iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** III **Month of publication:** March 2019

DOI: http://doi.org/10.22214/ijraset.2019.3206

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue III, Mar 2019- Available at www.ijraset.com

Avoid Accidents in Urban Environment using Ultrasonic Sensors

Pooja. G[1], Vishnu Priya. T[2], Narmadha B.E[3], Kapila Vani[4]
[1, 2]*Department of computer science and engineering, Prince shri Venkateshwara padmavathy engineering college*
[3, 4]*Assistant professor, Prince Dr. k. vasudevan college of engineering and technology.*

Abstract: ***Automotive transportation vehicular systems are increasingly being equipped with accident avoidance system for avoiding the collisions being occurred especially in Urban environments which faces dynamic traffic atmosphere, urban congestions and immediate turnings. The main cause of the vehicle accident is related to human factor which is drowsiness. In the project implementation eye-blink sensor is being used to monitor the eye closure of the driver. An automatic alarm system is incorporated so as a warning, Prolonged :slow-down of the motor indication to ambulance at immediate post-accident.***
Index Terms: Arduino mega 2560 controller, GPS, GSM, IR sensor, ultrasonic sensor.

I. INTRODUCTION

Acquiring instant vehicle speed is desirable and a corner stone to many important vehicular applications. Autonomous vehicles and Advanced Driving Assist Systems (ADAS) are safely-critical, cyber-physical systems that are used hierarchical control, long supply chains, and are expected to work in uncertain environments. An automatic alarm system is incorporated so as a warning, Prolonged: slow down of the motor indication to ambulance at immediate post accident. According to National Highway Traffic Safety Administration it was detected that 100,000 crashes, 6400 injuries, 800 deaths are due to drowsiness. Almost 9.5% of the crashes occurred only minutes before driver's eyes were closed. Therefore, our proposal would contribute an major role in order to deprive such instance it also plays an important role to avoid accidents when implemented to future automotive environments. Acquiring instant vehicle speed is desirable and a corner stone to many important vehicular applications. Engineering the tools to scale to bigger scenarios with larger number of modes and vehicles will be an natural and important next step**.**

To acquire an efficient system provided in these guidelines to ensure legibility and uniformity. The guidelines are designed to reduce the amount of accident risks and maximize the amount of safety travelling.

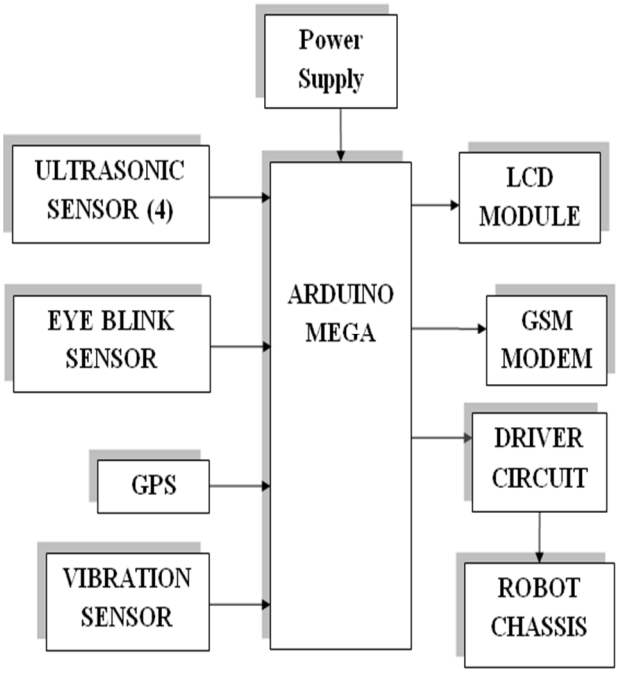
II. PROPOSED SYSTEM

Learning from existing platforms it's been found that there are many issues and lack of accidents avoiding system in automobile society. The system proposes in designing an vehicle that could prevail in traffic conditions even in urban environments which is an zone consisting of dynamic traffic atmosphere, urban congestions and immediate turnings .The work ultimately targets over developing a system which is safe and secured from occupation of the intruders and promoting an automatic control of the vehicular speed, slowing it down and also automatically getting it parked. Hence, the driver's drowsiness is being monitored using eye-blink sensor which is implemented using IR sensor, upon drowsy state the vehicle will be automatically parked on the left end of the road unless any obstacle being occurred (some of the human interventions, other running vehicles, trees etc are being considered as obstacles).There are four Ultrasonic sensors mounted to the four sides of the vehicle which is used to calculate the distance of the obstacle.

Whenever any obstacle is detected in running vehicle the slowing down of the motor occurs depending on the its distance and also, left end parking condition applies while the space is free. If there exist an forward obstacle the vehicle would reverse back a step to avoid collision. If there exist an obstacle on the front as well as back side of the vehicle there would be an constant speed maintenance instead of parking further at immediate instances stopping down would occur. Immediate brake application is avoided in order to avoid sudden crashes. Thus, all the above mentioned automatic workings and movements occurs only when the driver fall asleep or drowsy.

The drowsiness is assumed constantly detecting the retinal movements of the eye using eye-blink sensor equipped with an pair of glasses. While the fall of eye movement is detected an alarm is given priorly as a warning signal to awake the driver. If the accidents has occurred them an immediate intimation is sent to the ambulance and the authenticator as well.

System Architecture



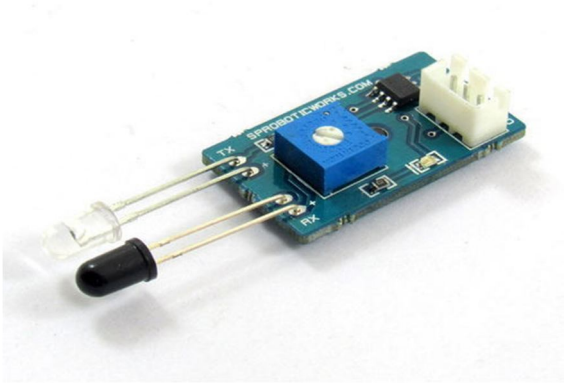
A. List of Modules

1) Sensing the driver's eye movement
2) Detecting the distance of the obstacles
3) Controlling the speed of the motor
4) Detecting the location
5) Sending the SMS to authorized person
6) Detecting the occurrence of accident

III. SENSING THE DRIVER'S EYE MOVEMENT USING EYEBLINK SENSOR

Driver's drowsiness is monitored using eye blink sensor which is implemented using IR sensor, If the eyelid closes more than 3 seconds it will send the signal to the Arduino controller.

IR Sensor



The buzzer will produce sound to wake up the driver. If the situation continues the Ultrasonic sensor start to calculate the obstacles from all the sides.

Peizo Electric Buzzer - Alarm

IV. DETECTING THE DISTANCE OF THE OBSTACLES

The proposed system uses ultrasonic sensor to calculate the distance of the obstacles from all the four sides. Ultrasonic sensors also known as transceivers(because they both send and receive) work on a principle similar to radar or sonar. It emits an ultrasonic sound at 40000Hz which travels through the air and, If there is an object or an obstacle on its path it will bounce back to the module. . Sensors calculate the time interval between by sending the signal and receiving the echo to determine the distance to an object.

The distance can be calculated with the following formula

Distance L=1/2 * T * C. Where L is the distance, T is the time between the emission and reception, and C is the velocity of sound.(The value is multiplied by ½ because **T** is the time for go-and-return distance.)

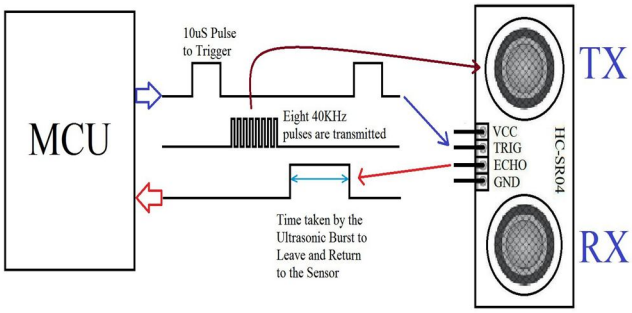
There are two pins in ultrasonic sensor: the transmitter (trigger pin) sends a signal: a high-frequency sound. When the signal finds an object, it is reflected and the transmitter (echo pin) receives it.

The ultrasonic sensor has four terminals: +5V, Trigger, Echo, and GND connected as follows

1) Connect the +5V pin to +5V on your Arduino board.
2) Connects Trigger to digital pin 7 on your Arduino board.
3) Connect the echo pin to digital pin 6 on your Arduino board.
4) Connect GND with GND on Arduino.

In our program, we have displayed the distance measured by the sensor in inches an cm.

Ultrasonic Sensor



V. CONTROLLING THE SPEED OF THE MOTOR

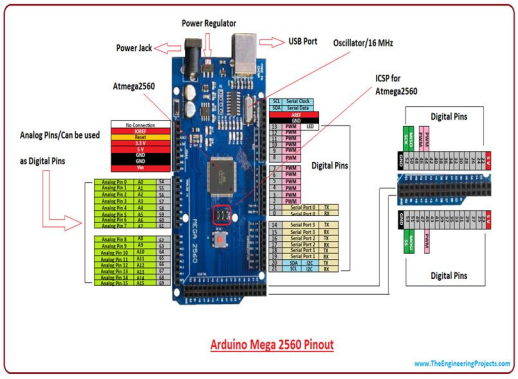
Here we use PWM (pulse width module) signals to connect the speed of the motor. Arduino controller contains 54 digital I/O. Out of 54 digital I/O, 15 are used for PWM (Pulse width modulation).After the signal from the ultrasonic sensor, The Arduino generates PWM signal and pass to the driver circuit to control the motor speed.

If any obstacle is present in the left side, the vehicle will continue its speed, otherwise the vehicle will park at the left side of the road.

A. Arduino Pin Configurations With Duty Cycle

1) Analog Write (pin, value) function used to output a PWM signal. The value can change from 0 to 255.
2) Analog Write (0) means a signal of 0% duty cycle.
3) Analog Write (127) means a signal of 50% duty cycle.
4) Analog Write (255) means a signal of 100% duty cycle.

Arduino Controller



VI. DETECTING THE LOCATION

The Global Positioning System (GPS) is a satellite-based navigation system. If accident occur or the driver slept, the GPS will detect the accurate location and send it to the authorized person [2]. It works in any weather conditions, anywhere in the world, 24 hours a day. This module has an external antenna and built-in EEPROM.

VII. SENDING THE SMS TO AUTHORIZED PERSON

GSM can be abbreviated as Global System for Mobile communication, It can be used to send and receive messages in critical area. The working of GSM modem is based on commands, the commands always start with AT (which means Attention) and finish with a <CR> character.

It is used to send the information about the driver conditions.

A. Arduino Mega 2560 to GSM board
B. Connect the RX pin of the GSM board to the 0.4 of the Arduino Mega 2560.
C. Connect the TX pin of the GSM board to the 0.3 of the Arduino Mega 2560.
D. Connect the 5V power supply to the Arduino Mega 2560.
E. At last connect the 12 DC voltage to the GSM board.

VIII. DETECTING THE OCCURRENCE OF THE ACCIDENT

Sensor is mounted at the bottom of the unit. The unit should be fixed with the vibrating body firmly the sensitivity is adjusted for the required vibration, shock is detected the output goes low and the delay is provided for proper operation vibrating frequency and amplitude can be detected.

Vibration Sensor Module comes with SW-420 vibration sensor.

A. Connections of vibration sensor on the Arduino board

1) VCC of the vibration sensor is connected to VCC of the Arduino board.

2) The GND pin of the vibration sensor is grounded to the Arduino board.

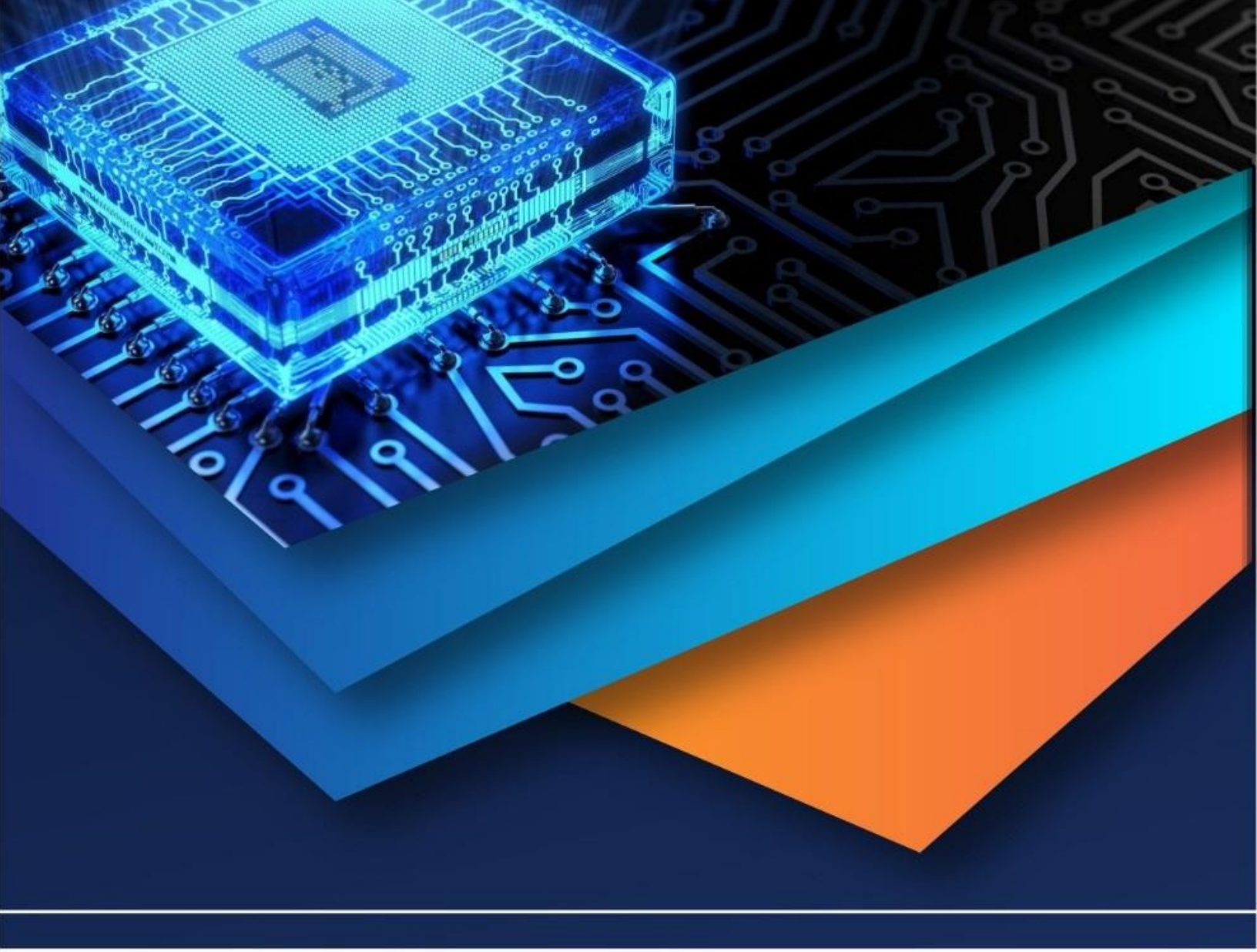
3) The DO pin of the sensor is connected to the 3rd pin on the Arduino board.

IX. CONCLUSION

According to National Highway Traffic Safety Administration it was detected that 100,000 crashes,6400 injuries, 800 deaths are due to drowsiness. Almost 9.5% of the crashes occurred only minutes before driver's eyes were closed. Therefore, our proposal would contribute a major role in order to deprive such instance it also plays an important role to avoid accidents when implemented to future automotive environments. Acquiring instant vehicle speed is desirable and a corner stone to many important vehicular applications. Engineering the tools to scale to bigger scenarios with larger number of modes and vehicles will be a natural and important next step.

REFERENCES

[1] Chuchu fan, bolun qui, sayanmitra “data driven formal reasoning and their applications in safety analysis of vehicle autonomy features” IEEE, 08,January,2018.
[2] Rafael Luiz Klaser, Fernando Santos Os’rio and Denis Wolf Laborat’ riodeticaM’vel, "Simulation of an autonomous vehicle with a vision-based navigation system in unconstructed terrains using OctoMap,”IEEE, 05,June,2014.
[3] ChairitWuthishuwong,ChaiyapornSilawatchananai,ManukidParnichkun, "Navigation of an Intelligent vehicle by using Stand-alone GPS,Compass and Laser Range Finder,”IEEE,08, may,2009.
[4] Abhishek Maurya,AvanishYadav,PratikArote, Amol Baviskar and, JaypalBaviskar, "Real time arduino based depth sensing for road condition monitoring,”IEEE, 2016.
[5] Gunjan Chugh, Divya Bansal and Sanjeev, "Road Condition Detection using Smartphone Sensors,”international journal of electronics and engineering, vol, 7 #,2014
[6] Bing-Fei Wu,Tsu-Tian Lee,Hsin-Han Chang,Jhong-JieJiang,Cheng-Nan Lien,Tien-Yu Liao,andJau-Woei, "GPS Navigation Based Autonomous Driving System Design,”IEEE, 2007.
[7] R.saranya, R.arunkumar “ vehicle accidentprevention usingsensor” international research journal on engineering and technology, vol, 4#, 2017.
[8] D.Haripriya, puthanail.M, Dr.P.C Kishore raja “accident prevention system and security for vehicles”, international journals of computer trends and technlology”, vol 12#,5 june 2104.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY