

Car Obstacle Detection and Pollution Level Tracing using Node MCU

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Abstract – The Modern development of the Internet of Things (IOT) and Smart things offers a prospect for the informationization for the automotive industry. India is the number one contributor to global road accidents death and injury figures. In India every hour many lives are lost due to road accidents. Vehicle accidents are one of the leading causes of death rate. Life of the people is under high risk. This system deals with the optimum solution to these problems. The ultrasonic sensor is used to detect the objects in front of car which avoid dangerous accidents. Also pollution is another leading problem in India. Gas sensors are used to detect CO₂ gas producing out from the car. This system also provides feature to see current car location on google map. A graphical user interface is provided to the user inside the vehicle to monitor the distance and can avoid accident with the obstacle. Obstacles locations thus marked by the detection system and are stored locally and uploaded to cloud time-to-time.

Key Words: Obstacles detection, ultrasonic sensor, Performance, NodeMCU, Co₂.

1. INTRODUCTION

The Internet of Things (IOT) is the network of physical devices, vehicles and other items embedded with electronics, software, sensors, mechanism, and network connectivity which enable these objects to collect and exchange data. The aim of the system is to create a smart accident prevention system using IOT. This system is develop to keep the vehicle secure and protect it by the occupation of the intruders. The main aim of the project is to develop a system automatic speed control of vehicle and accident avoidance using gas sensor and ultrasonic sensor. Whenever any obstacle is detected in running vehicle depends on distance automatically control the speed of vehicle. The ultrasonic sensor system continuously sends signals and monitors any car or other obstacles which comes in front of the car. To measure the distance from obstacle, ultrasonic sensors play a vital role. Ultrasonic sensors are very flexible in distance measurement. They provide inexpensive solutions. The distance up to which ultrasonic sensor can work may be up to 4 meter. When

any obstacle or vehicle detected by ultrasonic sensor system it will send signal to the embedded board. After receiving this signal embedded board sends a signal to the motor to reduce the car speed automatically which can control car speed immediately. Many accidents at High-ways are taking place due to the close running of vehicles, all of sudden, if the in front vehicle driver reduces the speed or applied breaks, then it is quite difficult to the following vehicle driver to control his vehicle, resulting accident. To avoid this kind of accident, the warning system, which contains display system can arrange at rear side of each and every vehicle.

2. LITERATURE REVIEW

Kiran Sawant et al. created an accident alert system using modem and Raspberry Pi. A piezoelectric sensor _rst senses the occurrence of an accident and gives its output to the microcontroller. The sensor detects the latitude and longitudinal position of a vehicle. The latitudes and longitude position of the vehicle is sent as message through the static IP address of central emergency dispatch server is pre-saved in the EEPROM. Whenever an accident has occurred the position is detected and a message has been sent to the pre-saved static IP address Pseudo Algorithm : Initialization: Lastlon=0, LastLat=0, LastAlt=0, DistTh=0 2. Get new GPS data: Lon, Lat, alt, Speed, hdhop, status AddNewPoint(GPS data) 4. Go to step 2[1]. Mrs Manasi Patil et al., described a better traffic management system using Raspberry pi and RFID technology. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. When an accident occurs the value of one of the sensor changes and a message to a predefined number (of the ambulance) is sent through GSM. The GPS module which is also interfaced with the controller also sends the location of the vehicle. When the message is received by the ambulance, a clear route has to be provided to the ambulance. The ambulance has a controller ARM which is interfaced with the RFID tag sends electromagnetic waves. When an ambulance reaches the traffic signal the RFID reader which is placed on the joints detect the

electromagnetic waves of the tag. If the traffic signal is red, then the readers goes through the database in fraction of seconds and turn the red light green. And automatically in such condition the RFID on opposite joints turn the opposite signal red. This provides a clear route to the ambulance.

Apurva Mane et al., described the methods for vehicle collision detection and remote alarm device using Arduino. Key features of this design include real-time vehicle monitoring by sending its information regarding position (longitude, latitude), time, angle to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft occurs. Also user/owner has an access to get real-time position of a vehicle in real time. Whenever accident occurs MEMS and vibration sensor detects and sends the signals to microcontroller, by using GPS particular locations where accident has occurred is found, then GSM sends message to authorized members. Prof. Mrs. Bhagya Lakshmi V et al., proposed a FPGA Based Vehicle Tracking and Accident Warning system using GPS. FPGA is mainly used to track position of any vehicle and send automated message to pre programmed number. The owner of vehicle, police to clear track, ambulance to save people can be informed by this device. FPGA controls and co-ordinate all parts used in system. With the help of accelerometer sensor, the exact position of the vehicle can be detected. It can also be predicted whether the vehicle is in normal position or upside down.

V.Sagar Reddy et al., developed an accelerometer based System for driver safety. The system has the advantage of tracking or identifying vehicles location just by sending a SMS or email to the authorized person. The system is designed by using Raspberry Pi (ARM11) for fast access to accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. Images captured by the camera on the vehicle are emailed to the concerned person (for example the owner of the vehicle) along with the type of accident and the time of the accident. When we designed this system into vehicle detected accelerometers values based to compare both X and Y axes value to the threshold value if the value is greater than the threshold value then send a snap shot to the predefined email id and Parallel send message to predefine number to the mobile. Sri Krishna Chaitanya Varma et al., proposed an Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. AT89C52 microcontroller is used in the system. When the system is switched on, LED is ON indicating that power is supplied to the circuit. When the IR sensors that are used sense any obstacle, they send interrupt to microcontroller. The GPS receives the location

of the vehicle that met with an accident and gives the information back. This information is sent to a mobile number as a message. This message is received using GSM modem present in the circuit. The message gives the information of longitude and latitude values. Using these values the position of the vehicle can be estimated.

3. PROPOSED SYSTEM

The main aim of the project to develop a system automatic speed control of vehicle and accident avoidance using alcoholic sensor and ultrasonic sensor .whenever any obstacle is detected in running vehicle depends on distance automatically control the speed of vehicle. sensor detect the driver is drunk or not if found drunk then alarm start buzzer. The system has a switch to enable driver to stop alert system in case of false alarms. This system acts as a black box to vehicles. The above figure can represents the circuit diagram of our design. Coming to the operation, Many accidents at High-ways are taking place due to the close running of vehicles, all of sudden, if the in front vehicle driver reduces the speed or applied breaks, then it is quite difficult to the following vehicle driver to control his vehicle, resulting accident. To avoid this kind of accident, the warning system, which contains alarm and display system can arrange at rear side of each and every vehicle. The circuit is designed such that whenever the infrared signal is interrupted, logic high signal is generated and it is fed to microcontroller, on receipt of this signal, the controller activates the display board and alarm automatically. The ultrasonic sensor system continuously sends signals and monitors any car or other work may be up to meter. When any obstacle or vehicle detected by ultrasonic sensor system it will send signal to the embedded board. obstacles are in front of car. The distance up to which ultra-sonic sensor can after receiving this signal embedded board sends a signal to the motor to reduce the car speed automatically which can control car speed immediately. Vehicle is controlled automatically without any manual operation when the vehicle is at meter distance away from the front vehicle. Also give alarm to alert to the driver.

3.1 Ultrasonic Sensor

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns. Ultrasonic sound vibrates at a frequency above the range of human hearing. Transducers are the microphones used to receive and send the ultrasonic sound. Like many others, use a single transducer to send a pulse and to

receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

3.2 MQ-7

Sensitive material of MQ-7 gas sensor is SnO₂, which with lower conductivity in clean air. It make detection by method of cycle high and low temperature, and detect CO when low temperature (heated by 1.5V). The sensor's conductivity is higher along with the gas concentration rising. When high temperature (heated by 5.0V), it cleans the other gases adsorbed under low temperature. Please use simple electro circuit, Convert change of conductivity to correspond output signal of gas concentration. MQ-7 gas sensor has high sensitivity to Carbon Monoxide. The sensor could be used to detect different gases contains CO, it is with low cost and suitable for different application

4. CONCLUSION

IOT based automatic breaking system for vehicles has been implemented using NodeMCU microcontroller. This system detects obstacles in significantly less time and controls the speed of the vehicle within a few seconds. This system will also calculate the level of CO₂ emitted by the vehicle. If the level is above the values as per norms of the RTO then system will automatically send the notifications to the RTO as well as the owner of the vehicles through text message and E-mail also. RTO officer can also monitor the level of CO₂ whenever he wants from the website

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