

# IOT BASED DRIVER ASSISTANCE MANAGEMENT SYSTEM

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**Abstract :** The increase in population leads to increment in accident. In some of the highly populated countries such as India, during accidents, people lose their lives due to unavailability of proper medical facilities at the right time. This paper detects the accident using the sensors present in the vehicle. The monitoring team or road side unit will receive the data of all the sensors through the MQTT cloud service i.e. hiveMQ broker free service provider that handles the task of data transmission and sends the alert message or push notification to the rescue team with the help of FCM through mobile application. GPS provides the location of the vehicle. LED will display the help message to the passing by vehicle. The proposed system will save many road side accident victims by providing proper medical service at right time.

**IndexTerms - Accident detection, Arduino UNO, Sensors, MQTT, FCM, GPS, Mobile application.**

## I. INTRODUCTION

Now a days Accidents on the road have been one of the major causes of unnatural and untimely death all over the world. This has become one of the most important issues of concern all over the world. It can be little difficult to avoid such accidents on the road but with the advancement of smart technology, there is an possibility to provide an on time and better health care or emergency services like rescue team that would help us save the life of the people affected in the accidents. This system has the ability to detect accidents and which will be detected due to the impact or vibration sensors present in the vehicle. Secondly, the mobile application will be used to get the real-time location of the vehicle and pass the message to nearby vehicles, hospital and police station and get notifications regarding the vehicle being mentioned while the tracker system will be used for managing the information about the vehicle and the system as a whole.

### A. MQTT (Message Queuing Telemetry Transport) Protocol

MQTT (Message Queuing Telemetry Transport) is the lightweight, publish-subscribe network protocol which is used to transport messages between devices. The connected devices in MQTT protocol are known as clients, which communicate with a server referred to as the broker. HiveMQ is used as the MQTT broker which is the free service provider that handles the task of data transmission between clients and whenever a client known as the publisher wants to distribute information, it will publish to a particular topic, the broker then sends this information to any clients that have subscribed to that topic known as subscribers.

### B. FIREBASE CLOUD MESSAGING (FCM)

Firestore cloud messaging is the one which was previously known as Google Cloud Messaging, is a cross-platform cloud for solution for messages and notification for Android, IOS and web applications. Here Firestore Cloud Messaging is used by the monitoring team or road side unit to send the push notification of the accident to the rescue team.

## II. LITERATURE REVIEW

[1] Vehicle Collision detection and Remote Alarm Device using Arduino. This paper represents the ways for vehicle collision detection and remote alarm device exploitation Arduino. Key the options of this style embrace period vehicle observance station and to the user mobile that should be facilitated them to induce medical facilitate if accident or the stealing happens. Also user has Associate in nursing access to include period position of a vehicle in real time. Whenever the accident occurs the mem sensor and the vibration sensor detects and sends the signals to the microcontroller, by exploitation GPS specific locations wherever accident has occurred is found, then GSM sends Accident Detection and Messaging System Using GSM sends message to authorized members. [2] Automatic Vehicle Accident Detection and Messaging System Using GSM and GPS Modem. In this paper an automatic alarm device is used in the vehicle which sends the basic information to the medical rescue team within a few seconds of an accident. This device can detect the accidents and send an alert message to the rescue teams in significantly less time which will help in saving the lives of the people. [3] An IOT Based Smart System for Accident Prevention and Detection. In this paper the system detects the accidents by vibration sensors, accelerometers. For detection, GPS and GSM module is used which locates the site of the accident and correspondingly informs the persons near ones and nearby hospitals through a text message. [4] Vehicle Collision Detection and Avoidance with Pollution Monitoring System Using IOT. In this paper different units are implemented which enhance the vehicular system. The main objective is to detect the accidents in real time and minimize the response of time of medical help. For the accident avoidance, tire pressure is measured whereas in the accident detection is implemented with the help of node MCU. MQ7 is used in order to monitor the pollution. The proposed system is useful in reducing the vehicular accidents and pollution monitoring will help to know the environment. [5] Vehicle Positioning System with Accident Detection Using Accelerometer Sensor and Android Technology. In this paper two different technologies is used to detect the accident namely embedded and android. Embedded technology is used to detect the accident by using the accelerometer sensor and android

technology is used to determine the name of that location instead of latitude and longitude values and can know about the vehicle location.

### III. EXISTING SYSTEM

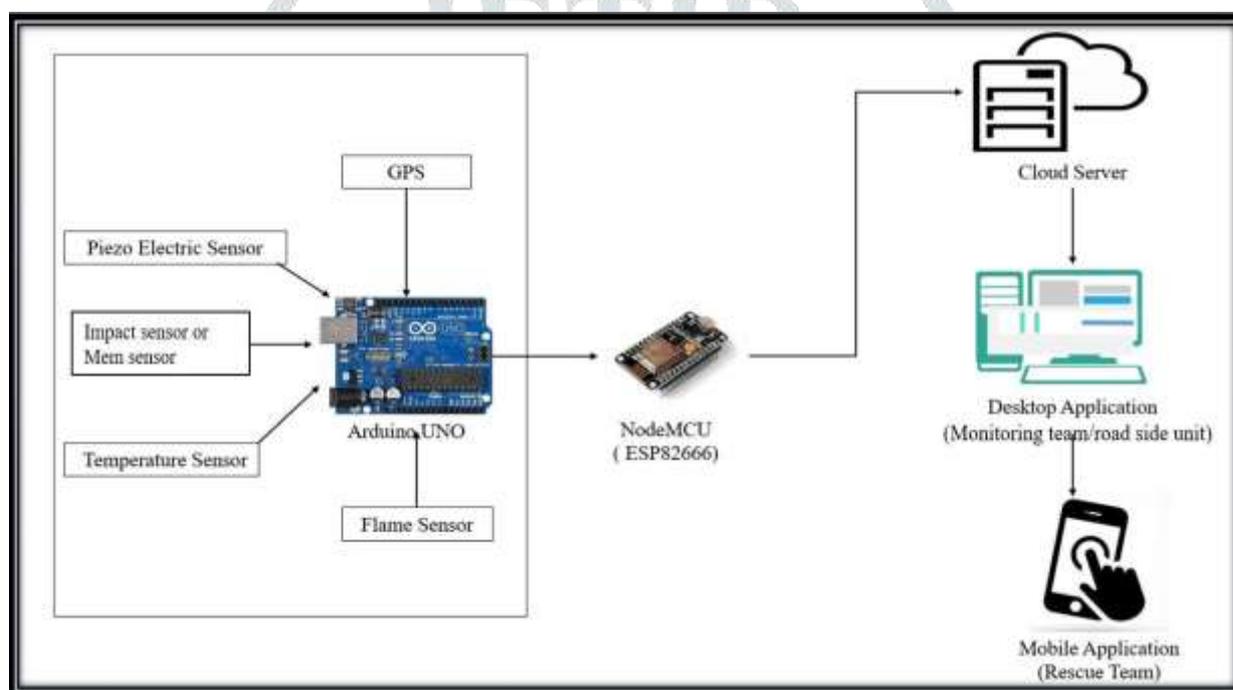
The existing system only use the information about the vehicle's vibrating measurements to detect the accident and that is doesn't work in network less areas. And after occurrence of the accident, controlling of traffic takes high time. Hence there is a delay for emergency services to arrive at the location of the accident and providing necessary health care which may even lead to death of the people met in accident or health issues. Also there is no system to recognize the flames in the vehicle or smoke in the vehicle immediately when the driver is driving the vehicle. This system is manual time consuming and also puts the life of the accident affected person at high risk.

### IV. PROPOSED SYSTEM

The proposed system provides the real time application to detect the accident. It helps the road accident victims by providing the medical service at right time. It detects the accident using the sensor system. The monitoring team will send the accident details to the rescue team.

- The aim is to detect the road accidents using the IOT technology and provide the road accident victims proper medical help at the right time.
- To design the vehicle unit with sensor system to detect accident details and send the alert message to road side unit. □  
To design the road side that receives all alert messages and sends that into the rescue team.

### V. SYSTEM DESIGN



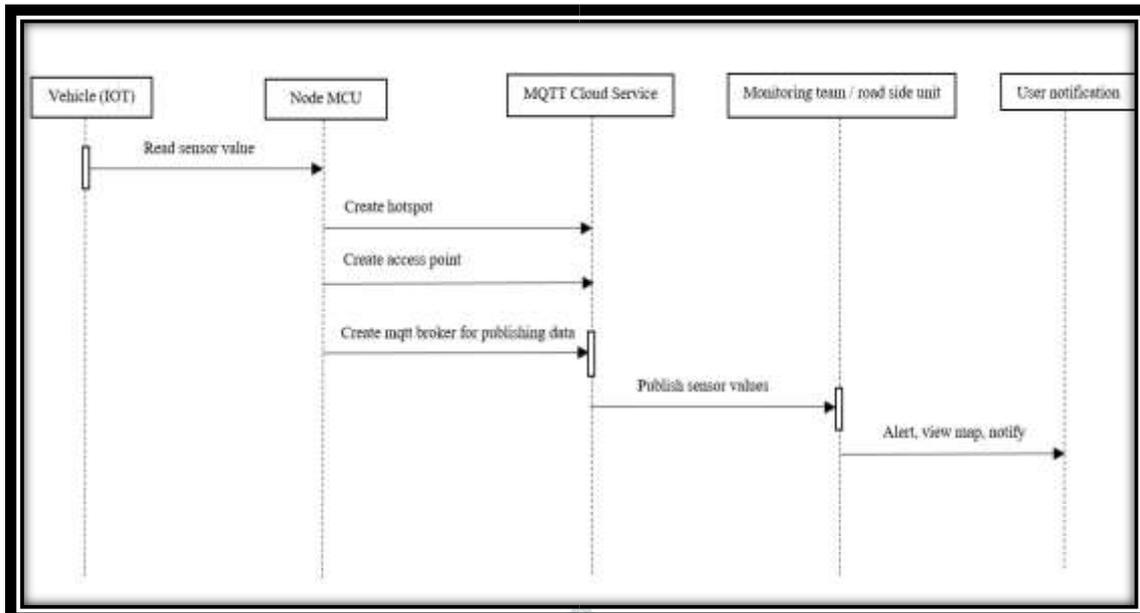
**Fig 1: System Architecture of Smart Seat for Driver Assistance Management**

This Fig 1 depicts the work flow of the accident detection and rescues management. The accident is detected using the sensor system. The temperature of the driver is monitored all the time. If there is a fire in the vehicle flame sensor is used to detect the fire. Whenever the vehicle meets with the accident the Impact sensor will detect the accident. The controller will get the input of all these sensors and send it to the cloud by using MQTT protocol which will send the data of all the sensors with the comma separation to the monitoring team or road side unit who will separate the values of the each sensors and sends the push notification using FCM to the rescue team. GPS will track the live location of the vehicle. Using the mobile application the rescue team can view the location and accident details. This helps the road accident victims to get the medical help at the right time.

**Arduino UNO:** The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with the sets of digital and the analog input/output pins that may be interfaced to various expansion boards and other circuits. The Arduino is one of the major control unit to detect or alert when an accident occurs.

**GPS (Global Positioning System):** The GPS is used to identify the exact location of the vehicle. In case of an accident, the system determines longitude and latitude of a position of an accident through the GPS module.

**FCM (Firebase Cloud Messaging):** Firebase Cloud Messaging is a cross platform which is used to send the push notification of the accident to the mobile of the rescue team.



**Fig 2: Sequence Diagram of Smart Seat for Driver Assistance Management**

This Fig 2 depicts the sequence diagram of Smart Seat for Driver Assistance Management. When the accident occurs the sensors value is read by Node MCU and it creates the hotspot and access point and sends to the MQTT cloud server to publish the sensor values then the monitoring team or road side unit will receive the accident details and it sends the notification to the rescue team through mobile application.

**VI. RESULTS**



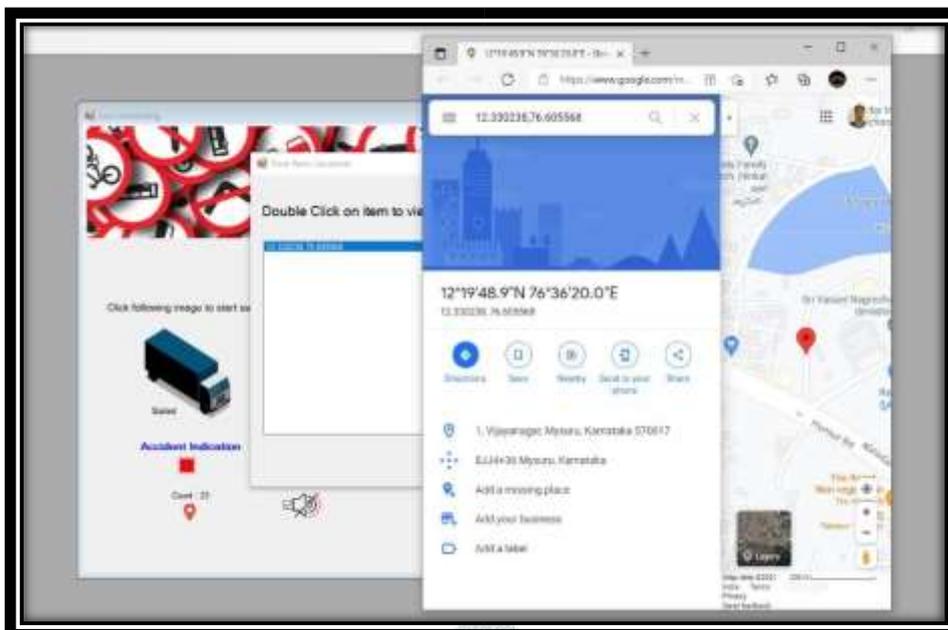
**Fig 3: Vehicle unit with Arduino UNO**

This Fig 3 depicts the vehicle unit which is integrated with the sensors and with the Arduino UNO which is the microcontroller board that get the inputs of all the data in the digital or analog form.



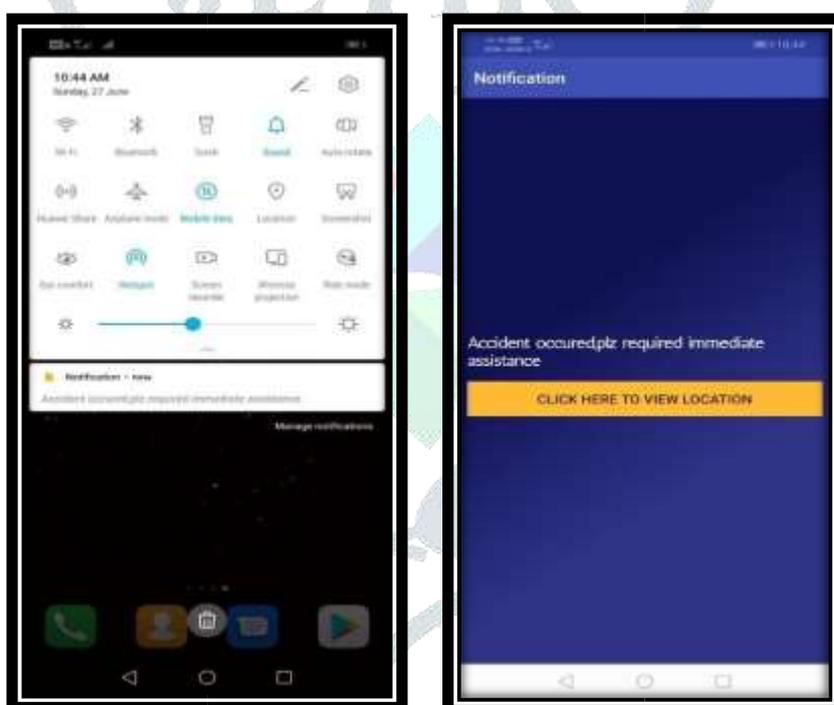
**Fig 4: Live Monitoring Pages**

This Fig 4 depicts the live monitoring pages which shows the live data i.e. temperature, longitude, latitude values of the accident before and after the vehicle is met with the accident.



**Fig 5: Accident Location Page**

This Fig 5 depicts the Accident location page which shows the live location of the vehicle by double clicking on the longitude and latitude values that displays on the page when the vehicle met with the accident.



**Fig 6: Notification Page of the Accident in Mobile**

This Fig 6 depicts the Notification of the Accident sent to the rescue team through the mobile application using the firebase cloud messaging which is the cross platform to send any notifications or the messages.

## VII. CONCLUSION

This project detects the accident using Intelligent of things. The impact sensor detect the accident and sends alert message to the monitoring team or road side unit. With the help of the FCM (Firebase Cloud Messaging) the push notification is sent to the rescue team. GPS tracks the location of the vehicle. Using the mobile application the rescue team can view the location and accident details. LED is used to display the help message to the passing by vehicles. It helps road accident victims to get the proper medical facilities at the right time.

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