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Design and implementation of real time wireless system for vehicle safety and vehicle to vehicle communication

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ABSTRACT

Objective of Vehicle to Vehicle Communication System paper is to avoid the roadway collisions and to drivers prior to the collision. Accidents are taking thousands of lives every day so with intent to reduce the adverse effects we implemented this project based on vehicle to vehicle communications systems, with the rapid advancement of wireless communication systems had paved path for the vehicle to vehicle wireless communication based warning systems.The proposed system aims at developing and designing a suitable system for automobile purposes using wifi protocols. The proposed system solves many of the problems and also uses sensor which are reliable in areas where human intervention is either unintended or where it puts life to risk. The problems of drunken driving in urban arterials are increasing day by day and it is very difficult to handle it. So we are developing a communication unit within the system to interact with other vehicles in order to alert them. This system aims at communicating with the vehicle in its surrounding with the help of Esp8266. When these vehicles are 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. The corresponding vehicle's engine whose driver is drunk will be slowed down.

Keywords: Car Safety system, Sensors, Actuators, IoT, Cost, Microcontroller, Communication Medium.

INTRODUCTION

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 though vehicle to vehicle (V2V) and Vehicle to Infrastructure (V2I) communications. The vehicle to vehicle and vehicle to infrastructure communication is done by using two Raspberry-pi.In this project advanced controller is used that is raspberry pi. It also implements wireless vehicle to vehicle communication. Here one vehicle transmits message to another vehicle wirelessly and it reduces noise pollution also because horn is not needed for indication. Ultrasonic sensor measures distance between two vehicles. Here we are also using alcohol detection sensor. When alcohol is detected in vehicles the supply will be off automatically by using relay. In this Project all this communication is done with IOT(Internet of things). we are also using GPS tracker which calculates the langitude and lattitude of vehicles and we will get exact position vehicle.Road traffic safety application have stringent requirements for both bounded delay and high reliability. Examples of road traffic safety applications are warning emergency vehicle approaching, stationary vehicles, drowsiness detection, alchohol detection, anti breaking system. Over the past few years there has been a rapid growth in the utilization of the RF region of the electromagnetic spectrum. This is because of the huge growth in the number of mobile phones subscriptions in recent times. This

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has been causing a rapid reduction in free spectrum for future devices. Light fidelity (Li-Fi) operates in the visible light spectrum of the electromagnetic spectrum i.e. it uses visible light as a medium of transmission rather than the traditional radio waves. Although Li-Fi can be used to off-load data from existing Wi-Fi networks, implementations may be used to provide capacity for the greater downlink demand such that existing wireless or wired network infrastructure may be used in a complementary fashion [1].

EXISTING METHOD

The current methods to prevent drunken driving includes an alcohol sensor and an alarm within the particular vehicle. When alcohol content is detected in driver's breath, the alarm will be switched. Li-fi basically known as "light fidelity" is an outcome of twenty first century. The basic ideology behind this technology is that the data can be transmitted through LED light whose intensity varies even faster than 13 the human eye. As the transmission of the data takes place through the light emitting diodes (LED‟s) the amount is comparatively small increase in the distance of transmission. As there is a limited amount of Radio based wireless spectrum available, a number of companies formed a consortium called Li-fi consortium in order to promote high speed optical wireless systems .The members of this consortium believes that a speed of 10 Gbps can be achieved in no time. Li-fi basically known as "light fidelity" is an outcome of twenty first century. The basic ideology behind this technology is that the data can be transmitted through LED light whose intensity varies even faster than the human eye. As the transmission of the data takes place through the light emitting diodes (LED‟s) the amount is comparatively small .In modern times, it is called as the optimized version of WIFI .The advantageous thing is the wireless communication which decreases the cost enormously. LiFi is the use of the visible light portion of the electromagnetic spectrum to transmit information at very high speeds. This is in contrast to established forms of wireless communication such as Wi-Fi which use traditional radio frequency (RF) signals to transmit data.It has been designed in such a way that it overcomes the disadvantages that occurs during the usage of Wi-Fi. In general terms, Li-fi works even under water thereby causing a great benefit to the military operations. The physics envisions that this technology would make a great difference between the assumption and the proof in this case .The demonstration took place using two Casio smart phones. The data was made to exchange between the phones using light. Even though the distance was nominal, it is sure that there would be a rapid increase in the distance of transmission. As there is a limited amount of Radio based wireless spectrum available, a number of companies formed a consortium called Li-fi consortium in order to promote high speed optical wireless systems .The members of this consortium believes that a speed of 10 Gbps can be achieved in no time [2].

PROPOSED METHOD

The proposed system consists of a main unit consisting of various functional sub units where a receiver and a transmitter are placed in the main unit which sends and collects data. Major unit is the vehicle to vehicle communication for alcohol consumption alert. The unit will interact with the nearest vehicle and sends information regarding the situation. The second sub unit is the system that slows down the engine of the vehicle whose driver is drunk. The real time data i.e., consumption of alcohol in the nearest car is displayed on the LCD display. The main objectives of this project are we have to analyze different methods to avoid accidents on road, Design, simulate and analyze the new technologies on wireless connectivity for safety on highways. Also we have to do communication with internal and external environments supporting the interactions betweenvehicle and sensor, vehicle and vehicle, vehicle and Infrastructure [3].

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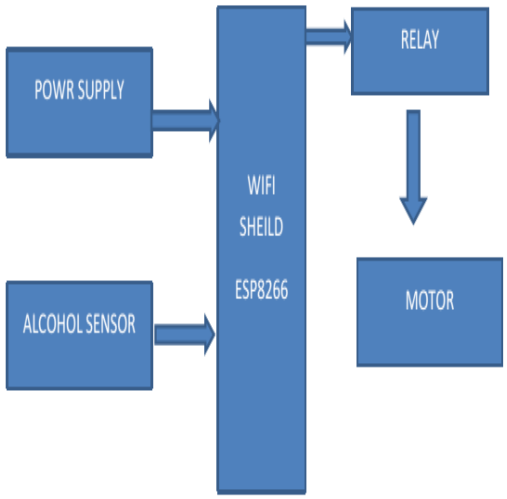
BLOCK DIAGRAM

Intelligent Transportation System (ITS) ensures the information transmission so real time, secure reliability that realizes the long distance control. It is an advanced application which, without embodying intelligence as such, aims to provide innovative services relating to different modes of transport and traffic management and enables user to be make safer, more coordinated, and smarter use of transport networks. The alternative method is to create and deploy on which enables optimal use of existing road infrastructure by interactive management of all traffic [5].

Microcontroller is the heart of our system which is responsible for the synchronizing among all sub-components, and also plays the role of the decision maker when to sound the buzzer, instruct the motor to apply the vehicle braking system, or to contact law enforcement authorities in case the first two options do not heed desired results. The microcontroller is powered by DC supply, commonly available from the cigarette-lighter knob in most car's dashboards. The alcohol value which is detected by the alcohol detector are fed into microcontroller. If the threshold value of the alcohol sensor is more than 600 baud rate the value will gets displayed in the LCD display as a warning message intimating the current state of the driver. The microcontroller can be interfaced to the vehicle braking system which starts applying the brakes slowly if warranted by the condition of the driver. A networking card can also be connected with the microcontroller to send a message to the law enforcement authorities, if desired [6].



IMPLEMENTATION PLATFORM HARDWARE REQUIREMENTS

- Power supply unit
- Microcontroller – ATmega 8A
- LCD display – 16x2
- Alcohol sensor
- Esp8266
- Relay

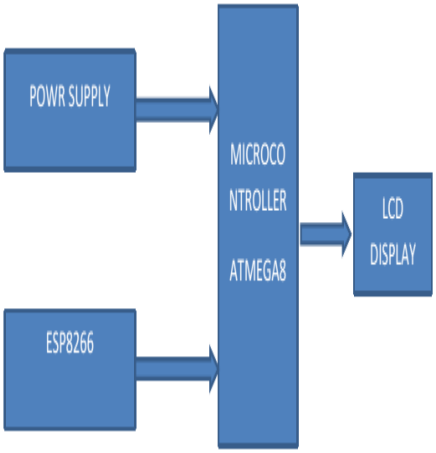
Software Requirements

- Platform - AVR STUDIO
- In System Programmer - ProgISP

Advantages

1. Reduces loss of life & property:It is very difficult and also dangerous to communicate through mobile phones while driving. With this project it will be easy and safe to communicate from one vehicle to another without accessing any cellular device hence this will reduce loss of life & property [7].
2. Get road condition prior : It is impossible to know how the road conditions of the route will turn out on which we are travelling so we can get updates of road conditions prior to the journey [8].
3. Easy to Communicate: Due to use of Raspberry-pi as communication device we can communicate easily for V2V and V2I communication [9].
4. Efficient and Saves Time,Money:The parameters to be sensed across this network infrastructure, provides new technological opportunities for more accuracy and efficiency of the real world into computer-based systems, this will reduce human intervention and saves time and money this will give better life [10].

CONCLUSION



In this project smart system has been implemented for the highway system which uses concept of IOT. This project includes use of various sensors like ultrasonic sensor that detects various type of accidents, to avoid it, a novel idea is proposed for monitoring the accident over the highways. Using wireless communication message will be sent to another vehicle, Infrastructure (Home, hospital, police station or quick response team) and also displayed on server display. Thus here by we conclude that the proposed system remove all the drawbacks of existing system and enhanced with the IoT system for V2V and V2I system. So it makes the highway system very smart thus we named it as “Smart highway system for accident prevention using IoT”.

REFERENCES

[1]. Kim MH and M. Gerla, “A Survey of urban vehicular sensing platforms,”Computer Nteworks,. 54, no. 4, 2010, 527-544.

[2]. Lee, Y. T. and Son, J, “AgeRelated Physical and Emotional Characteristics to Safety Warning Sounds: Design guidelines for intelligent vehicles,” IEEE Transactions on Systems, Man, and Cybernetics, Part C: Applications and Reviews, 99, 2010.

[3]. Shih-Nan Lu, Hsien-Wei Tseng, Yang-Han lee, Yih-Guang Jan and Wei-Chen Lee, "Intelligent safety warning and alert system for car driving" Tamkang journal of Science and Engineering, 13, 4, 2016, 395-404.

[4]. Suresh B. Mer, "Smart Vehicle-to-Vehicle Communication with 5G Technology" International journal on recent and innovation trends in computing and communication, 3, 2014, 5.

[5]. Swati B, Dr. Preeti R. Bajaj, Dr Latesh G Malik "Prediction Of Vehicle Collision Probability at intersection using V2V Communication" International journal of scientific & Engineering Research, 6, 2015.

[6]. S. Pooranachandran, B. Sharomena Aarthi, "Design and implementation of a vehicle to vehicle communication system using Li-Fi technology "international research journal of Engineering and technology (IRJET) 03(05), 2016.

[7]. Thomas Kiber, Dr Sahibzada Ali Mehmud, Musatfa Basit, "Inter-Vehicle Collision Avoidance Using Zigbee Sensor networks "international journal of scientific & Engineering Research, 4(4), 2013.

[8]. Umair Ali Khan, Stefen Poferl. Gotthard Bock, Hans-peter Huber and Eberhard Zeeb, "optical data Buses for Automotive Applications," journal of light wave technology, 40, 2004.

[9]. Vineeth Kodire, Sreebha Bhaskaran, Vishwas H.N "IEEE 802.11p for Vehicle-toVehicle (V2V) Communications".School of Electronics Engineering and Computer Science, Peking University, Beijing, China 2015.

[10]. Zijun Zhao and Xiang Cheng "GPS and ZigBee Based Traffic Signal Preemption" Amrita School of Engineering, Bengaluru, India, Publisher IEEE 2016.