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Design and Implementation of Accident-Avoidance Systems for Reducing Road Accidents

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ABSTRACT

Road accidents have become the major issue during these days. Accidents bring loss to our economy. Much remarkable work has been done on the driver alert system through this project. Using the ARDUINO series of Microcontrollers with compatible sensors and components, the accidents could be reduced in an efficient way. Alcohol sensor senses the person whether he is in a drunk condition and sends signal through a message using GSM and the vehicle will automatically stop. If the driver is drowsy eye blink sensor detects the drowsiness and alert the driver. Auto-dimmable headlights gain attention due to danger caused by sudden glare on drivers at night conditions which makes automatic dimming of headlight necessary by placing a wireless transmitter and receiver on both the vehicles. The mechanical parameters such as engine failure, brake failure etc. are also analyzed. Brake failure sensor and Fuel dry sensor is used to analyze whether the brake has a failure and whether the fuel is nearing the empty condition or not. It is also an essential one for both vehicle and the driver's safety measure like accident avoidance in the realistic driving conditions

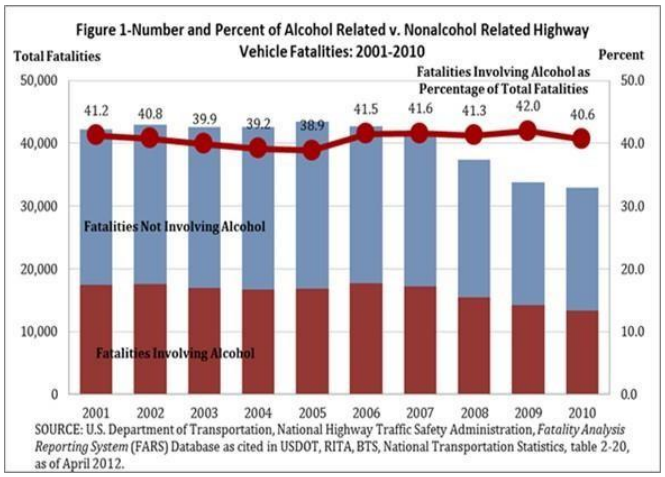
Keywords : Speed Control, Driver drowsiness, Brake failure, fuel dryness, headlight dimming.

I. INTRODUCTION

According to statistics more than 1.2 million people die each year on the road accidents. 20 - 50 million of people suffer from non-fatal injuries due to these road accidents across the world. According to the NHTSA (National Highway Traffic Safety Administration) in the year 2008, it estimated that 5,870 deaths, 7, 45,000 and 350,000 injuries are due to lack of driver concentration on the road. Drivers stress behavior may be the reason for lack of inattention, which causes the accidents. Driver influence of alcohol, it causes severe damage of life and property as well as the loss of the economy.

Alcohol and Drugs are the major factor for road accidents.

Due to drunk driving driver lost their control and accidents are occurs. In recent years the number of accidents in vehicle has been increased manifold due to aggressive driving, sleeping disorders, driver's yawn frequently as there is a lack of concentration ofthe driver while driving. The statistics shows a linear relationship of accidents. Day by day the growth of vehicles on road increases and along with that the no. of accidents also increases.

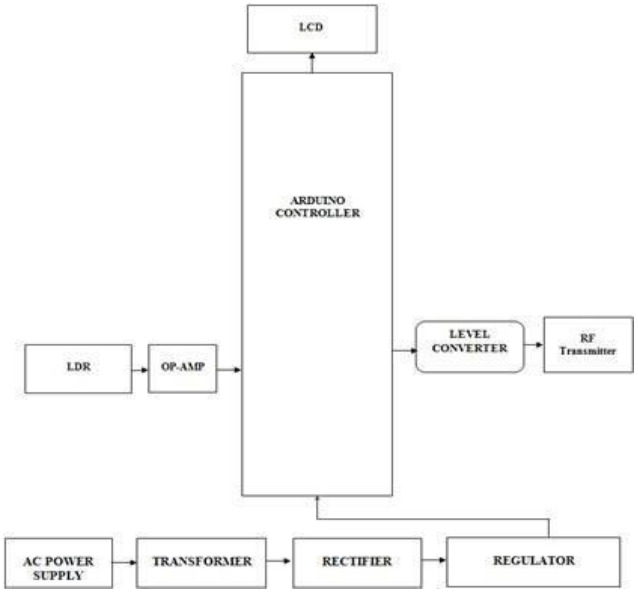


II. LITERATURE SURVEY

[1].Rough usman et al presented a paper called "Analysis of accident avoidance system and its corrective measures" .This explained about the digital signal process systems of avoiding road accidents.It was accepted by IEEE.[2].Ralph Oyini Mbouna et al., presented a visual analysis of Eye State and HeadPose (HP) for continuous monitoring of alertness of a vehicle driver. The proposed scheme used visual features such as Eye Index (EI), Pupil Activity (PA), and HP to extract critical information on non-alertness of the driver. [3]. Using a computer vision Mona Omidyeganeh et al., designed an automatic system. It runs on embedded smart camera platform and used to detect yawning. [4].Sinan Kaplan et al., presented a survey that provides a comprehensive insight into the well-established techniques fordriver inattention monitoring and introduces the use of most recent and futuristic solutions that exploits mobile technologies. The studies were categorizedinto two groups: driver drowsiness and distraction.[5]. Wang dong et al., aimed at the seriousphenomenon of drunk driving in modern society by using a MCU electronic circuit board in the system along with alcohol sensor MQ303A, the alcohol concentration was detected. [6]. Yue-cheng Wu et al., developed an automotive anti-drunk driving system with real-time monitoring. The uniqueness ofthe driver by combining the function of alcohol detection along with the face identification system is guaranteed by forwarding the design of combination of the alcohol main detection and also the image processing surveillance. [7].T. P. Nguyen et al., demonstrates an eye tracking system for drowsiness detection of a driver. It is related to the application of Viola-Jones algorithm and also Percentage of Eyelid Closure (PERCLOS). The system alerts the driver if the drowsiness index exceeds a pre-specified level. [8]. Anirban Dasgupta et al., proposed a robust real- time embedded platform to monitor the loss of attention of the driver during day and night driving conditions. The eye closure percentage was used for the alertness level. Face detected using HAAR -like features, the eye state was classified as open or closedusing support vector machines.

III. MATERIALS AND METHODOLOGY

There are both transmitter and receiver section for the system. Following figure shows the system setup inside the vehicle. In the transmitted section with the help of LDR the system automatically controls the headlight of both vehicles. An RF transmitter is kept on the transmitter block and a value is set. If the value of the light exceeds the constant value the headlight is automatically dimmed in the opposite vehicle. The headlight is controlled automatically at a particular distance.



The alcohol sensor will detect the alcohol content from human (driver) breath and send its value to

microcontroller. Alcohol sensor is suitable for detecting alcohol concentration just like your common Breathalyzer. It has a high sensitivity to small value of BAC and fast response time, provides an analog resistive output based on alcohol. The LCD display fitted inside the car act as an indicator to the driver and other people who are sitting inside the car.This display gives indication of alcohol detection level by alcohol sensor. This provide warning message to the driver to stop the vehicle within particular time. Afterwards car will automatically stop, indication of smoke/gas detected in car. In this we use GSM that can accept any GSM network operator SIM card as like a mobile phone with its own unique phone number. Applications such as SMS Control, remote control and logging can be developed easily. The modem can be directly connected to PC serial port or to any microcontroller.

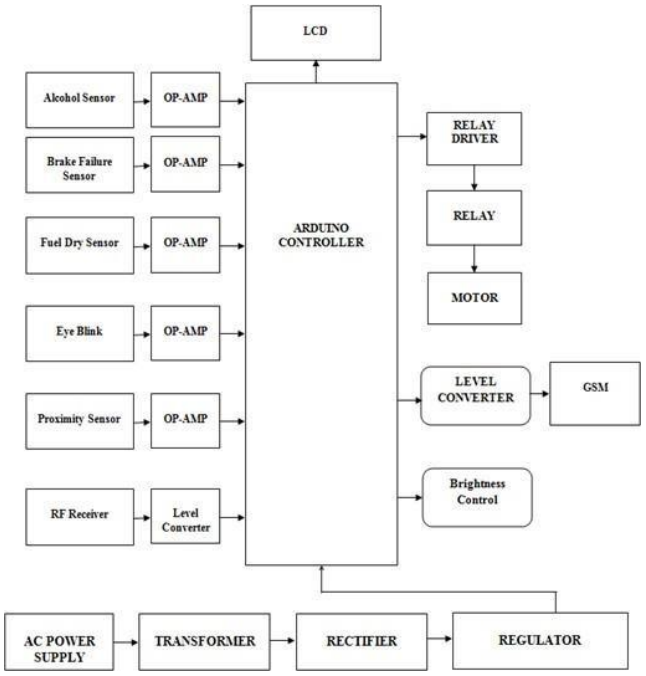
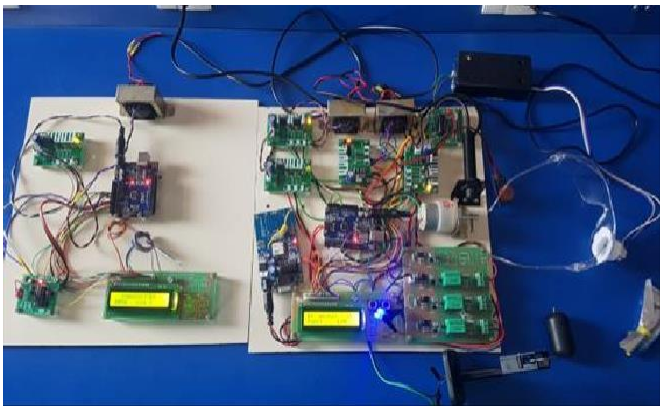


Fig No.3-Receiver

IV. RESULTS AND DISCUSSION

Brightness control (dimming the headlight) will be controlled when wireless is kept on vehicles. An RF transmitter and receiver is kept on both the vehicles. There is no need for the driver then to dim and high the beam. When there is a brake failure or fuel dryness detected antilock system in the engine is activated. The brake failure sensor and fuel dry sensors are activated. Following shows the transmitter kit where you can see a light dependent resistor. A value of 200 is set to analyze the control.

```
lcd.print(c3);
lcd.print(c4);*/
if(A>=500)
{
 lcd.setCursor(4,0);
 lcd.print("Alchl:Y");
 Mflag=0;digitalWrite(motorpwr,LO
 alcoholflag=1;lcd.setCursor(13,0
       lcd.print("S: ");
}
else  if(A<500)
{
 lcd.setCursor(4,0);
 lcd.print("Alchl:N");
 alcoholflag=0;
}
   if(L>200)
   {
   digitalWrite(RF,HIGH);
    lcd.setCursor(7,1);
    lcd.print("V:D  ");
   }
   else if(L<=200)
   {
   digitalWrite(RF,LOW);
   lcd.setCursor(7,1);
   lcd.print("V:N D");
   }
   delay(100);
 }
```



Driver's drunkenness is detected by the alcohol sensor .If the alcohol is detected sensor gives alert to the driver and a message will be passed to the corresponding authority. If sensed the engine will automatically stop and it is displayed in the lcd display. The eye blink sensor gets activated when the driver is drowsy. The eye blink time is set for 10 sec. If the driver closes the eye for more than 10 sec automatically the engine will stop. The fuel dry sensor is in floating state. When the fuel is nearing the empty condition the system stops and the output is shown in the lcd display.

V. CONCLUSION

It has been a daily routine for us to read accident news happening due to driver's carelessness such as drowsiness, over speed, drunk drive etc. In this project it we propose mechanisms that can detect if one has over-consumed alcohol and also various sensors are incorporated to perform a specific task in the system. In this project Arduino UNO controller is used for detecting the alcohol consumption, failure of the brake, fuel nearing empty condition drowsiness of the driver and also the current speed of the vehicle. In addition to these parameters the head light intensity of the vehicle is decreased based onthe data received from RF transmitter which is located on another vehicle.

VI. FUTURE ENHANCEMENT

This project can be extended by adding the image processing technique including the head movement. Also the alcohol and drowsiness detection can be analyzed using ECG and EEG signals of brain.
For the automatic control of headlight the government should take initiative to create awareness among the people to keep the proposed system inside the vehicle.

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