International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 03 | Mar-2018 www.irjet.net p-ISSN: 2395-0072

REVIEW PAPER ON IOT BASED TECHNOLOGY IN AUTOMOBILES

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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*.

Key Words: **Internet of Things, Vehicle Automation, driver assistance system, accident mitigation, intelligent light management system**

1.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.

2. Literature Survey

Mario Gerla, Eun-Kyu Lee, Giovanni Pau[1]: This paper 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.

Abhinyaa Balasundaram, Aiswarya Udayakumar, Baladharshini Gopalan, Kaaviya Bhaskaran, Bharkathnisha Abdul Muthalip [2]: This paper 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.

Mohammad Rubaiyat Tanvir Hossain, Md.Asif Shahjalal, Nowroz Farhan Nur[3]: This paper illustrates autonomous vehicle system. It demonstrates the video streaming technics and remote access. It also portraits the performance level of the system developed in a miniature car.

Minghe Yu, Dapeng Zhang, Yurong Cheng, Mingshaun Wang[4]: This paper explains the solution to the problem of real-time vehicle monitoring and traffic management. It unravels two techniques to identification uncertainty of automobiles with the use of Radio Frequency Identification. It proposes anti interference protocol and data clearing algorithm.

Sagar Sukode, Shilpa Gite[5]: This paper 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.

3. PROPOSED WORK

The proposed work is to build driver assistance system. It consists of two parts: light management and overtake alert system.

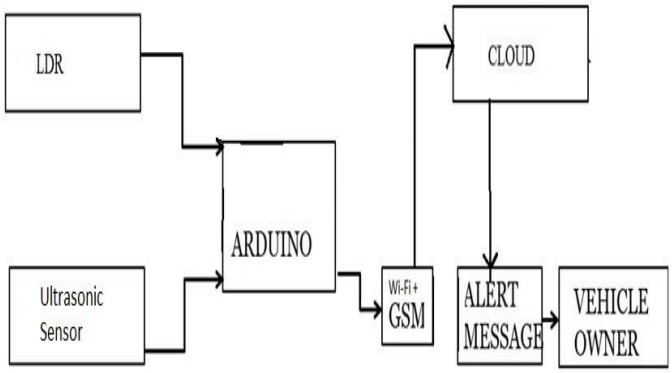

Fig-1: Block Diagram of proposed work

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 sensor HC-SR04 that detect the presence of an object. The appropriate alert is passed to the user's mobile via cloud technology.

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 ultrasonic transmitter, 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 accuracy and 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 are coded 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.

4. CONCLUSION

Accidents on road increasing at alarming rate. A study of 3200 vehicles in Punjab and Haryana by "The Times 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 in the 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.

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BIOGRAPHIES

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