IOT BASED SMART VEHICLE ALERT SYSTEM FOR ACCIDENT PREVENTION

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Abstract - *The number of accidents in India are highest in the world as India has a large population and most of the transport is by road. The actual number of accidents took place may be higher than documented. One person dies in every 4 min in accident. Nowadays safety on roads has become a serious issue all over the world. Accidents occur mainly during dawn and night time. The accidents on highways can be prevented by using a smart system. A smart system for accident prevention is an ideal concept for smart roads. It is a project with innovative ideas for safety on roads and highways. The data collected could be used and avoid most of the accidents. In this paper we are presenting a system consisted of communication module which is used to connect all the vehicles through an application and can avoid the accidents.*

***Key Words*: IOT, NodeMCU, HC-SR04, Cloud, Android application development.**

1. INTRODUCTION

We connect all the cars with an wireless module. Here we use NodeMCU to connect the vehicles which consists of GPS system by which the live location of the vehicle could be found. Ultrasonic sensor measures distance between two vehicles and in-case if two vehicles come closer to one another, an alarm could be set which can alert the driver .In this Project all this communication is done with IOT(Internet of things).All the information obtained from the GPS is fed to an application consisting of map. That application can be installed in every car and the live location of every car in a particular area could be found which would be very helpful during the time of low visibility to know their current position and any vehicles in their path and could have a safe ride. It is a known fact that due to the increase in pollution, the visibility decreases as in Delhi. So this type of project would be helpful for such drastic situations.

1.1 NodeMCU:

It is a open source IOT platform with inbuilt Wifi module in it. In this MCU stands for Micro Controller Unit. This is a great advantage for the persons working with internet connectivity as the cost for buying the Wifi module is significantly reduced. At first it was working with ESP 12 module but now it is upgraded to ESP 32.The programming for NodeMCU can be given through Arduino which is also an open software.

Figure 1

1.2 Ultrasonic sensor HC-SR04:

Now a days the role of ultrasonic sensor is in all fields. The main application of ultrasonic sensor is to find the distance between the objects or obstacles. It consists of an transmitter and receiver, the signal is sent from the transmitter which hits the obstacles and bounces back to the receiver. The time taken for the signal to be received helps us to find the distance between the objects. The distance could be found by the given formula

Distance= (Time x Speed of Sound in Air)/2 where speed of sound in air is 340 m/s.

Figure **2**

1.3 Global Positioning System(GPS):

It is a satellite-based radio navigation system which is to track or find any location in the earth. It was developed by the country United States Of America. There are many satellites used for this operation. It gives the exact location and time of the object. It is used by many people, at first it was used for military purposes but is now used by all common people. It also have some loses, the obstacles like mountains causes errors in the obtained information. It does not require any user to transmit the data, it operates independently through an internet connectivity or telephone connectivity. The received data is

$GPRMC,141848.00,A,2237.63306,N,08820.86316,E,0.553,,100418,,,A*73

$GPVTG,,T,,M,0.553,N,1.024,K,A*27

$GPGGA,141848.00,2237.63306,N,08820.86316,E,1,03,2.56,1.9,M,-54.2, M,,*74

$GPGSA,A,2,06,02,05,,,,,,,,,2.75,2.56,1.00*02

$GPGSV,1,1,04,02,59,316,30,05,43,188,25,06,44,022,23,25,03,324,*76

$GPGLL,2237.63306,N,08820.86316,E,141848.00,A,A*65.

LATITUDE	10.002580
LONGITUDE	76.500583
DATE	02/02/2020
TIME	09.11.39 PM

Table 1: Results from GPS

1.4 Cloud:

Cloud is a place to store the data online which can be retrieved whenever required by the user. This is very helpful as it reduces the storage component required by an individual user. The data can be accessed from any device via internet. Firebase is the cloud we are using in this work.

1.5 Android Application Development:

An application is developed for this project which contains the maps and the location of every vehicle is added to the application and the application should be installed in all vehicles so that every vehicle in the location can see every other vehicle in that nearby location. This is connected through a cloud platform which can also be useful to find the car in case of any theft.

2. EXISTING METHODOLOGY:

There is already an idea of connecting all the cars with the IOT for any accident purposes or during any theft but it does not connect the cloud with an android application containing maps. So in this project we suggest the cloud to be connected to an android application and to be installed in vehicle. In the existing idea a car is connected to the cloud to find the location in case of any accidents or theft. It uses GPS to track the location of the car and and also contains sensors to find whether the driver is drunk or not and many other sensors like gas sensors, ultrasonic sensors are used.

3. PROPOSED METHOD:

The main objective of this project is to avoid accidents on road, Design, simulate and analyze the new technologies on wireless connectivity for safety on highways. We create an application used by all people to know their location and nearby car location during the time of low visibility. A cloud platform is used to store all the information and it is in-turn connected to the created application.

When a car is used in low visibility, this proposed idea would be very helpful as we can see all the vehicles in the application. We propose that all the cars should have the application we create and the car driver could see every other car in their location using the GPS system and during low visibility the car could be controlled in a more safer mode than now.

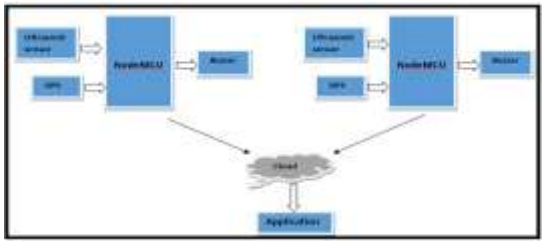

Figure 4: Proposed block diagram

4. ADVANTAGES:

1) Reduces the rate of accidents and saves a lots of human life.

2) The condition of the road can be known prior as it shows the vehicles in the road upto a certain distance so that we could plan the journey according to it.

3) The communication is easy as the NodeMCU itself consists a Wifi module in-built in it.

4) The application of new technology helps for safe and comfortable journey.

5. APPLICATION :

The system can be used in highways to avoid accidents as our main motto is saving human lives due to human errors. By this system the driver could take a better decision during driving and avoid errors.

6. CONCLUSION:

A smart system is implemented to avoid accidents in the highways. This project includes use of ultrasonic sensor that detects the vehicle when taken very close to another vehicle, a novel idea is proposed for avoiding the accidents in the highways. In future, this could be implemented in all the vehicles which would be very much helpful for the drivers driving at night where there will be very low visibility. The cost for this idea is also very less as the components cost is low and all are open sources. The proposed system requires internet connectivity so it would be impossible to implement it in the place where there is alack of internet connectivity and also there are some un controllable constraints in using iot. As we also use a sensor with it the proper function of the sensor is important as it can affected by severe weather conditions like rain, thunderstorms etc This could also be used to help messages during the time of accidents to the nearby infrastructure and also can be sent to the nearby vehicles located near them. Thus, we conclude that the proposed system removes all the drawbacks of existing system and enhanced with the IoT system. So it makes the driving system very smart thus we named it as "IOT based Smart Vehicle System for Accident Prevention".

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