# IoT BASED SMART VEHICLE IN TRAFFIC SIGNALS

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**ABSTRACT:-In this contemporary world, humans are depending upon devices for doing their work, which is interconnected via networks of networks. This Paper mainly focused on smart transportation system by providing safety measures for both devices and vehicle by using different types of sensors. This paper helps in monitoring driver's heart condition through pulse sensor and drink and drive condition through alcohol sensor by which it can prevent the accidents by controlling through IOT. IOT conveys the emergency message to the owner, ambulance and the police through GSM message. This paper also controls the traffic levels through traffic light sensors and also helps in providing way to the driver in case of any emergency situations.**

**Keywords:***Pulse sensor, Light sensor, Alcohol Detection sensor, GSM.*

## I. INTRODUCTION

Internet of Thing (IoT) has the fundamental improvement in this changing world to innovate new ideas to make the world smarter. As per the recent survey published by World Health Organization reveals that most of the accidents in India occur due to cardiac arrest while driving. According to the survey, around 336 people die each day in the road accidents.

Arduino microcontroller and ARM 7 are used to implement things easier in IOT.  This paper implements smart car system consisting of two sections as vehicle section and traffic section. These two sections comprises of various sensors to monitor conditions of driver and vehicle.

Pulse sensor is used which monitors driver's heartbeat rate before hetakes off. Traffic Light sensor is also used to avoid accidentsby following traffic rules and regulations.

In this concept driver must follow the rules like cannot able to drink and drive, and cannot able torun through the car in red signal.

Pulse sensor monitors the heartbeat rate of a driverbefore the car gets start.Alcohol sensor will detect the alcohol level from air which is presented in the steering to detect the alcohol level in air breath out by driver. If level of alcohol is detected then it will send message to ARM 7 microcontroller.

ARM7 microcontroller compares the level of alcohol send by the sensor with normal level of alcohol. If the level of alcohol detected in the sensor is higher than normal level then microcontroller execute the code which would not allow the driver to start the car. If the alcohol level is become high while car in moving condition then the car will be slowed down like parking and send message to owner using GSM. This system also sends the car location to the relatives and police using GPS. The LCD display with 16x2 configuration is used to user to know the status.

Traffic section of this system consists of  sensor, Arduino microcontroller and Zigbee. Traffic level sensor gives information about four ways traffic signals. It uses Zigbee to transmit themessage from traffic light to car. If the traffic signal displayred signal then the Zigbee will send the message from trafficlight to all receivers in 10 meters range. Cars movingtowards signal within 10 meters range will receive thismessage. ARM 7 microcontroller presents in the cars note

thespeed of the car and execute the code which makes buzzer to
start alarm to alert the driver about red signal. Even afterbuzzer alarm if the driver does not reduce speed of the carthen Microcontroller will execute the code which will slowdown the car like parking till it reaches zero in speed.

## II.LITERATURE SURVEY

In [1] describes Smart highway system for accident prevention using IoT for monitoring the accident over the highways. It implements connected vehicles safety applications to increase situation awareness for accidents though vehicle to vehicle (V2V) and Vehicle to Infrastructure (V2I) communication. It reduces noise pollution caused by horns and measures distance between two vehicles using ultrasonic sensors.

In [2] designed a system which would prevent the accident by seat belt and alcohol test as well as detect accident and trace location details via GPS and send message via GSM.

In [3] designed anAutomatic accident detection system to recognizethe location of the accident and to reach thelocation easily. This paperfocuses on to minimize the delay caused by traffic congestion and to provide the smooth flow of emergency vehicles. The concept of this scheme is to green the traffic signal in the path of ambulance automatically with the help of RF module.

In [4] implemented drunken driving detection and prevention modeling using IOTto safeguard drunk and drowsy drivers especially at night. It also discusses analysis of alcohol concentration, eye-blinking rate and the rate at which the car is made to turn to detect a drunken or drowsy state and hence undertake protective measures.

In [5] describesHeart attack and alcohol detection sensor monitoring in smart transportation using IOT.It focused on the safety measures for both driver and vehicle by using three types of sensors: Heartbeat sensor, Traffic light sensor and Fuel Level sensor. Heartbeat sensor is used to monitor heartbeat rate of the driver constantly and prevent them from accidents by controlling through IOT. IOT conveys the emergency message to the Owner, Ambulance and the Police. Traffic light sensor is used to follow the traffic rules and regulations by the driver. If the Red light is in the ON state, then

the vehicle automatically stops before itreaches the white line. Fuel level sensor is usedto measure vehicle's fuel level and calculate whether the available fuel is enough to reach the destination or not, if it is not enough then map will suggest the driver to reach the nearby petrol bunks.

The total number of accidentsand fatal accidents is increasing year by year.According to table mostly 70 percent of road accidents are occurring due to drink and drive.

| S.No. | States | Accidents caused due to intake of alcohol | | |
|---|---|---|---|---|
| | | No of accidents | No of persons | |
| | | | Killed | Injured |
| 1 | Andhra pradesh | 1,315 | 379 | 1,778 |
| 2 | Assam | 807 | 246 | 366 |
| 3 | Bihar | 1,532 | 790 | 1,094 |
| 4 | Kerala | 28 | 1 | 36 |
| 5 | Punjab | 147 | 111 | 72 |
| 6 | Goa | 13 | 1 | 8 |

*Table 1 Shows State Wise accident*
According to Table 2 mostly 70 percent of road accidents are occurring due to the following reasons.

| Total no of Road Accidents at various Traffic Controlled areas | | | |
|---|---|---|---|
| | Accidents | Killed | Injured |
| Traffic light signal | 31,807 | 7,648 | 29,287 |
| Police controlled | 19.291 | 4,058 | 13,285 |
| Stop sign | 13,228 | 3,464 | 10,614 |
| Signal break | 15,183 | 5,129 | 16,663 |
| Uncontrolled | 1,66,158 | 44,059 | 1,70,568 |

*Table 2 Number of accidents at various traffic controlled areas*

## III. PROPOSED SYSTEM

The proposed system consists of two main section which focuses on smart transportation system by providing safety measures for both drivers and vehicle by using different types of sensors and also coordinates with each other and makes sure that in emergency vehicle reaches the destination without any delay.

This system is divided into following sections:

1. Vehicle section.
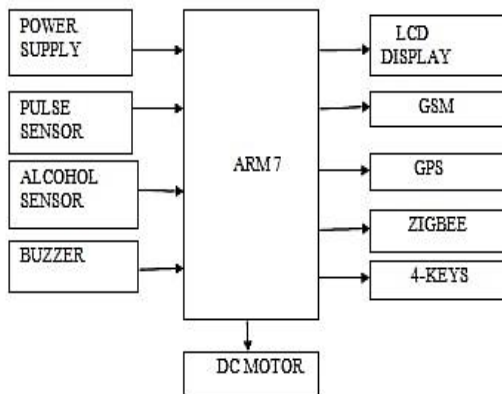2. Traffic section.

**VEHICLE SECTION:**



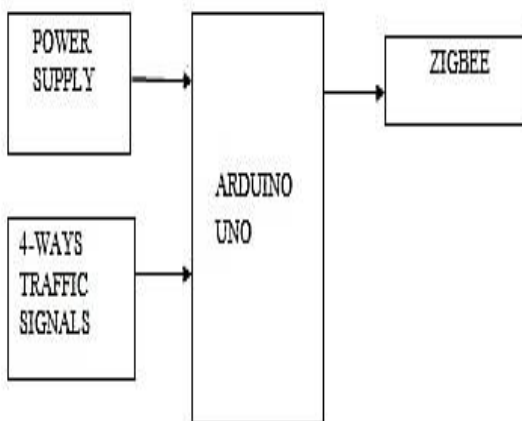*Fig.1: The Block Diagram of Vehicle Section*

**TRAFFIC SECTION:**



*Fig.2: The Block Diagram of traffic section*

1. To check the driver's Pulse rate constantly

To monitor heartbeat rate of driver using pulse sensor is attached to the finger tip of the driver of the car. Once the driver starts the vehicle and wears the seat belt, this sensor automatically monitors the heartbeat rate of the driver through Internet of Things. When the heartbeat rate goes abnormal, IOT notifies the emergency message to the owner of the car, nearby Ambulance and the Police to prevent the driver from accident and save the driver's life. This emergency message will be conveyed to the respective person via GSM.

2. Vehicle Ignition control based on alcohol detection using alcohol sensor:

Vehicle ON/OFF managing is primarily based on alcohol detection by the use of alcohol sensor. Now days, many accidents are happening because of the alcohol consumption of the driver or the person who is driving the vehicle. Thus drunk driving is a major reason of accidents in almost all countries all over the world. Alcohol Detector in Car is designed for the safety of the people seating inside the car. Alcohol sensor is fixed on the steering to analyze alcohol in the driver's breath. When the alcohol-level detected is above the pre-determined threshold then the vehicle will automatically slow down like parking and a message is sent to the police and relatives with the help of GSM and GPS and the vehicle can be traced.



*Fig.3: Vehicle gets stopped automatically if the driving consumes alcohol*

3. Vehicle's emergency way is selected using zigbee communication:

The usages of vehicles are rapidly increasing and at the same time the occurrence of accident is also increased. The value of human life is ignored. No one can prevent the accident, but can save their life by expediting the emergency vehicles to the hospital. The objective is to minimize the delay caused by traffic congestion and to provide the smooth flow for the emergency vehicles. It is mainly focused to green the traffic signal in the path of emergency vehicle by pressing the emergency key with the

helpZigbee module. So that the vehicle can reach the spot in time and human life can be saved and in this the major priority is given to the ambulance vehicles.



Fig.4:Ambulance Gets High Priority

4. To check if the vehicle follows the traffic rules and regulations:

We can avoid accidents by following Road rules and regulations. This can be done by interfacing traffic light with microcontroller along with Zigbee. If the traffic signal is orange or yellow light then, then the microcontroller will start executing the code, and sends the message through Zigbee 802.15.4g to the owner to be ready to stop the car. If the traffic signal is red then Zigbee transmitter will send the message to Zigbee receiver and microcontroller will start executing the code and sends the message to all owners to stop the car and in the same way if the traffic signal is green then ZigBee transmitters will send messages to all the receiver's to make a move.

## IV. IMPLEMENTATION

The main objective is toprovide various mechanisms to avoid accidents on road. This paper design,analyze and simulate new technologies for safety by implementing smart transportation system using IOT. It also focuseson communication with internal and external environments supporting the interactions betweenvehicle and sensor, vehicle and vehicle, vehicle and Infrastructure.

1) Decrease in loss of life & property:It'sunlawful and also dangerous to communicate through mobile phones while driving. This project,makes it easy and safe to communicate from one vehicle to another without accessing any cellular device, thereby decreasing the loss of life & property.

2) Knowing the road condition prior: It is impossible to know how the road conditions of the route will turn out on while traveling so we can get updates of road conditions prior to the journey.

3) Easy to Communicate: Due to use of microcontroller as communication device we can communicate easily for V2V and V2I communication [5].

4) Efficient in saving Time and Money:The parameters to be sensed across this network infrastructure, provides new technological opportunities for more accuracy and efficiency of the real world into computer-based systems, this will reduce human intervention and saves time and money this will give better life [6].
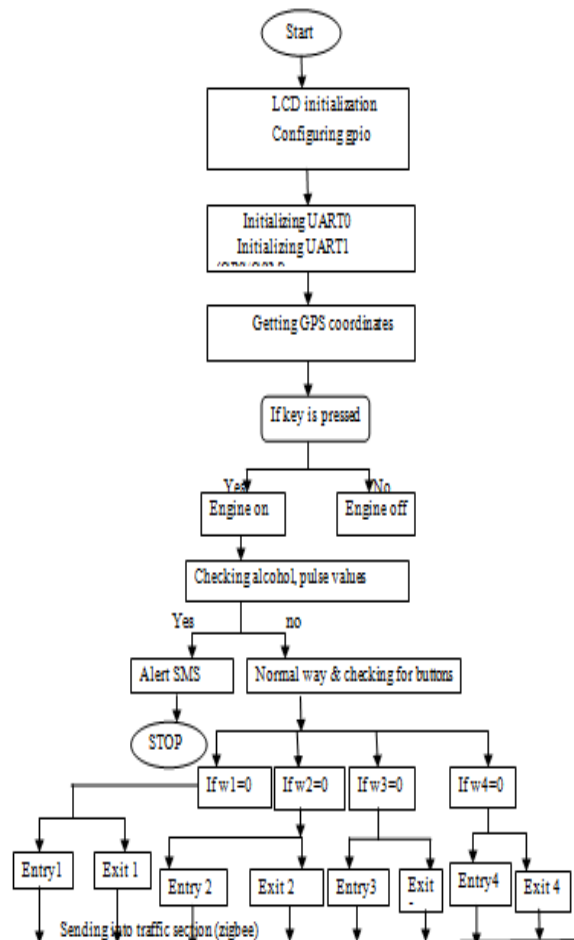
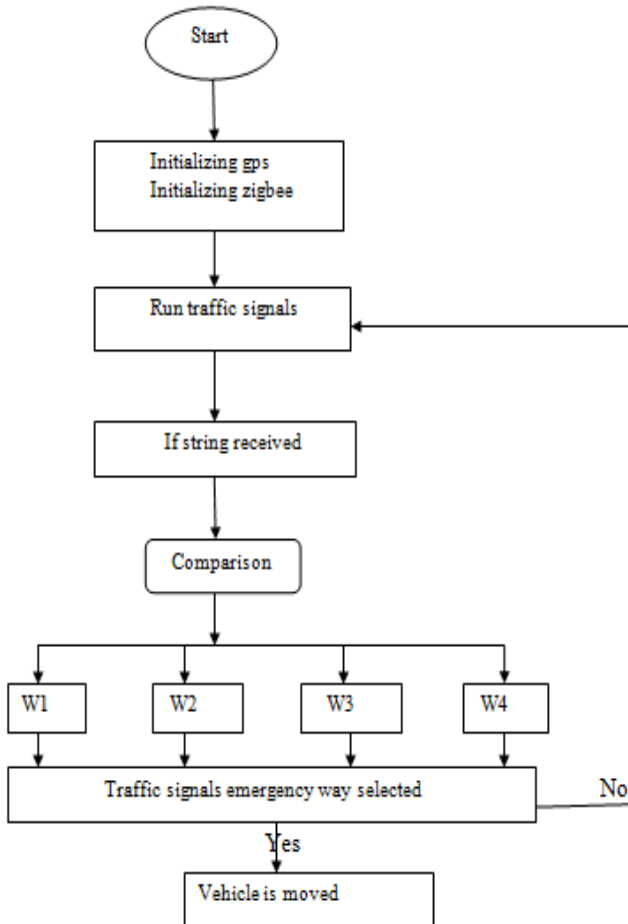## V. FLOW DIAGRAM



**Fig.5: Vehicle Section Flow Diagram**

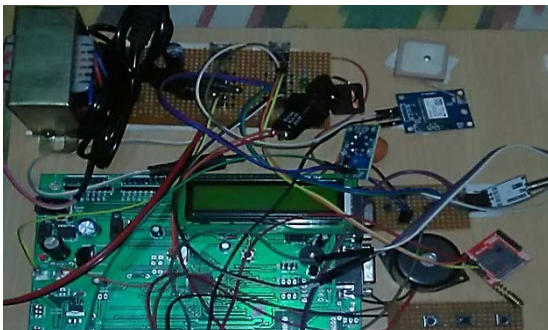**Fig.6:Traffic Section Flow Diagram**

**VII. RESULTS**



**Fig.7:Vehicle Section Hardware**



**Fig.8:LCD Display when Alcohol consumes**



**Fig.9: LCD Display when high pulse detected**



EMERGENCY ALERT:
AT LOCATION:
http://www.google.com/maps/
place/17.3966,78.4736

12:28 pm

EMERGENCY ALERT:ALOCHOL
DETECTED, LAT: 17.4326, LONG:
78.4466
https://www.google.com/maps/
place/17.3966,78.4736

12:31 pm

EMERGENCY ALERT: HIGH
HEART RATE
AT LOCATION:
http://www.google.com/maps/
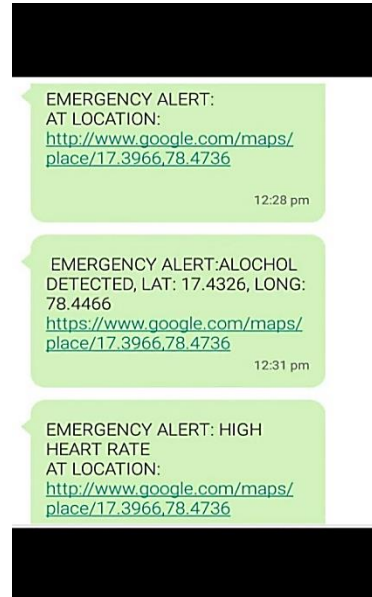place/17.3966,78.4736

**Fig.10:Screenshot of mobile SMS alerts**



**Fig.11:Google Maps Location Update**



**Fig.12:LCD Display when Emergency Occurs**



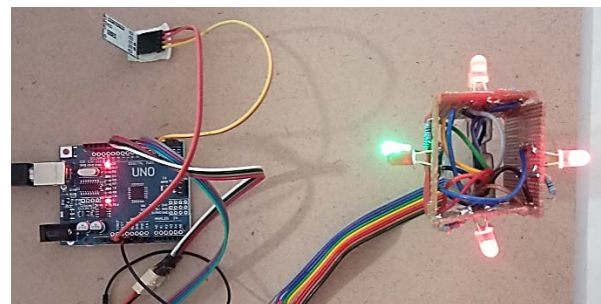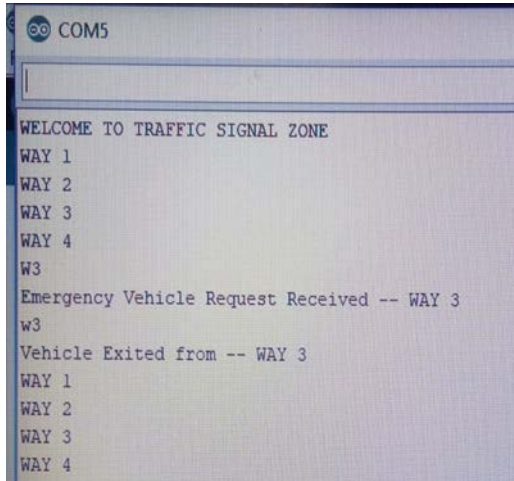**Fig.13:LCD Display when Emergencyvehicle exits**



**Fig.14:Traffic Section Zone**

**Fig.15:Traffic Section Terminal Monitor**

## VIII. CONCLUSION AND FUTURE SCOPE

Smart car system has been proposed using IOT, GSM and sensors for protecting the persons and drivers travelling in the car from accidents. By implementing this system in vehicle, a safe journey is possible which would decrease the injuries caused by accidents and also reduce the accident rate due to drunken driving. By using Zigbee technology it provides way to the vehicles in case of any emergency. By implementing this smart car system it makes our life safe and secure.

This paper can be enhancedto automate many more violations like illegal parking, lane cutting at certain intervals.It can further be used to develop an intelligent system using different type of sensors i.e., Vehicle speed can be controlled by detectingdrowsy driving using eye blink sensor, accident detection by vibration sensor.E-Challan Automation for RTO using RFID tags which minimizes the work of Traffic as they just have to enter the car details and with one go they can get all the information about the owner and his Challans..

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