Review Paper on Iot Based Technology in Automobiles

Deepak Garg[1], Rachit Gupta[2], Naman Tyagi[3]
Electronics and Communication Engineering Department,
ABES Engineering College Ghaziabad

Abstract - *The car is now a formidable sensor platform to assist in safe navigation and traffic management. The concept of the Internet of Things in the area of vehicle automation is the next step in evolution. The main objective of this paper is to provide an overview of the existing IoT applications in vehicles. Moreover, this paper suggests a prototype for affordable driver assistance system. It has modules for accident mitigation by intelligent headlight management system and technology to prevent accidents while overtaking. A vehicle which can detect obstacles, can sense temperature, water, heat, fire, which is anti theft, alert with high speed and sleep sense alert and many more things. We are combining the technologies of different cars in one and naming is as a smart vehicle.*
Key Words: *Internet of Things, Vehicle Automation, driver assistance system, accident mitigation, intelligent light management system*

I.   INTRODUCTION

The world is getting hyper-connected. The Internet of Things (IoT) is an emerging technology rendering connectivity. The wide use of internet in the world has become a burning factor for IoT. It is defined in many different ways, and it encircles many different outlooks of life from homes and cities to automobiles and roads. Internet of Things is a collection of "things" consisting of sensors, electronics, software that together manipulates data and provide service of various kinds. It is a technology that helps in data exchange between the "things" thereby they can organize and manage themselves. This technology aims to improve the life of human beings by providing connectivity between the virtual and physical world. The number of devices getting connected using IoT is increasing. It is flourishing in various fields. The transformation in the automobile industry is evident. It is unavoidable for the automobile industry to update to the technology of connectivity. The cars in the early days were focusing on factors like mileage, brakes and other mechanical factors have now started to focus on the comfort features in automobiles. The manufacturers are now incorporating technologies to add security and comfort to the automobile. Technology is applied not just to an automobile but the entire vehicle traffic congestion and its management. Moreover focus is to transform vehicle to the connected device. Automobiles can be connected to sensors or embedded device and linked to network with the wired or wireless connection. IoT technology can be the best to be applied to the automobile to make it a smart vehicle.

II.   LITERATURE SURVEY

The paper [1] conveys the transition of the Internet of Vehicles to Vehicular Cloud, the equivalent of Internet cloud for vehicles, providing all the services required by the Autonomous Vehicles. It mentions the evolution from intelligent Vehicle Grid to Autonomous, Internet-connected Vehicles, and Vehicular Cloud. Paper discusses the human control is removed, the autonomous vehicles must efficiently cooperate to maintain smooth traffic flow in roads and highways.

The paper [2] sketches Vehicle Emission Monitoring System using IoT. It narrates the sensors and circuit gathering the pollutant discharge in vehicle and how this data is used for monitoring the pollutant levels.

The paper [3] illustrates autonomous vehicle system. It demonstrates the video streaming techniques and remote access. It also portraits the performance level of the system developed in a miniature car. The paper [4] explains the solution to the problem ofreal-time vehicle monitoring and traffic management. It unravels two techniques to identification uncertainty of automobiles with the use of Radio Frequency Identification. proposes anti interference protocol and data clearing algorithm.

The paper [5] illustrates Intelligent Transportation System with help of IR sensor, sensor array, gas sensor and temperature sensors. These will evaluate real-time traffic density. The system uses real-time approach tracking of automobiles and broadcasting traffic-related events. The paper [6] is about blending of renewable energy and expansion of energy use are both critical enablers of sustainable energy transitions and climate change. IoT is increasing globally and its network infrastructure consisting of various devices, e.g. actuators, sensors, and other appliances which are physically embedded objects and having the capability of

sensing.

The paper [7] discusses IoT, which is now the state of art technology used for many multimedia applications, smart transport systems and smart city design and deployment issues. The smart transport system can be a part of the smart city projection for days to come. This may be because of the nature of the contents involved in applying and developing IoT applications. The paper [8] discuss the design and development of an accelerometer based system for driver safety. This framework is structured by using Raspberry Pi (ARM11) for quickly accessing the control and accelerometer for event discovery. If any event occurs the message is sent to the authorized personnel so they can take quick and immediate response to save the lives and abate the harms. The system only incorporates one module ignoring the other fatal causes thus making the proposed model incompetent and incomplete.

The paper [9] emphasis is on making a monocular vision, self-sufficient auto model utilizing Raspberry Pi as a handling chip. A high-definition camera alongside an ultrasonic sensor was utilized to give fundamental information from this present reality to the automobile. The automobile is ft for achieving the given goal securely and insight fully in this manner avoiding the danger of human mistakes. Numerous current calculations like path identification and impediment location are consolidated to give vital control to the auto. The paper undertakes the implementation of the system using Raspberry Pi, by the ethicalness of its processor . The security segment proposed by this framework in paper [10] is the driver in an unusually abnormal state of tipsiness isn't allowed to drive an automobile as the start framework will be shut down. This method works in a way to intimidate the driver about his own condition, which is ironic because the person won't be mindful to take any action against it. The idea is novel but practically it is not workable [11].

The health of both private and public cars is a major concern, so the tracking system for GPS vehicles assures their protection when driving. Different monitoring methods are used in the existing system, such as connectivity of Google maps, intelligent transit instructions or real-time tracking and estimation of arrival time. Radio Frequency Identification is a cellular identification system used in many areas, including the tracking of solid state, organisms, artefacts and animals [12].

III. PROPOSED WORK

The proposed work is to build driver assistance system. It consists of two parts: light management and overtake alert system. The circuit fixed in the car detects inputs from the sensors. Data acquired from sensors will be send & processed in Arduino. The data is passed on to cloud via GSM- Wi-Fi modules to the cloud which send the corresponding alert to the user's android device.

The first module comprises a system that is used to reduce the intensity of headlight of an automobile to one-fourth of its intensity when light from opposite vehicle is detected. The second module is an alert system that generates alert to the car driver whether the roar is safe and clear for him to overtake. The alert is generated in the driver's android device. The light management uses LDR to detect light from approaching the vehicle. The circuit designed will pass the voltage from the battery to flow through the circuit with one- fourth of original intensity of the headlight. When the illumination over LDR gets shifted the headlight gains its original intensity. The overtaking module uses the ultrasonic

LDR: Light Dependent Resistor is photoresistor. When light falls on the resistor it exhibits photoconductivity. Some LDR has high resistance up to 100000 ohms but when they are illuminated with light the resistance drops dramatically.

Ultrasonic Sensor: Ultrasonic sensor uses sonar to detect the objects. The HC-SR04 includes the ultrasonictransmitter, receiver and control circuit. It has VCC, GND, Trig and ECHO pins. It sends a high-frequency sound and detects the distance by calculating the time interval between sending of signal and receiving of echo. It has high ranging accuracyand stable performance.

Arduino: It is an inexpensive single-board microcontroller. These modules can be assembled by hand. It has a set of digital and analog input pins. It is preprogrammed with bootloader and has flash memory for storage. They arecoded using the universal serial bus. Arduino Project provides Arduino integrated development environment. It has a programming tool with compilers so it can be coded in any language. It generates a binary machine code for target processors.

GSM Module: ESP8266 Wi-Fi module is self-contained with TCP/IP stack. Each of the modules is preprogrammed with AT command set firmware. They are the powerful onboard device with good storage capabilities and it is cost effective.

Cloud Platform: ThinkSpeak is an IoT platform to analyze, aggregate, visualize data in the cloud. Sensors can

send data to this platform through Arduino. The data received is manipulated to provide various service.

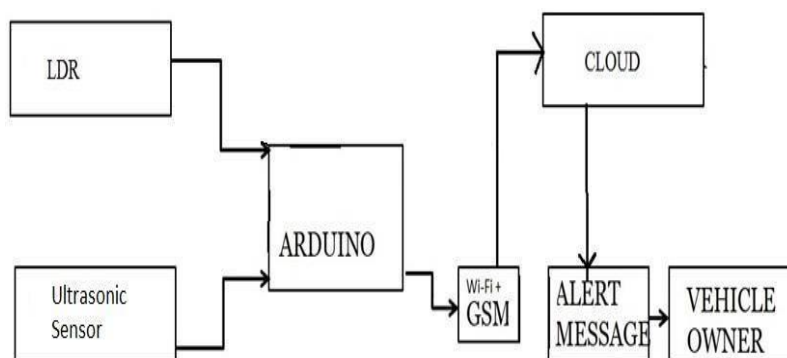The above operation is shown in the block diagram Fig.1

Fig.1: Block Diagram of Proposed Work

IV. CONCLUSION

Accidents on road increasing at alarming rate. A study of 3200 vehicles inunjab and Haryana by ''TheTimes of India''showed that 73.83% of vehicles travel with high beams. Their statistics showed that 400 accidents occurred in 3 days due to the glare of high beam. Noticed factors inthe most accidents in recent days are the use of high beam headlights and wrong overtaking. Technologies have been developed for accident mitigation. They are being implemented on luxury vehicles. (Intelligent headlight technology in BMW). The proposed work is an affordable technology to solve this problem by automatically managing the headlight system. The proposed work also provides an overtaking assistance to the driver by indicating the status of the road, thereby alerting driver whether it is safe to overtake or not. This will reduce the cases of accidents on road.

ACKNOWLEDGMENT

REFERENCES

[1]. Mario Gerla, Eun-Kyu Lee, Giovanni Pau, "Internet of Vehicles: From Intelligent Grid to Autonomous cars and Vehicular Clouds", IEEE World Forum on Internet of Things, 2014.
[2]. Abhinyaa Balasundaram, Aiswarya Udayakumar, Baladharshini Gopalan, Kaaviya Bhaskaran, Bharkathnisha Abdul Muthalip ,"IoTBased Vehicle Emission Monitoring System", National Conference on Networks, Intelligence and Computing Systems, IJIRST,March 2017.
[3]. Mohammad Rubaiyat Tanvir Hossain, Md.Asif Shahjalal,Nowroz Farhan Nur,"Designof an IoT Based Autonomous Vehicle with the Aid of Computer Vision", International Conference on Electrical, Computer and Communication Engineering(ECCE),Cox'zBazar, Bangladesh, February 16-18, 2017.
[4]. Minghe Yu, Dapeng Zhang, Yurong Cheng, Mingshaun Wang,"AnRFID Tag based Automatic Vehicle Identification System for Traffic IOTApplications",Control and Decision Conference (CCDC), 2011 Chinese, 4192-4197.
[5]. Sagar Sukode, Shilpa Gite, "VehicleTraffic Congestion Control & Monitoring System inIoT",International Journal of Applied Engineering Research, ISSN 0973- 4562Volume 10, Number 8(2015), pp.19513-19523.
[6]. Li Da Xu, Wu He, and ShancangLi,"Internetof Things in Industries: A Survey" IEEE transactions on industrial informatics, vol. 10, no. 4, November 2014 oung, The TechnicalWriter'sHandbook. Mill Valley, CA: University Science, 1989.
[7]. KeertiKumar M,Shubham M, R.M.Banakar"Evolution of IoT in SmartVehicles",International Conference on Green Computing and Internet of Things(ICGCIoT), 2015.
[8]. V. N. Kumar, V. S. Reddy, and L. P. Sree, ""design and development of accelerometer based system for driver safety." international journal of science," Engineering and Technology Research (IJSETR), vol. 3, p. 12, 2014.
[9]. G. S. Pannu, M. D. Ansari, and P. Gupta, ""design and implementation of autonomous car using raspberry pi." international journal of computer applications 113," no., vol. 9, 2015.
[10]. A. F. B. A. de Oliveira and L. V. L. Filgueiras, "Developer assistance tools for creating native mobile applications accessible to visually impaired people: A systematic review," in Proceedings of the 17th Brazilian Symposium on Human Factors in Computing Systems, ser. IHC 2018. New York, NY, USA: Association for Computing Machinery, 2018.
[11]. A. F. B. A. de Oliveira and L. V. L. Filgueiras, "Developer assistance tools for creating native mobile applications accessible to visually impaired people: A systematic review," in Proceedings of the 17th Brazilian Symposium on Human Factors in Computing Systems, ser. IHC 2018. New York, NY, USA: Association for Computing Machinery, 2018.
[12]. Understanding GPS: Principles and Applications (Artech House Telecommunications Library), Elliott D. Kaplan (Editor) / Hardcover / (1996), (USD 99).