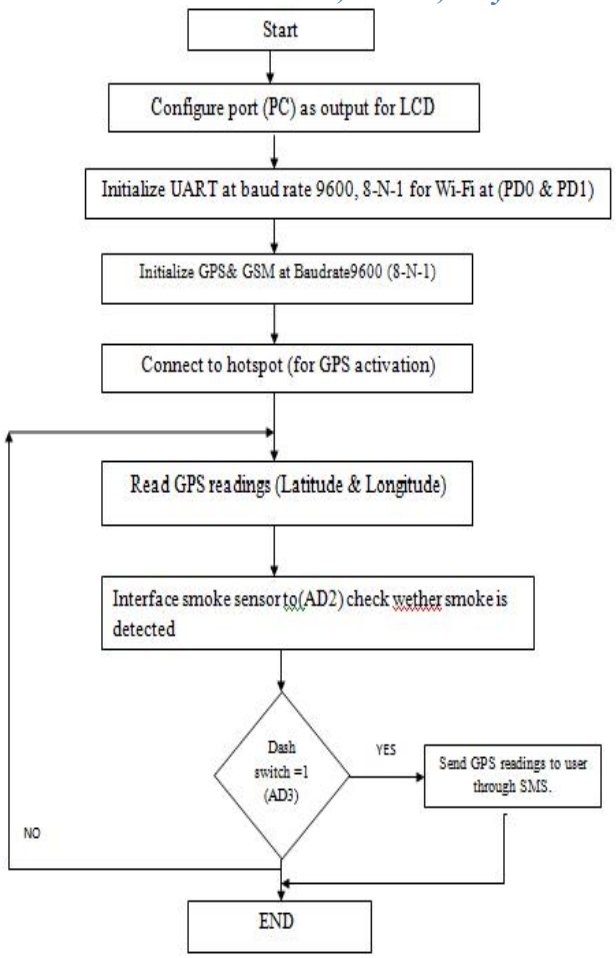

Fig 1: Flowchart of the System

The microcontroller, along with the entire system, is powered from an external supply (such as a battery). When the system is in its initial state, all the values are below the threshold and no corresponding action is taken. The system continuously monitors the values recorded by the sensor. When the microcontroller detects a change in the measured values, it detects the occurrence of an accident. Typically in this scenario; the vehicle either experiences a collision or gets tilted. This produces a response from sensor, and the latter sends an electric charge to the microcontroller, thereby alerting it. The system does have a physical ALERT button, which can be pressed by the driver in case of a positive. In this case, the entire alert process is activated. That is, if the driver is physically harmed, then he may choose to simply press the ALERT button and alerts will be sent[6].

IV. SYSTEM ARCHITECTURE

The plan of the system is to generate a intelligent accident detection systems the use of that detects the occurrence of an accident and sends a message to the traffic operate authorities or tragedy help centers in case of an accident so that instant assist can be provided. It also allows immediate monitoring of vehicle’s location by sending message. The system has a switch to agree to driver to stop alert system in case of false alert alarms. This device acts as a black container to vehicles. The vehicle’s position can be see the use of Google maps

which is a simpler than Location in conditions of latitude and longitude.

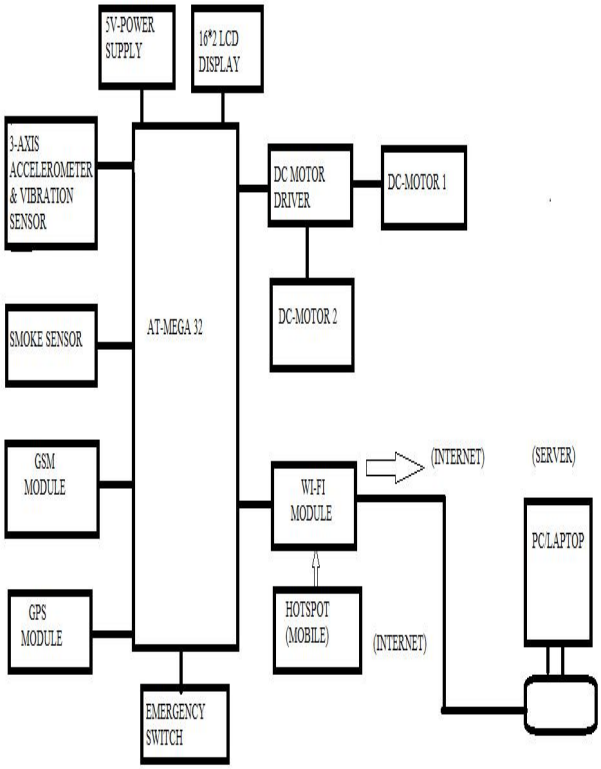

Fig 2: Architecture System Block Diagram

A. *Atmega 32*

Atmega 32 is the main part of the system, using atmega 32 we have interfaced smoke sensor, GPS & GSM module when smoke is detect by smoke sensor the Atmega 32 gives signal to GSM component, this GSM module will send an alert message to the user.

This will allows the svms to continuously keep track of vehicles Location. This data will be used to find the location of accident.

B. *GPS module*

The GPS (Global Positioning System) module is a little electronic circuit allows us to attach to the board to obtain the both things that is location and altitude, as well as the speed, date and time in UTC (Coordinated Universal Time).

C. *GSM module*

When smoke is detected by the smoke sensor the GSM module will immediately send an alert message, if the smoke detection continues after delay of 20msec again an second SMS alert will be send to the registered user and the contacts that are available with Atmega 32.

D. *Smoke sensor*

This is straight related to the proposed system in case of accident if fuel tank is damaged there is possibility of fire the smoke sensor detect the smoke and immediately give the alert message to the system.

E. *Lcd display*

The reasons after using Lcd's : LCDs are inexpensive; simply programmable; have no limitation of displaying special & even custom characters (unlike in seven segments).LCD display is used only to display the name of the project.

F. *Wi-Fi Module*

The ESP8266 is the low cost Wi-Fi microchip among full TCP/IP stack and microcontroller ability. The ESP8266 is capable of also hosting an application or offloading all Wi-Fi networking functions from another application processor. WIFI module is used to provide internet access to the GPS module.

V. CONCLUSION

The purpose of this survey paper is to provide an overview of the functionality of an IOT enable real time vehicular emergency system. By which team can provide instant medical or civil help to the site of accident. Using Atmega 32 we have interfaces smoke sensor using Atmega 32 we have interfaced Smoke Sensor, GPS & GSM Module when smoke is detected by smoke sensor the Atmega 32 gives signal to GSM Module, this GSM module will send an sms alert to the user. A delay of 20 msec is provided in the programming so that continuous sms are not send. if the smoke detection is continued after 20 msec again an sms will be send to the user and other contacts in the program. GPS module is interfaced to Atmega 32 we will get the exact latitude and longitude according to the location of the vehicle. As we need internet for GPS Wi-Fi module is interfaced to Atmega 32.

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