



## International Journal of Innovative Research in Computer and Communication Engineering

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# Intelligent Traffic Management System Based On Internet of Vehicles (IOV)

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**ABSTRACT:** This paper provides Internet of Vehicles (IOV) based on intelligent traffic management system, which is featured by high compatibility, easy to upgrade to replace traditional traffic management system, low cost and the proposed system can improve road traffic tremendously. The IOV is based on the internet, detection technologies and network wireless sensors to recognize traffic object, monitoring, managing and tracking & processed automatically. In recent years, popularity of private cars is getting urban traffic more and more crowded. As a result, traffic I becoming one of the important problems in big cities in all over the world. Some of the traffic concerns are congestions and accidents which have caused a huge waste of time, property damage and environmental pollution. The proposed system is mainly based on the concept of Internet of Things (IOT). IOT is a world-wide network connecting all the smart objects together, enabling them to talk with each other. Whenever those smart things are restricted to connected vehicles only, then it can be named as Internet of Vehicles (IOV). The basic functionalities of this proposed system include monitoring of speed limits, pollution checks, and emergency response to road accidents and providing security to the server, etc., should also be taken care to make life easier.

**KEYWORDS:** Internet of Things (IOT), Internet of Vehicles (IOV), Monitoring, Tracking, Communication, Server.

### I. INTRODUCTION

In 1999, the concept Internet of Things (IOT) was first introduced by Kevin Ashton. IOT describe a different apparent objects and their virtual representation in the internet. IOT establish a world where all the objects around us which is resulting from a natural impulse or tendency and they are connected to each other and communicate with each other. The aim of IOT is to create a better world for human beings. IOT is the latest and becoming recognizable model. The IOT it is bridge between the virtual world and physical world. The major objectives of IOT are to create smart environment based on self-aware thing for new and innovative things. The IOT involves the increasing prevalence of objects and entities provided with unique identifiers and it has capability to transfer data automatically over a networking the vehicles perhaps also the traffic congestion on the road increases. Now it is a very serious problem on road, more number of vehicles are present and due to that pollution increases and road accidents have been a major issue for most of the countries. Hence number of death due to road accidents is increasing year by year making safety a major concern. The Internet of Things (IOT) is the network of physical object devices, vehicles, buildings and other items which are embedded with electronics, sensor, Software and network connectivity.

In today's world, internet is a global phenomenon. Many more devices are getting internet friendly, due to which with the help of internet traffic management in transportation working becomes easy. As vehicle ownership has been increasing at an exponential rate, no traffic issue arises. It is logical that the monitoring of speed limits, pollution checks, vehicle tracking, alcohol detection and emergency response to road accidents should also be taken care and makes life easier.



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The traditional solutions offers to this problem are periodic pollution checks, monitoring of vehicular speed through speed trackers and cc t.v. cameras. While the choice is being obvious, these strategies tends to be unsuccessful when it comes to monitoring of a huge number of vehicles i.e., when the number of vehicles increases then the effectiveness by which the road transport authority can handle the incoming breaches of vehicular code decreases. This is how Internet of Things (IOT) comes into play. Out of the various proposed methodologies with wireless sensor networks in traffic management, the prospects of Internet of Vehicles (IOV) stand out. This paper mainly focuses on discussing the methodology and advantages. In short Internet of Vehicles (IOV) is nothing but the combination of physical object, controller, actuators, sensor and internet.

## II. LITERATURE SURVEY

Literature survey is carried out to gain knowledge and skills need to complete this project. The main sources for this project are the previous projects and thesis that is related to this project. And the other sources are journals and articles obtained from internet. This chapter discus about the project and thesis related to this project. Therefore by analysis of the project did by others researches, there is a possibility to know what features are lacking in their projects. It is very important to improve and develop a successful project. Information about few research papers or previously implemented projects that we have used as a reference for making our project are mentioned below:

In [1], the microcontroller MSP430F149 is used as CPU and along with that GPS, RS232 and fuel level sensor is used for tracking vehicle, communication and fuel level respectively.

In [2], the proposed system as unique mounted on stem valve of tire and remains outside the tire, it can measure wide range of the pressure. The system used for the board RF receiver along with LCD and keypad for d=user interface.

The [3], paper introduce a real time traffic monitoring system to solve the problem of real time traffic controlling and monitoring. The proposed system presents a new way of traffic control by the better utilization of resources. The traffic administration department can use this real time traffic monitoring information to detect the dangerous situations on the road and thereby react by imposing immediate actions. On the whole, IOT will play an important role in traffic monitoring by improving the efficiency of traffic safety and travelling costs.

The [4], paper has developed an implemented a novel traffic system that is capable of monitoring and managing urban traffic. This system is tested with various conditions and is proved to be scalable. The additional vehicle spotting feature makes this system different from the other implementation. The incorporation of IOT into the system makes this as a blend of standard and advanced technologies. Vehicle owners can track their vehicle from anywhere in the world. The system developed in this paper proves to be reliable and cost-effective.

## III. PROPOSED WORK

The proposed system contains 2 kits, one is the Vehicle Management Kit and the other is the Traffic Management Kit. For the prospects of Internet of Vehicles (IOV) to be reality, the vehicles need to be able to work and communicate seamlessly. Communications in this proposal are:

### A. *Communication between the vehicles and the vehicles owners:*

Few attributes of the vehicle like vehicle speed and fuel level are directly reported to the users in the vehicles, only when the vehicle is in use. However, to enable the user to receive active updates even when the vehicle is not being used and when the user is away from the vehicle, an onboard processor is useful.

### B. *Communication between vehicles and a centralized server:*

The data monitored from the vehicle is relayed to the nearest communications node via computer. The node in-turn communicates the data via a satellite to the communications node of the server which monitors breaches.

### C. *Communication between server and third parties like ambulance, police patrol, fire engine, etc.:*

This mode of communication occurs between the server and the third parties including:

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1. Emergency response like fire engine and ambulance
2. Police Patrol
3. Pollution Control

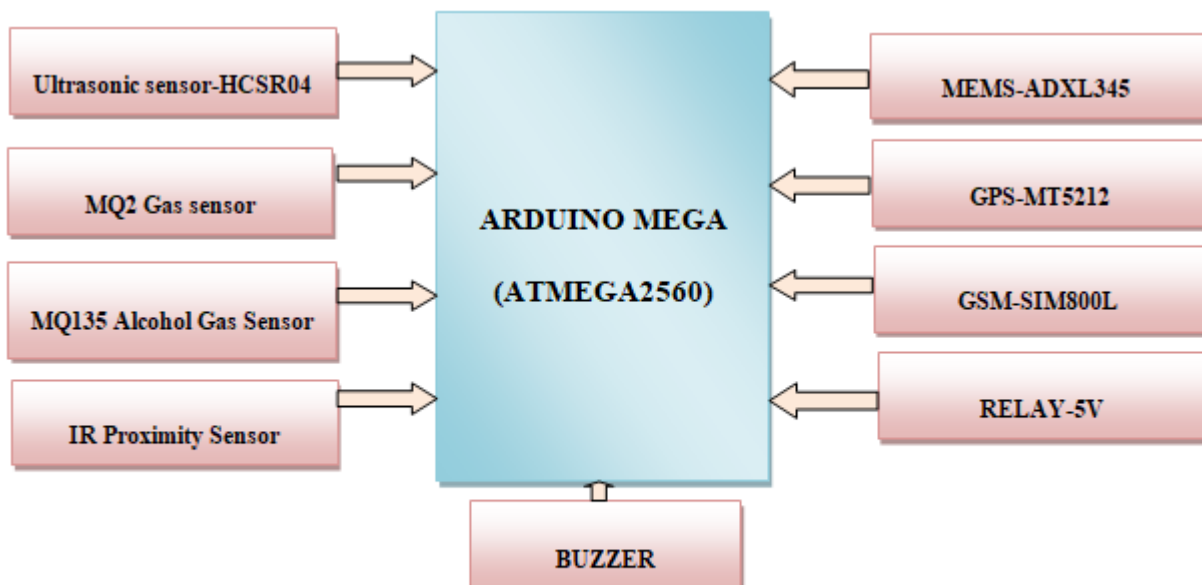


Fig.1 Block Diagram for Vehicle Management

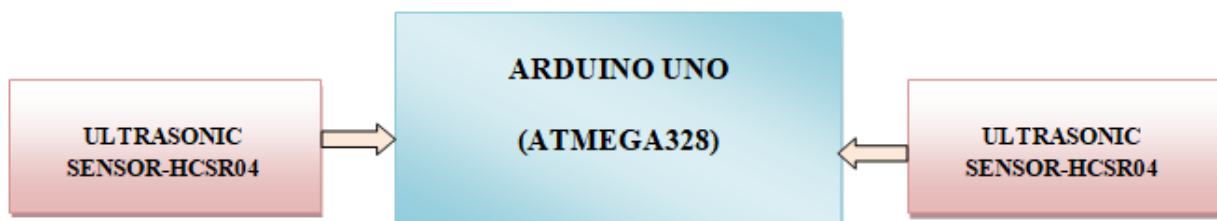


Fig.2 Block Diagram for Traffic Management

## IV. WORKING

Initializing the system with the help of a relay of 5V, it then detects the presence of the person inside the vehicle. The information from the sensors like Ultrasonic sensor, IR proximity sensor, Gas sensor and MEMS will be given to the third parties like ambulance, police patrol, etc. through SMS by using GSM as well as GPS.

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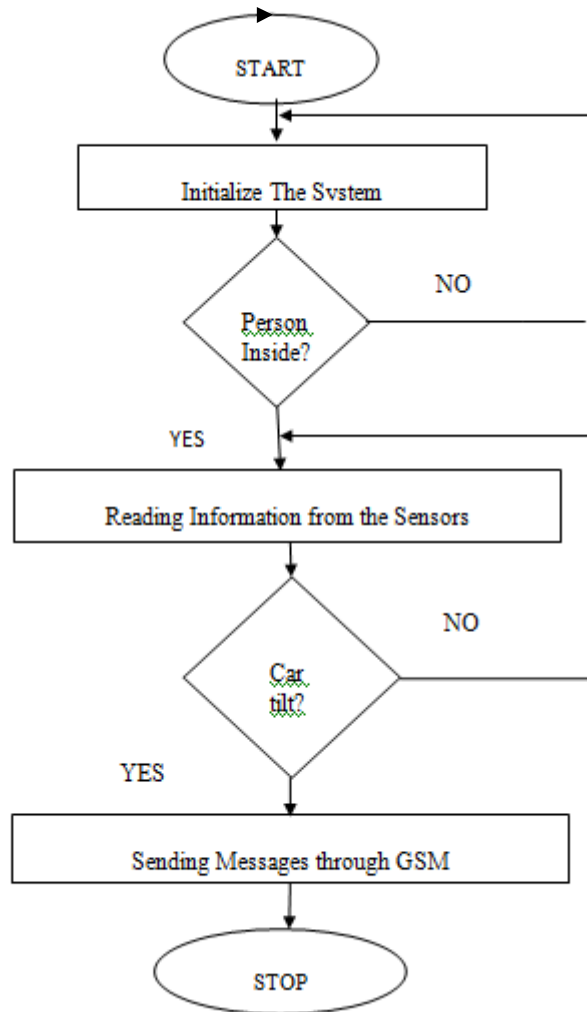


Fig.3 FLOW CHART OF THE SYSTEM

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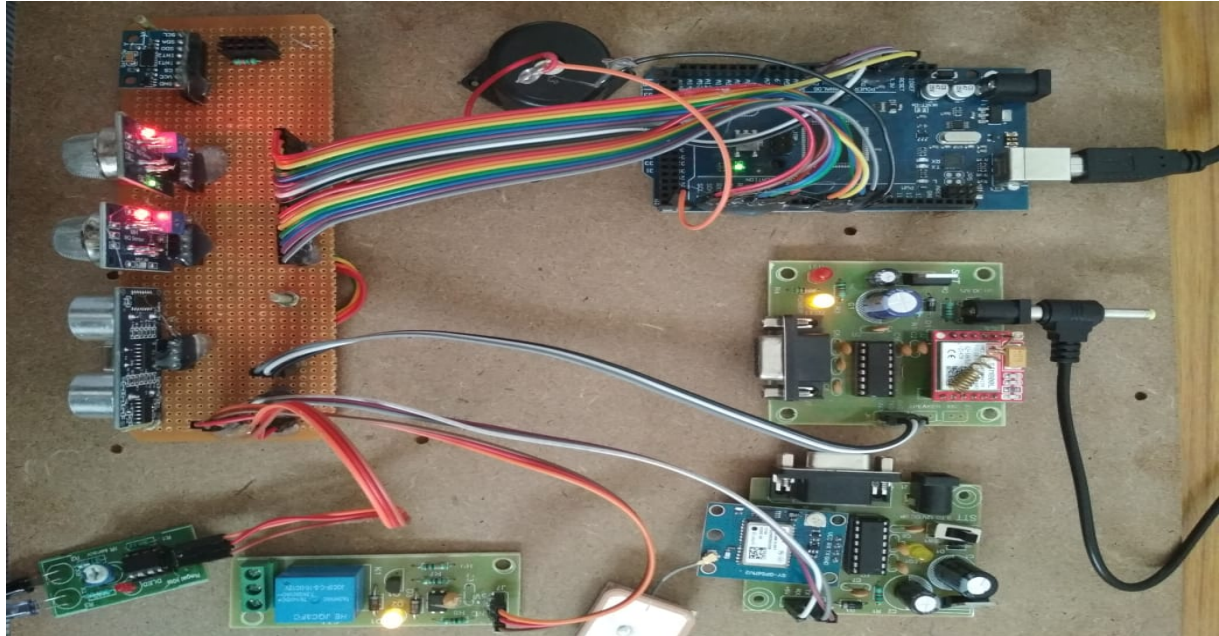


Fig.4 VEHICLE MANAGEMENT KIT

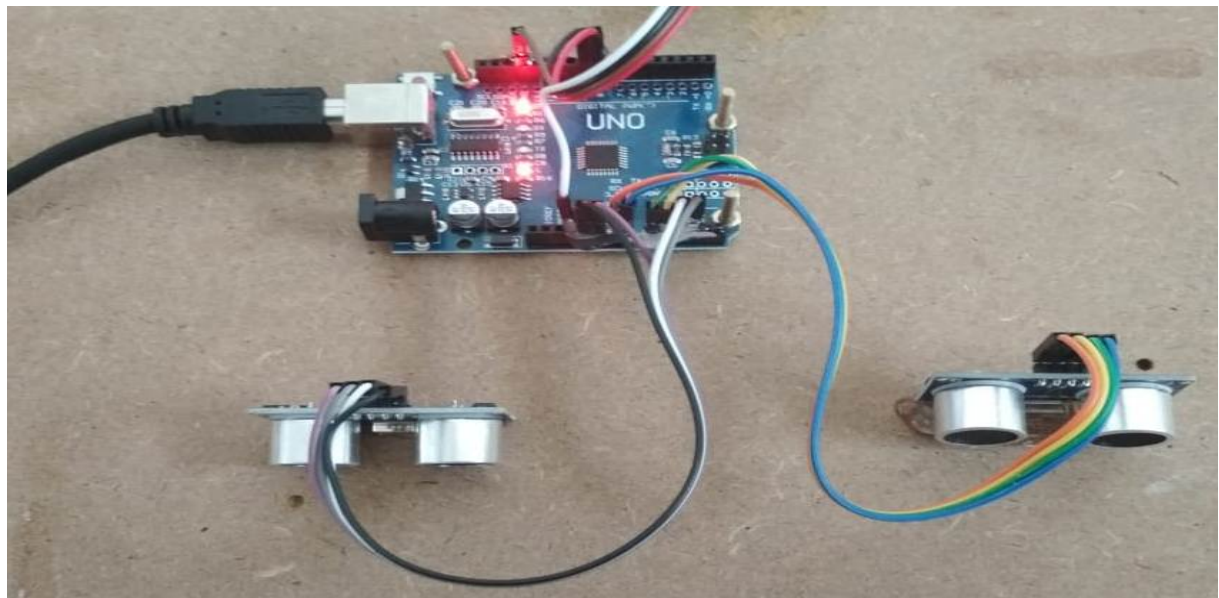


Fig.5 TRAFFIC MANAGEMENT KIT



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## V. RESULTS

The Ultrasonic Sensor detects the presence of any vehicle before the vehicle containing this kit. A buzzer indication is given to the person present in that vehicle notifying it as an obstacle. The IR Proximity Sensor gives the seat belt indication by giving a buzzer alert as seat belt fault.

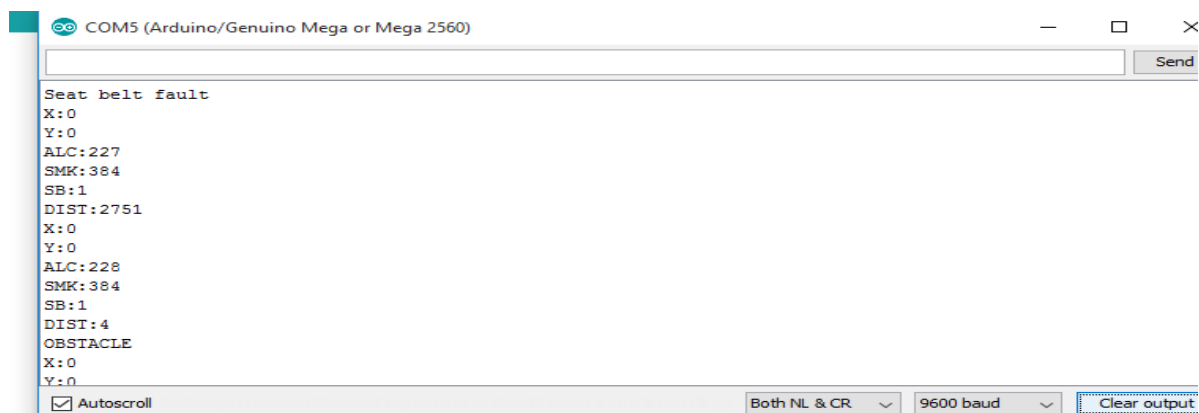


Fig.6 Obstacle & Seat belt Indication

The MEMS Sensor gives the indication that the vehicle has a fall or the vehicle is subjected to an accident. A buzzer indication along with an SMS containing the exact GPS location is sent to the third parties like ambulance, police patrol, etc.

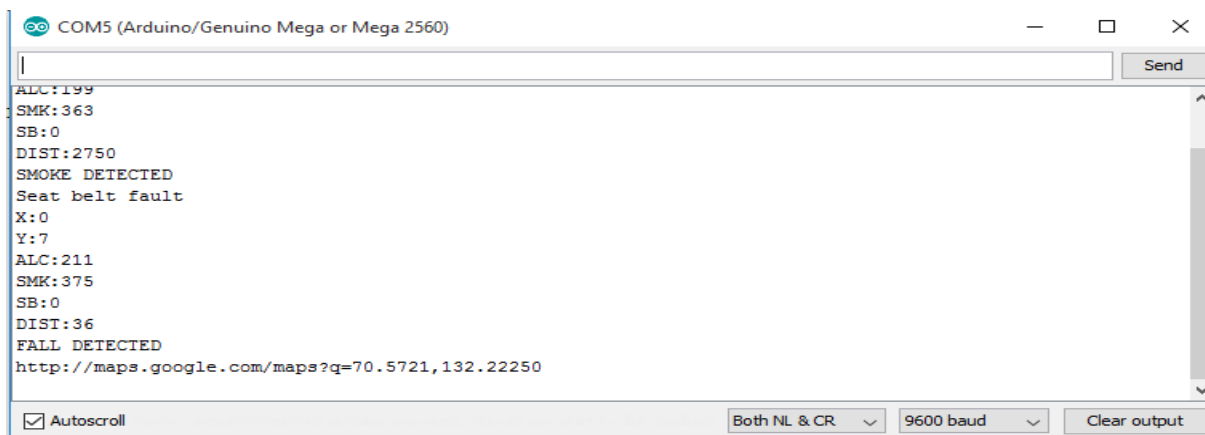


Fig.7 Vehicle Fall Detection

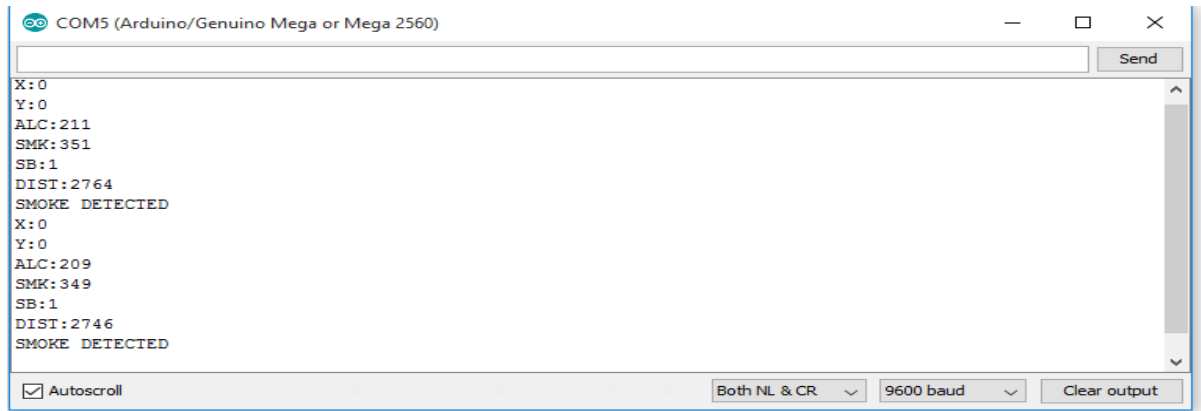
The MQ2 Gas Sensor senses any leakage of gas in the vehicle. When the required data is collected, a buzzer indication is given to the person in the vehicle.

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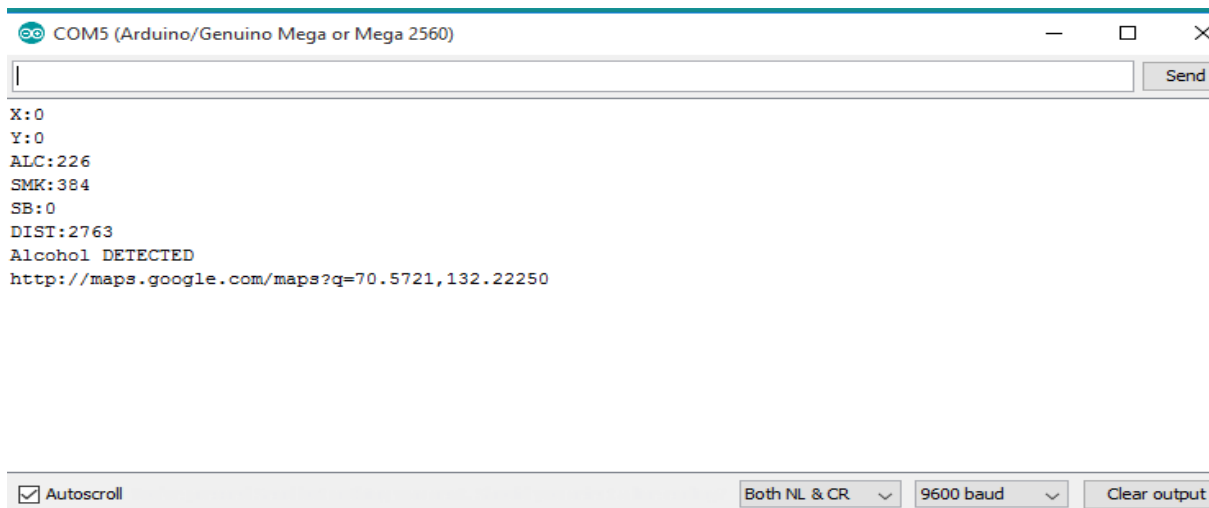


```
COM5 (Arduino/Genuino Mega or Mega 2560)
X:0
Y:0
ALC:211
SMK:351
SB:1
DIST:2764
SMOKE DETECTED
X:0
Y:0
ALC:209
SMK:349
SB:1
DIST:2746
SMOKE DETECTED
```

Autoscroll Both NL & CR 9600 baud Clear output

Fig.8 Smoke Detection

The MQ135 Alcohol Gas Sensor senses the presence of alcohol in the vehicle and gives the buzzer indication. Then the engine gets off and an SMS with an exact GPS location is sent to the third parties like police patrol.



```
COM5 (Arduino/Genuino Mega or Mega 2560)
X:0
Y:0
ALC:226
SMK:384
SB:0
DIST:2763
Alcohol DETECTED
http://maps.google.com/maps?q=70.5721,132.22250
```

Autoscroll Both NL & CR 9600 baud Clear output

Fig.9 Alcohol Detection

The two ultrasonic sensors are used for the detection of the traffic present in a particular area. If none of the sensors detects the presence of vehicles, then it is said to be LOW TRAFFIC. If any one of the sensors is detected, then it is said to be MEDIUM TRAFFIC. If both the sensors detects the presence of vehicles, then it is said to be HIGH TRAFFIC.



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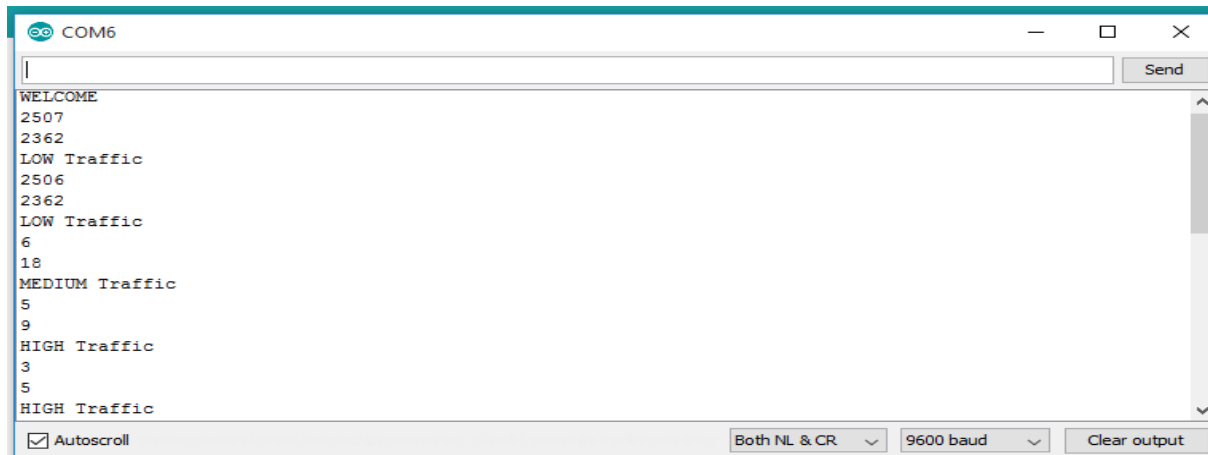


Fig.10 Traffic Indication

## VI. ADVANTAGES OF IOV

### A. Early warning System:

Driver fatigue and lack of early warning system is responsible for crashes.

### B. Traffic Control:

By obtaining the total information of the surrounding vehicles, i.e., the vehicle to vehicle communication enables us to control the traffic to a great extent.

### C. Vehicle Autonomous:

All the required data, i.e., speed, tyre pressure, fuel level, condition of the tyres, oil level in the engine are collected and given to the server to use when in need. This makes a vehicle to be autonomous by taking its own decision.

## VII. CONCLUSION

Internet of Things (IOV) is a special application of Internet of Things (IOT). It has become an indispensable platform with information interaction among vehicles, humans and road-side infrastructures. It has attracted a lot of attention. The notion of IOV is no longer a matter of IT applications in the automotive industry; it has become a national and global concern. With time IOV will become important part of us and make intelligent transport system do without traffic lights, road accidents, and other related problems. It will make millions of people enjoy more convenient, comfortable, and safe traffic service.

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