IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

## IN COMPUTER & COMMUNICATION ENGINEERING

Volume 8, Issue 8, August 2020

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

9940 572 462 | 6381 907 438 | ijircce@gmail.com | www.ijircce.com

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | Impact Factor: 7.488 |

|| Volume 8, Issue 8, August 2020 ||

# Intelligent Road Assessment and Emission Monitoring System

Jeevanandhan.S[1] , Gowtham.R[2], Joeldurairaj.G[3], Harisankar[4], Ganeshamoorthy.R[5]

UG Student, Dept. of ECE, Panimalar Engineering College, Chennai, India[1,2,3,4]

Assistant Professor, Dept. of ECE, Panimalar Engineering College, Chennai, India[5]

**ABSTRACT:** In the modern technology the roadways has become the most common mode of transportation. Everyone has own vehicle for transportation. In recent days car accidents have become more common. The accidents are occurred due to the path hole presents in the road which will cause accidents mostly in the night time.Also incomplete combustion in the engine of a vehicle leads to emission of different gases contributing to increase in the pollution and adversely affecting the environment. This emission from vehicles cannot be completely avoided but, it definitely can be controlled. As a solution to the above problems we aim to build an automated control system for emission level control and path holedetection. So, by this way accidents can be stopped which occurs because of path holes. The presence of devices in an automobile that connect the device to other device within the vehicle or devices networks and services outside the car including other car, home, office or infrastructureConnected vehicles safety applications are designed to increase situation awareness for accidents through vehicle to vehicle (V2V) and Vehicle to Infrastructure (V2I) communications.

**KEYWORDS:** Emisson control through AI, V2V communication ,Driver monitoring, Pathhole detection, Vechile tracking system.IOT emission control,Automatic emission monitoring.

## INTRODUCTION

The global environment is currently facing a major issue of air pollution. Vehicles have become an integral part of every one's life. The major reason behind this is usage of ignition vehicles. In solution for this the aim of project is to design Arm controller based pollution gas detector from the vehicles. The objective of the proposed system for the moving vehicles is to monitor NO2, humidity, Temperature, CO, SO2 level of air contamination by using NO2 sensor, humidity sensor, Temperature sensor, SO2 and CO sensor. In this system monitors the pollution created by the vehicles. If any vehicle crosses its threshold value then it will get reported to the traffic department and agencies of the national environment. The beginning of the 21st century was the time when importance for Environmental awareness was instigated. One of the major concerns regarding the environment is air pollution. Air pollution contributes to the greenhouse gases,which causes the greenhouse effect, whose side effects are now well known to all of us after finding that the hole in the ozone layer.Air pollution is not only harmful to the environment but, also to all other living beings on earth. Air pollutants that are inhaled have serious impact on human health affecting the lungs and the respiratory system; they are also taken up by the blood and pumped all-around the body. These pollutants are also deposited on soil, plants, and in the water, further contributing to human exposure and also affecting the sea life. Vehicles are one of the major contributors to air pollution apart from industries. The main pollutants from vehicles are the oxides of carbon and nitrogen, which can be easily detected these days with the help of semiconductor gas sensors.The incomplete combustion in the engine of a vehicle leads to emission of different gases contributing to increase in the pollution and adversely affecting the environment. Detection and control of these gases is an important area of work. This emission from vehicles cannot be completely avoided but, it definitely can be controlled. Now a day's accidents are common reason for deaths.

The presence of devices in an automobile that connect the device to other device within the vehicle or devices networks and services outside the car including other car, home, office or infrastructure.Connected vehicles safety applications are designed to increase situation awareness for accidents through vehicle to vehicle (V2V) and Vehicle to Infrastructure (V2I) communications. These are critical things to control so here we come up with a concept to reduce pollution and prevent accident using IOT. As a solution to the above problems we aim to build an automated control system for emission level control of vehicle and accident prevention. Smoke sensor is used to detect the amount of smoke released by the vehicle due to combustion of fuel in it. Alcohol sensor and eye blink sensor can be used to monitor live condition of driver.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | Impact Factor: 7.488 |

|| Volume 8, Issue 8, August 2020 ||

## II.LITERATURE REVIEW

**Gowda C P Mallikarjuna, RajuHajare (2017)**

The proposed system aims at developing and designing a suitable system for automobile purposes using ZigBee protocols. The main problems faced in the existing system are inaccuracies in the calculation of speed, distance measurement, and slow response time, etc. The proposed system solves many of the problems faced by the existing systems by using a GPS module instead of the conventional speedometer and also uses sensors which are reliable in areas where human intervention is either unintended or where it puts life to risk. The problems of traffic congestion in urban arterials are increasing day by day and it is very difficult to handle it during emergencies. So we are developing a communication unit within the system to interact with other vehicles in order to clear the lanes. This system aims at communicating with the vehicle in its surrounding with the help of its location (i.e., using the latitude and longitude) to indicate their proximity. When these vehicles are very close in proximity the drivers are cautioned with the help of a message. In this way the drivers can communicate with each other and act according to the situation.

**NannanWang, Xi Wang (2017)**

In this paper, we consider the problem of cooperative driving for connected autonomous vehicles to reduce traffic congestion. The connected autonomous vehicles are able to exchange information as well as driving intentions with surrounding vehicles through vehicle-to-vehicle (V2V) communications. We define three driving conditions for a given vehicle, namely, maximum, deadlock, and freerun, in which a deadlock condition implies that the vehicle is in a congestion condition that cannot be resolved alone. For the purpose of improving overall traffic flow, we design a strategy called Altruistic Cooperative Driving (ACD), in which a connected autonomous vehicle can automatically identify a deadlock condition and form a multi-vehicle coordination group to resolve the deadlock through a cooperative maneuver procedure. The proposed ACD is evaluated in our traffic simulator in terms of speed efficiency and communication traffic between the connected autonomous vehicles. The results show that ACD can improve speed efficiency and successfully resolve traffic congestion caused by deadlock conditions.

## III.PROPOSED SYSTEM

The proposed system consists two sections; vehicle section and v2x section. Vehicle section consists of ultrasonic sensor, eye blink sensor, alcohol sensor, smoke sensor and IOT, and all of them are integrated and connected to a Controller. Ultrasonic sensor is to find out the path hole present in the road. If any hole is found then the micro controller intimate to the driver by making sound and as well as the message will be send to all nearby vehicles viawireless sensor network (WSN).Simultaneously conditionof driver is continuously monitored whether he consumed any alcohol by using alcohol sensor. If he consumes alcohol, then vehicle's engine won't be started which is controlled by controller.Smoke sensor continuously monitors the smoke emission level in a vehicle. When a vehicle attains certain threshold pollution level then the controller will command IOT module to transfer the message intimation to the server. Then the particular authorized person willbe allowed for one day to repair the polluted.After one day the pollution from the same vehicle means, again the intimation data will send to the RTO department.Then there by they will send a command signal through vehicle controlling switch to lock the vehicle automatically. Once request is sent to the RTO department after repairing the vehicle using switch, RTO department will unlock the vehicle. LCD is used to display various statuses. This project demonstrates an effective utilization of technology for saving human lives as well as environment.

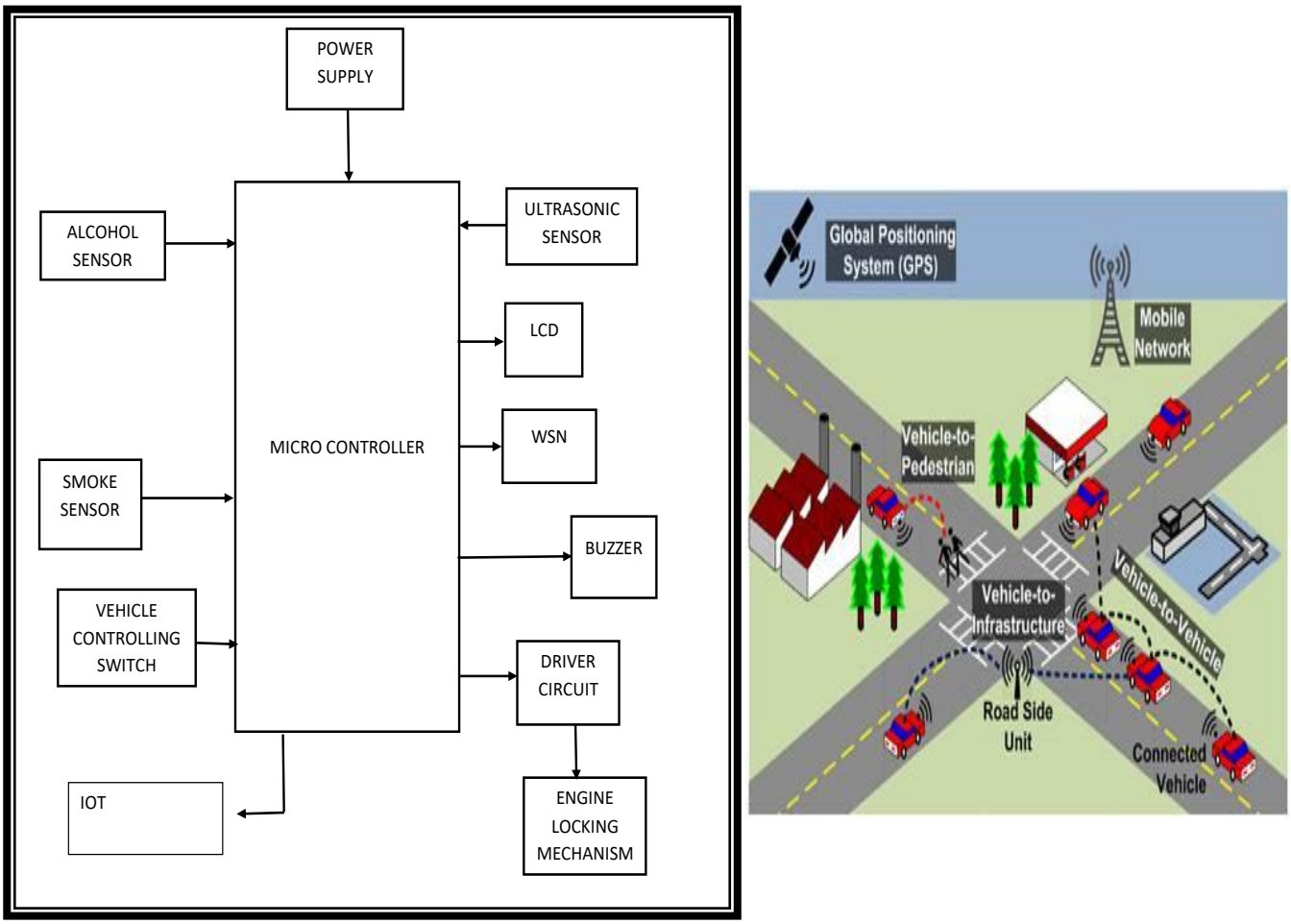


**Figure 1:**Model of V2V communication

cooperative maneuver procedure. The proposed ACD is evaluated in our traffic simulator in terms of speed efficiency and communication traffic between the connected autonomous vehicles. The results show that ACD can improve speed efficiency and successfully resolve traffic congestion caused by deadlock conditions.

## IV.EXPERIMENTAL RESULTS

The working model of the proposed system is shownin. It was tested in a simulated environment with artificial potholes and humps.Tests were carried out in two phases. In the first phase,information about potholes and humps was recorded and stored in the server database. In second phase, alerts were generated based on pothole and hump information stored in database. While testing in the simulated environment,the microcontroller module was fixed on a toy-car and the threshold value was configured to 5 cm. During the test sit was found that the microcontroller module worked as expected to identify potholes and humps.

A set of potholes and humps identified by the system in the simulated environment. Information about potholes and humpswas successfully sent to the android device (server). The snapshot of these messages can be seen in . The serverprocessed the messages received and stored in the database.

INFORMATION ABOUT POTHOLES AND HUMPS COLLECTED IN SIMULATED TEST ENVIRONMENT

| Sl No | Obstacle Type | Height/Depth in cms | Latitude | Longitude |
|---|---|---|---|---|
| 1 | P | 19.35 | 12.9563 | 77.5544 |
| 2 | H | 3.1 | 12.9406 | 77.5661 |
| 3 | H | 3.8 | 12.9421 | 77.5668 |
| 4 | P | 13.2 | 12.9434 | 77.5669 |
| 5 | P | 8.7 | 12.9411 | 77.5654 |
| 6 | P | 6.3 | 12.9423 | 77.5658 |
| 7 | H | 2.3 | 12.9547 | 77.5755 |
| 8 | P | 15.8 | 12.9575 | 77.5769 |
| 9 | H | 3.1 | 12.9417 | 77.5659 |
| 10 | P | 18.2 | 12.9567 | 77.5760 |

In the above table, obstacle type 'P' indicates a potholeand 'H' indicates a hump.In the second phase of testing, the mobile application that generates alerts was successfully tested by moving the toy-car on routes containing potholes and humps and alerts were generated for potholes and humps recorded in the first phase

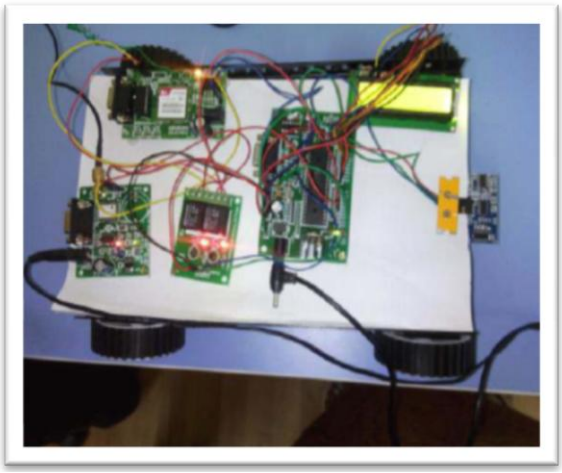

**Figure 2;** Experimental Verification of Results

The vehicle was information of pathhole and testing are collected in real time through testing vehicle which moved from Chennai to Bangalore national highway and state highway roads for the purpose of recording information about potholes and humps, and the test results were as expected. Table II shows a set of potholes and humps detected during real-time tests

INFORMATION ABOUT POTHOLES AND HUMPS COLLECTED IN SIMULATED TEST ENVIRONMENT

| Sl No | Obstacle Type | Height/Depth in cms | Latitude | Longitude |
|---|---|---|---|---|
| 1 | P | 19.35 | 12.9563 | 77.5544 |
| 2 | H | 3.1 | 12.9406 | 77.5661 |
| 3 | H | 3.8 | 12.9421 | 77.5668 |
| 4 | P | 13.2 | 12.9434 | 77.5669 |
| 5 | P | 8.7 | 12.9411 | 77.5654 |
| 6 | P | 6.3 | 12.9423 | 77.5658 |
| 7 | H | 2.3 | 12.9547 | 77.5755 |
| 8 | P | 15.8 | 12.9575 | 77.5769 |
| 9 | H | 3.1 | 12.9417 | 77.5659 |
| 10 | P | 18.2 | 12.9567 | 77.5760 |

.

The model proposed in this paper serves 2 important purposes; automatic detection of potholes and humps and alerting vehicle drivers to evade potential accidents. The proposed approach is an economic solution for detection of dreadful potholes and uneven humps, as it uses low cost ultrasonic sensors. The mobile application used in this system is an additional advantage as it provides timely alerts about potholes and humps.

The solution also works in rainy season when potholes are filled with muddy watera alerts are generated using the information stored in the database. We feel that the solution provided in this paper can save many lives and mailing patients who suffer from tragic accident/The proposed system considers the presence of potholes and humps. However, it does not consider the fact that potholes or humps get repaired by concerned authorities periodically. This system can be further improved to consider the above fact and update server database accordingly. Also, Google maps and SATNAV can be integrated in the proposed system to improve user experience.

## V.CONCLUSION

In this work, we present a Intelligent path hole detection and continuous emission monitoring system . Where the emission monitoring system is used to monitor the emission of the vehicle and report to theRTO department by the way I can be monitored through AI and IOT .and in additional to that we have added pathhole detection and V2X communication in order to detect the path hole and alerting the nearby vehicle through WSN and IOT

so that accidents can be prevented by monitoring the driver .this is proposed model.The proposed system surpassed all the other existing systems in speed and accuracy. This system can be incorporated in various fields requiring continuous surveillance and multiple object detection.

**ADVANTAGES**

- Accidents due to pothole can be avoided
- .Driver will be intimated about potholes
- Automatic speed can be controlled if pothole• detected.
- GPS tracks the location of pothole and sends it to
- control room so as to repair the road.
- Enhanced safety and security provided.
- Drivers utilizes vehicle management functions to reduce operational costs and ease in usage. Drivers and owners get information on condition of vehicle, service related reminders etc.

**APPLICATIONS**

- The concept can be implemented in military vehicles.
- It can be used in railways for identification of cracks.
- It can be used in highways in usual transportation of cracks.
- It can be used in bridges and flyovers.
- It can be used by the government authorities to monitor the road conditions effectively.

**REFERENCES**

[1] Maki, T., Kajzer, J., Mizuno, K., &Sekine, Y. (2003). Comparative analysis of vehicle–bicyclist and vehicle–pedestrian accidents in Japan. Accident Analysis & Prevention, 35(6), 927-940.
[2] Tsai W.C., Frank Kuo,Yuehching Lee. The Application of RFID in Emergency Medicine [A]. National Natural Science Foundation of China!Science Fund for Creative Research Groups.Proceedings of the Fourth International Conference on Electronic Commerce∧Ċ∨ [C].National Natural Science Foundation of China!Science Fund for Creative Research Groups:, 2004:6.
[3] Han Qiu, ZhiyuanChen,FanghaoZhong. Multifunctional Miners Helmet Design based on Wireless Sensor Network Technology [A]. International Conference on Mechatronics, Materials,Chemistry and Computer Engineering (ICMMCCE 2015)[C].International Informatization and Engineering Associations!Atlantis Press:, 2015:6.
[4] Zhiping Liu, Wei Tao,LeiJiang,Cunle Zhu. Design and Application on Electric Vehicle Real-time Condition Monitoring System by Internet of Things Technology [A]. IEEE Beijing Section.Proceedings of 2014 IEEE 5th International Conference on Software Engineering and Service Science[C].IEEE Beijing Section:, 2014:4.
[5] Frank, A., McGrew, J., Valenti, M., Levine, D., & How, J. (2007, May). Hover, transition, and level flight control design for a singlepropeller indoor airplane. In AIAA Guidance, Navigation and Control Conference and Exhibit (p. 6318).
[6] Boulos, M. N. K. (2005). Web GIS in practice III: creating a simple interactive map of England's strategic Health Authorities using Google Maps API, Google Earth KML, and MSN Virtual Earth Map Control. International journal of health geographics, 4(1), 22.
[7] R. Rajamani, Han-Shue Tan, Boon Kait Law and Wei-Bin Zhang, "Demonstration of integrated longitudinal and lateral control for the operation of automated vehicles in platoons," IEEE Transactions on Control Systems Technology, vol. 8, no. 4, pp. 695-708, Jul 2000.
[8] H. Fritz, "Longitudinal and lateral control of heavy duty trucks for automated vehicle following in mixed traffic: experimental results from the CHAUFFEUR project," Proceedings of the 1999 IEEE International Conference on Control Applications (Cat. No.99CH36328), Kohala Coast, HI, 1999, pp.1348-1352 vol. 2.
[9] T. Robinson, and E. Coelingh, "Operating Platoons on Public Motorways: An Introduction To The SARTRE Platooning Programme." [Online]. Available: https://www.researchgate.net/publication/268300380_Operaing_Platoons_On_Public_Motorways_An_Introduction_To_The_SARTR E_Platooning_Programme
[10]S. Solyom and E. Coelingh, "Performance Limitations in Vehicle Platoon Control," IEEE Intelligent Transportation Systems Magazine, vol. 5, no. 4, pp. 112-120, 2013.'
[11]S. Tsugawa and S. Kato, "Energy ITS: another application of vehicular communications," IEEE Communications Magazine, vol. 48, no. 11, pp. 120-126, Nov. 2010.
[12]R. Kianfar et al., "Design and Experimental Validation of a Cooperative Driving System in the Grand

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | Impact Factor: 7.488 |

|| Volume 8, Issue 8, August 2020 ||

Cooperative Driving Challenge," IEEE Transactions on Intelligent Transportation Systems, vol. 13, no. 3, pp. 994- 1007, Sept. 2012.
[13]S. Kokogias et al., "Development of Platform-Independent System for Cooperative Automated Driving Evaluated in GCDC 2016," IEEE Transactions on Intelligent Transportation Systems, vol. PP, no. 99, pp. 1- 13.
[14]G. J. L. Naus, R. P. A. Vugts, J. Ploeg, M. J. G. van de Molengraft and M. Steinbuch, "String-Stable CACC Design and Experimental Validation: A Frequency-Domain Approach," IEEE Transactions on Vehicular Technology, vol. 59, no. 9, pp. 4268-4279, Nov. 2010.
ss

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | Impact Factor: 7.488 |

|| Volume 8, Issue 8, August 2020 ||

INNO SPACE

SJIF Scientific Journal Impact Factor

Impact Factor:
7.488

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

## IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details