

Accident Prevention in Fog Environment

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ABSTRACT

Number of accidents are increasing in foggy weather, to prevent this there should be a system to detect an object beforehand in fog. Object detection in foggy weather can be a challenging task due to the reduced visibility and the limitations of traditional vision-based methods. In this article, we introduce a way for object detection using Arduino microcontroller and an Ultrasonic sensors. It is designed to alert the driver to any objects in front of the vehicle via a buzzer and LED. To make sure this, we connected an ultrasonic sensor to identify the object and also the distance from the driver and alert the driver about the object.

Keywords : Ultrasonic Sensor, Buzzer, L.E.D, Accidents, Fog

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I. INTRODUCTION

In India, road accidents are growing daily and so there is a want to layout a device that lets in detecting other vehicle or objects at the highways. Talking about the transportation system in India, we've highways, railroads, airways and aqueducts. In malignancy of numerous glitches, we Indians consider highways as one of the accessible ways of traveling. Our design is aimed to overcome these road business straits by using the rearmost technology. Latest surveys state Low visibility conditions cause increased speed variance, which increases crash risk. Each year, over 38,700 vehicle crashes occur in fog. Over 600 people are killed and more than 16,300 people are injured in these crashes annually. There also are tone- driven vehicle which can be automatic

and made in any such way that they descry any possibility of accidents and road traffics as well however they proved they are not in a position completely to let it be automatic. There is nobeing device that has been advanced to permit tone- drive vehicles out within the fog.

II. LITERATURE SURVEY

A. Existing System

After exploration on the prevailing device of our design, we came across fog lighting that might assist in keeping off the accidents. FOG lighting are designed to turn on while the visibility is limited, drastically in fog, snow or heavy rain. They may be used to look beforehand when the road is not clear and its visibility is restricted for a minimum route.

Hinder fog lights generally make the other drivers uncertain about boscage lights and may help the driver to realize before that our vehicle has come to a stop. Both, the front and hinder fog lights produce gratuitous light in good visibility. Therefore, every time we've proper visibility, one have to turn their fog lights off manually flashing back it [2].

B. Proposed System

Our device is designed to prevent the number of accidents that happened because of low visibility foggy atmosphere. The space between the obstacle and the car is calculated with the help of the ultrasonic sensor. There are primary injuries that occurred due to fog terrain, which drew our concern towards it, and we'd like to place forth a result to avoid those accidents. We notify the driver about the other vehicle or object in advance via LED light and buzzer.

SYSTEM DESIGN

This section explains the functioning and circuits of "Object Detection in Foggy environment". It may be understood by means of its block diagram & circuit diagram.

C. Requirements Software

- Arduino IDE
- Arduino programming

Hardware

- Arduino UNO
- Buzzer
- 4 Dc Geared Motors 200RPM
- 2 Motor Chassis
- Castor Wheel
- Battery
- L298N motor driver
- 7805 for external power supply
- Ultrasonic sensor

The benefit of this proposed device is to prevent accidents in foggy environment. Then Ultrasonic detector is used for discovery of vehicles when they

get near to us. The driver is transferred the signal through LED light and a buzzer.

All the introductory factors of the system are shown in the below block illustration. Arduino Mega 2560 R3. An AVR core is the microcontroller to which all the detectors and other factors of the system are connected. The Arduino chip reads all the signal received from ultrasonic sensor. The transmitter section includes of one microcontroller, one sensor. When any of these detectors admit signal, they're transferred to Arduino and through Arduino any announcement is passed to the driver through any type of signal initiated. A microcontroller is the main part of the device. It controls all of the operation associated with the accident or car detection. It'll shoot the alert through devices like LED and buzzer to the driver.

Ultrasonic detector module HC- SR04 ranges between 2 cm- 400 cm, the ranging delicacy can reach to 3 mm. This short scale ultrasonic detector might have only short distance range. There are other ultrasonic detectors that can descry objects from 3 to 13 feet. The modules contains ultrasonic transmitter, Arduino Uno, control circuit and receiver [4].

D. Working

The foremost module in our design was to detect an object ahead of the driver. This detection is done using the ultrasonic sensor.

Not only does this detector descry but also calculates the distance between the object and the detector. As soon as it detects the object, the driver is transferred a signal through LED light and buzzer [3].

III. FEASIBILITY

A. Feasibility Analysis

An essential aspect about the device is its feasibility. Feasibility relies upon at the sources and time the device is constrained to. There are three basic varieties of feasibility that are

- Economic Feasibility
- Technical Feasibility
- Operational Feasibility

Economic Feasibility

Economic Feasibility or cost-advantage is a work of the financial justification for an IOT based totally mission. Hardware is the constructing block of this assignment. The value of hardware is much less and affordable by common audiences and additionally with the innovation for society, we look ahead to apply hardware at a low cost price. The sensors aren't too high-priced while in comparison to different technologies, so the project is economically viable. With future improvements, we look ahead to creating it price-cutting in order that it could be availed through all the commoners.

Technical Feasibility

According to Rogers. Pressman, Technical Feasibility is the evaluation of the specialized assets we used to build the layout. We have used the Arduino IDE for programming the sensor and LED and buzzer to consistently have interaction with the driver. Further, the Arduino has created a growing period wherein people interact with smart devices via the assist of microprocessor.

The ultrasonic detector detects if an object is there and calculates the gap and cautions the motorist with the help of an LED and buzzer. The ultrasonic detector we've used is about for a distance of 40 cm at outside on this design for design purpose.

Operational Feasibility

Operational Feasibility is the study of lookouts of the system to be developed. This system eliminates or rather reduces mortal stress while driving in the fog by notifying the motorist through LED and buzzer.

IV. IMPLEMENTATION

The ultrasonic sensor sends out a high- frequency sound wave (usually 40 kHz) and waits for the wave to bounce back. When the sound wave hits an object, it bounces back to the sensor. The sensor measures the time it takes for the sound wave to travel to the object and back.

When this sensor receive signal, they are sent to Arduino. Then Arduino calculates the distance and if distance is less than or equal to 40 cm then it send high signal to buzzer to warn the user. Then again calculates the distance and if distance is less than or equal to 25 cm then Arduino sends signals to servo motor to stop and prevent vehicle from accident [5].

V. LIMITATIONS

The ultrasonic detector presently works only for a small distance approximately between 20- 40 cm, while this layout overcomes all of the partitions, ultrasonic detectors of a range up to 400 cm,

We have set the range in real time to 50 cm to decrease the velocity of the automobile beforehand it approaches the obstacle.

VI. FUTURE ENHANCEMENT

In this task, we designed a prototype to detect obstacles beforehand of the moving vehicle, alert the

driver, and apply brakes automatically in case of an accident occurred.

We want to put our idea forward and deliver it into the limelight to assist society in a great cause

We want to improvise it to discover holes or water obstacles throughout the moving vehicle and notify the driver so that he can make decisions.

An interactive Chabot can also serve the purpose of awake the driver the whole time while he is driving.

VII. CONCLUSION

Based on surveys we have come across Low visibility conditions that cause increased speed variance, which increases crash risk. Each year, over 38,700 vehicle crashes occur in fog. Over 600 people are killed and more than 16,300 people are injured in these crashes yearly found no real-time measures are taken to avoid these accidents and right here we're providing a prototype that might assist in decreasing the range of accidents taking place in foggy environments, placing our attempt to make it a real-time project. Ultrasonic sensors are commonly used to locate obstacles and calculate the gap. In comparison with others, the advantage of this technique is to make use of statistical data and it's responds in real-time scenarios.

VIII. ACKNOWLEDGMENT

We'd like to thank our council for furnishing us this platform to bring our idea into real time with further efforts and we look forward to put life into it. The idea of developing " Object Discovery in Fog Environment" came to us while probing about inventions for society. Prostrating all the pebbles, we ought to give maximum support for society to avoid accidents in case of Fog. We also look forward to give voice backing in original languages for easy commerce with the motorist and use of Artificial Intelligence would help us produce magic on hands.

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