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Advanced Vehicle Security for Road Accident Prevention Using IOT

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Abstract— **Nowadays in India, the rate of accidents are increasing due to careless driving. On an average 1.5 Lakh of people are losing their lives due to accidents. Apart from drunk and drive cases and careless driving. The blind spot is also a major cause for the accidents. So today we will share some of our ideas to avoid accidents. To avoid accidents we are planning to implement some features like blind spot detection, front collision warning, overtaking suggestion and lane keep assist. As the usage of vehicles is increasing drastically, the hazards due to vehicles are also increased. The main cause for accidents is a high speed driving, blind Spot and lane changing on highways. This paper deals with the accident detection system that occurs due to the carelessness of the person who is driving the vehicle. This introduces an accident alerting system which alerts the person who is driving the vehicle. The ultrasonic sensor system continuously sends signals and Monitors any car or other obstacles are in front of the car. The distance up to which ultrasonic sensor can work may be up to 4 meters. When any obstacle or vehicle detected by the ultrasonic sensor.**

Keywords: Alcohol detection, Ultrasonic detection, Radio frequency signal, Wireless video transmission for Do Not Pass Warning using IOT.

INTRODUCTION:-

Road accidents are a human tragedy. The various reasons behind that. As a solution, the advent of smart Internet of Things (IoT) technologies can reduce the number of accidents. This project mainly related to road accidents that happen intoxicated persons while in driving mode. Also when the driver will be drunken state, the alcohol sensor detects and speed will be decreasing accordingly to the rate of alcohol. We can given the alcohol percentage and speed limit conditions to the controller. Also to avoid collision of two vehicles, we are using collision avoidance system. This system always monitors the distance between obstacles that are in front, using distance sensor. It will alert the driver to control the speed and reduce the speed by itself when a critical distance comes. Overtaking accidents are certainly amongst the most serious. For the realization of a safe road environment, a wireless communication system is needed. Most of the accidents are occurred in single way two lane road in rural areas. To avoidance of these type accidents, the safety system consist of wireless camera attached to front of vehicle. When the back vehicle comes in range of front vehicle, driver can send the request to next vehicle and it will accept by front vehicle driver. The monitor gives front
vehicle drivers behind the view of what is going on ahead, even in the dark of night. It can show the full video streaming of the frontal road by using V to V communication & this allows to have a better view when deciding whether it is safe to overtake or not. In this project we specify, connected vehicle architecture solutions for both safe and smart driving in personal or public vehicles. Also in the Highways or Ghat sections there could be some accidental zones. To prevent these types of accidents we can using the Radio Frequency signals to control the speed of vehicle. When the vehicles comes into accidental zone, the speed will be automatically decreases with respective speed limitations

1] Alcohol Detection:

These days, majority of road accidents are caused by drink-driving. Drunken drivers are in an unstable condition and so, rash decisions are made on the highway which endangers the lives of road users, the driver inclusive.
The entire system adopted the Arduino uno microcontroller board. The core functions modules are Arduino uno alcohol sensor module (MQ3), LCD display.

***ALCOHOL SENSOR (MQ3):**

The analog gas sensor- MQ3 is suitable for alcohol detecting, this sensor can be used in a breath analyzer. It has a high sensitivity to alcohol and small sensitivity to benzene. The sensitivity can be adjusted by the potentiometer sensitive material of MQ3 gas sensor is SnO2, which with lower conductivity in clean air. When the target alcohol gas exist, the sensors conductivity is higher along with the gas concentration rising, use of simple electro circuit, convert change of conductivity to correspond output signal of gas concentration.
MQ-3 gas sensor has high sensitivity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapour. It has fine sensitivity range around 2 meters. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application.
In India, road accidents are happen because of intoxicated persons while in driving mode. Also when the driver will be

drunken state, the alcohol sensor detects and speed will be decreasing accordingly to the rate of alcohol. We can given the alcohol percentage and speed limit conditions to the controller.

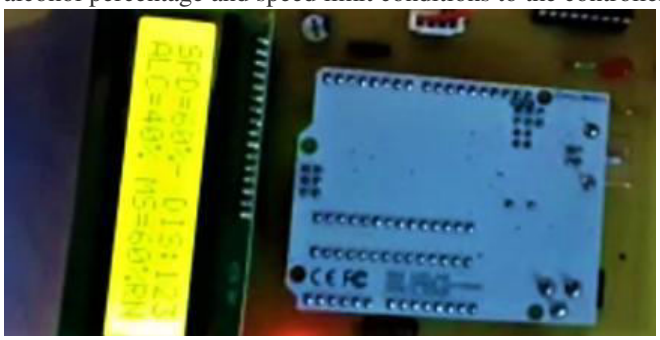

Figure 1.Alcohol detection system and speed limit according to how many percentage alcoholic the driver

2] Ultrasonic Sensor:-

The objective of this project is to develop a safety feature in cars to avoid colliding with a vehicle or an obstacle in the way. The main objective of this system is to help driver prevent car collisions due to blind spots and their carelessness while driving. Collision avoidance systems are especially useful in bad weather conditions. The sensors in the car would be capable of detecting even in the poor conditions and would inform the driver distance from the various objects in front of the car which will help the driver to drive safely in such poor conditions and a central microcontroller would also be able take decisions according to different situations. For example, fog affects visibility, the sensors would recognize another car and alert the driver of any dangers that lie ahead, giving the driver enough time to slow down, allowing him to escape from what could have been a bad accident.

Figure 2. Creating accidental zones to detect front vehicle warning.

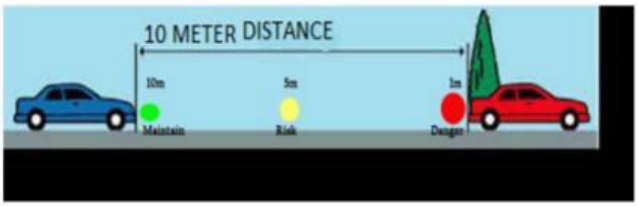

Figure 3. Distance measure from ultrasonic sensor & it automatically takes keep a safe distance

***PROPOSED SYSTEM:-**

The idea is to prevent the accident by calculating the distance. There have been many technologies to avoid the accident but none of it used ultrasonic.

Many limitations in the existing system are tried to overcome in our proposed system. Our proposed system is about preventing fatal accidents using Ultrasonic. Our main goal is to calculate the distance between the automobile and an obstacle. Also there are technologies to apply brake and stop the vehicle before the accident could occur. The hardware requirements are power supply, micro-controller, ultrasonic sensor, DC motor, buzzer and LCD to display the distance between automobile and the obstacle. The software requirements are Arduino.

The Collision preventive system is engaged whenever the car is turned ON. The ultrasonic sensor fixed in the vehicle is used to detect the obstacle in front of the vehicle. The ultrasonic sensor is also used to calculate the distance between the obstacle and the vehicle. The distance between the vehicle and the obstacle would be preset. If the obstacle is recognized at the 50 cms then the vehicle is decreasing the speed. The alert system goes on at the decrease of every 5 cms. If still the driver doesn't pay heed to it, the LCD display would display the danger. Even if the driver doesn't show any attention and if the obstacle is recognized at 10 cms then the braking system is applied to stop the vehicle by sending the command signal to the motor driver IC L293D & servo motor is stopped.

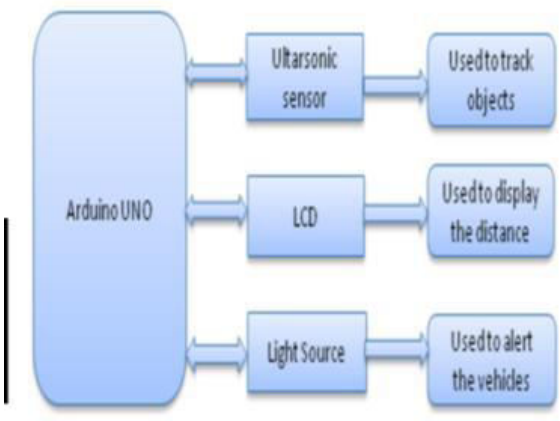

Figure 4. Front Collision avoidance system

3]RF(Radio Frequency) signal:-

The objective of this project is to automatically control the speed of the vehicles at speed restricted areas such as school and hospital zone, U-turn etc. and accident avoidance using ultrasonic sensor. At particular zone special kind of transmitters which are tuned at frequency of 433MHZ are mounted. These transmitters continuously radiate RF signal. When the vehicle comes within this radiation the receiver in the vehicle gets activated. Whenever the vehicle is within the zone, the vehicle speed is controlled by receiving the signal i.e. every time the vehicle speed is decreased to some cutoff and kept constant until the vehicle moves out of the zone, and then the vehicle can get accelerated by itself. The ultrasonic sensor system continuously sends signals and monitors any car or other obstacles which are in front of car. The distance up to which ultrasonic sensor can work is not more than 4 meter. When any obstacle or vehicle detected by ultrasonic sensor system it will send signal to the arduino After receiving this signal arduino sends a signal to the motor driver to stop the car immediately

Also in the Highways or Ghats sections there could be some accidental zones. To prevent these types of accidents we can using the Radio Frequency signals to control the speed of vehicle. When the vehicles comes into accidental zone, the speed will be automatically decreases with respective speed limitations.

*Radio Frequency Technology:

Radio frequency (RF) is any of the electromagnetic wave frequencies that lie in the range extending from around 3 kHz to 300 GHz, which include those frequencies used for communications or radar signals.

RF signals are high frequency alternating current (AC) signals composed of electromagnetic energy. RF propagation occurs at the speed of light and does not need a medium like air in order to travel. RF waves occur naturally from sun flares, lightning, and from stars in space that radiate RF waves as they age. Humankind communicates with artificially created radio waves that oscillate at various chosen frequencies. RF communication is used in many industries including television broadcasting, radar systems, computer and mobile platform networks, remote control, remote metering/monitoring, and many more.

In this we are using two main IC components which are HT12E and HT12D. HT12E is basically Encoder IC implemented for transmission of signal. HT12D is decoder IC which we implemented on Vehicle for receive the transmitted signal. By using paired HT12E encoder and HT12D decoder we transmit 12 bits of data serially. It's basically consists of 8 address bits and 4 data bits which are to be encoding and decoding for transmitting and receiving signal. It also sends simply 1 and 0 values to enable and disable the signal.

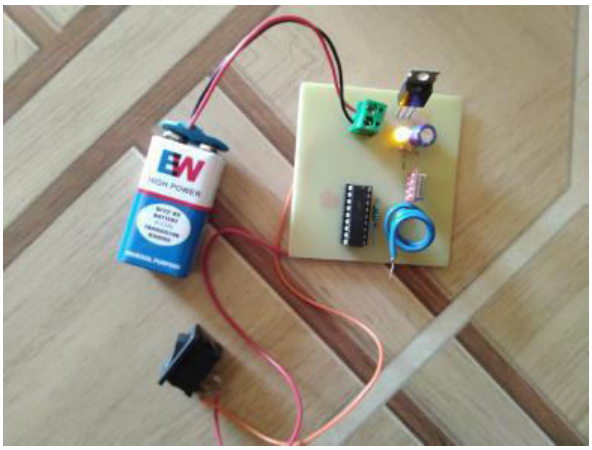

Figure 5. Result of RF Transmitter Module is activated

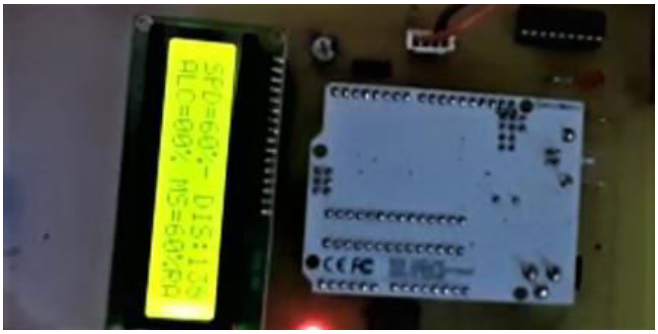

Figure 6. Result for Blind Radio Frequency is activated and max speed limit is 60% when accidental zone is detected

4]Camera:-

For the realization of a safe road environment, a wireless communication system is needed. In this project we use camera for transmission of video. Overtaking accidents are certainly amongst the most serious. For the realization of a safe road environment, a wireless communication system is needed. Most of the accidents are occur in single way two lane road in rural areas. To avoidance of these type accidents, the safety system consist of wireless camera attached to front of vehicle. When the back vehicle comes in range of front vehicle, driver can send the request to next vehicle and it will accept by front vehicle driver. The monitor gives front vehicle drivers behind the view of what is going on ahead, even in the dark of night. It can show the full video streaming of the frontal road by using V to V communication & this allows to have a better view when deciding whether it is safe to overtake or not. In this project we specify, connected vehicle architecture solutions for both safe and smart driving in personal or public vehicles.

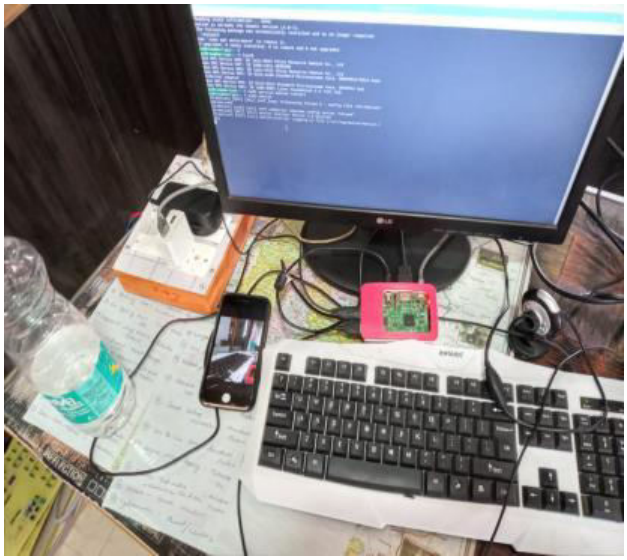

Figure 7. Result of wirelessly camera module to show vehicle front view in mobile display

Figure 8. Result of speed, distance, alcohol and Rf signal is showing in LCD display

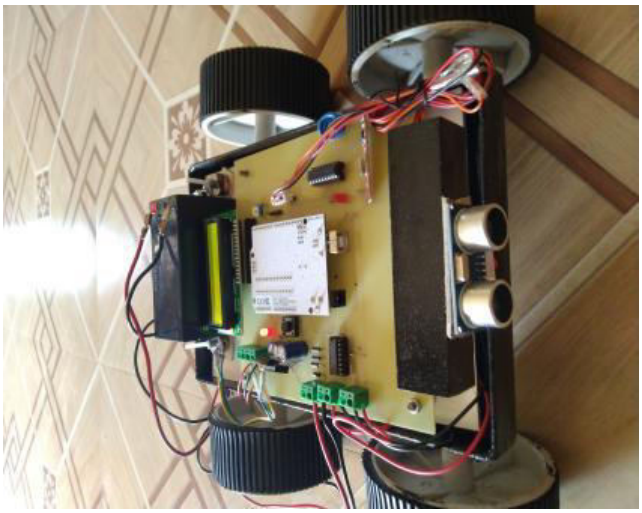

Figure 9. Result of final demo of vehicle.

ADVANTAGES:-

1.The Project will help to reduce accident rates. This project saves human lives.
2.This project is easy to implement and advanced than other principles.
3.The Cost of the project is less than other systems.

I. CONCLUSION:-

In this project we will generate a model which can prevent such an incident. The Purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of vehicle to avoid accidents. In the view of road safety, there is a much need for the system which at most prevents accidents. This can be achieved by implementing some of the features which are mentioned above. This helps in reducing the number of accidents in real time scenario. Since wireless communication is implemented, there will be better interaction of messages between vehicles. The main purpose is to provide

safety for the passengers who are in the vehicle and prevent accidents as much as possible.

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