

Advanced Accident Prevention System

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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- Front collision, Obstacle detection, Lane assist, Ultrasonic sensor.

I. INTRODUCTION

From the beginning of 20th century, road traffic accident in India has rampantly been in the increase, and one cannot deny the fact that many prominent people have lost their lives as a result of this unfortunate situation at stake; many have attributed this to the poor road network in India neglecting the major causes of road accident. Nowadays, the rate of accidents are increased rapidly. Due to decrement in usage of public transport and increase in the usage of personal vehicles like cars and bikes are increased. The main cause of the accident in India is careless driving. Due to unavailability of advanced techniques, the rate of accidents can't be decreased. To reduce the accident rate in the country this paper introduces an optimum solution.

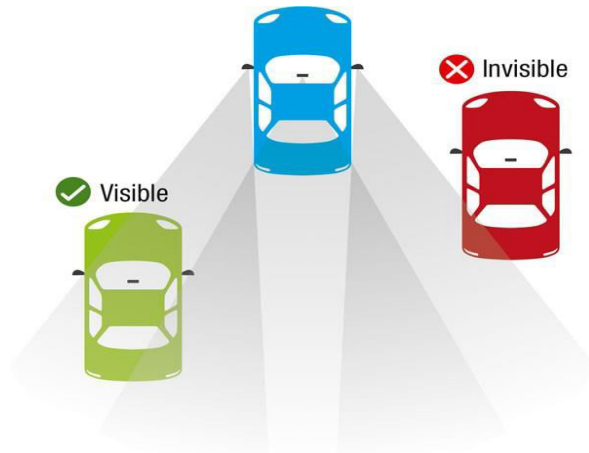
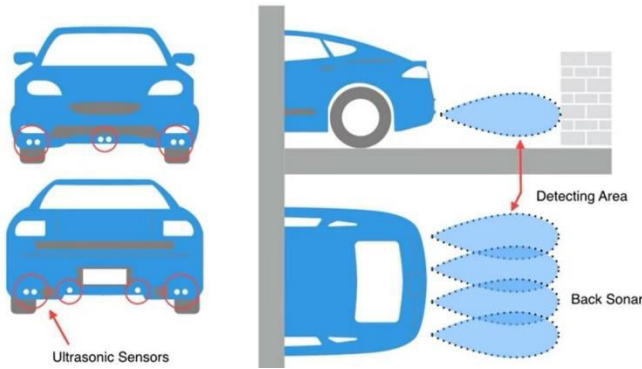
This paper solves one of the three major problems which cause accidents. The solution for this three problems is introduced in terms of three features provided in this paper.

The first feature provided is the front collision warning. The solution for this problem is available but for detecting the front collision we are planning to provide low-cost solution by using

of distance from ultrasonic sensor and according to that distance, we are going to speed decrement or breaking suggestions to the driver along with attention seeking sound with a buzzer. The second feature is blind spot detection. As we all know accidents due to blind spot, are those in which nobody was found guilty. As shown in image blind spot is a spot on the left and right side of the car which can't be covered by any one of the mirror present in car to avoid that we are planning to install two ultrasonic sensors on both sides of the car to cover the blind spot area and as shown in picture when an object is present in an either side of the blind spot the respective LED on that side will glow which is placed near the mirror indicating that there is a vehicle or object in the blind spot at that side. Lane keep assist is the third feature. This feature tracks the lane lines and warns driver for unnecessary lane change.

II. FRONT COLLISION

Front collision system is a warning that alerts the driver if there is an object or another vehicle in front of our vehicle. Forward collision systems warn you if a slowly moving vehicles or any steady object is ahead of your vehicle. Forward collision warning uses an array of ultrasonic sensors to detect an object in front of vehicle while you drive. To implement this feature ultrasonic sensors are placed in front of car. The sensors are detecting objects based on two threshold distances. If an object passes the second level of threshold distance i.e. if there is a slow moving vehicle in front of your fast moving vehicle then the suggestion as to decrease your speed is given to you. If an object/car in front of sensor passes first level of threshold distance then it means the vehicle is very close to your vehicle so the suggestion to apply breaks is given to you. To implement this mechanism simple controller boards like arduinouno or other low cost boards with ultrasonic sensors are used.



III. BLINDSPOT

Blind spot is the area that the driver cannot see by using any of the mirror present in his vehicle and in some cases, by looking directly. There are certain design elements of a vehicle's design that impact on the size of blind spots. Large vehicles, such as trucks, tourist coaches and buses, are a challenge to drive because of their big sized blind spots as they take up so much room on the road. Specifically, if there is vehicles like bike or bicycle then it becomes more difficult to trace them in blind spot. To solve this problem the paper provides solution by using number of ultrasonic sensors depending on size of vehicle on each side of vehicle. The ultrasonic sensors are fixed at threshold distance depending on area covered by mirror. As shown in image if there is a vehicle detected in blind spot (e.g- red car in image) then ultrasonic sensors senses that vehicles and respective side LED to indicate driver that there is a vehicle in blind spot is turned on. The LED's are placed at respective mirror side so when driver wants to turn on left side then he will see at left side mirror and if there is no vehicle at left side but there is vehicle in blind spot of left side then respective LED will glow on that side which tells driver that though there is no vehicle in mirror but there is a vehicle in blind spot which will cause problem while turning on the vehicle.

To implement this feature simple microcontroller boards like arduino can be used alongwith LED's and ultrasonic sensors.

IV. LANEASSIST

Lane Assist is a feature which warns the driver if the vehicle is leaving its lane. This feature is useful with fast moving vehicles on highways or expressways. The feature uses camera as sensor to detect lane lines and if a car departs from lane then it will give warning to driver and tells him to return in the lane by moving left or right.

The feature can be implemented using raspberry pi and a camera module. Camera here is used as sensor while raspberry pi will carry out image processing to detect lanes from images obtained by camera.

OpenCV is the library used for image processing in python. OpenCV (Open source Computer Vision) is an open source computer vision and machine learning software library. Once the camera is installed, and openCV library is built, then the live video obtained by camera is processed in terms of frames and suggestions to driver are given about lane change.



V. BLOCK DIAGRAM

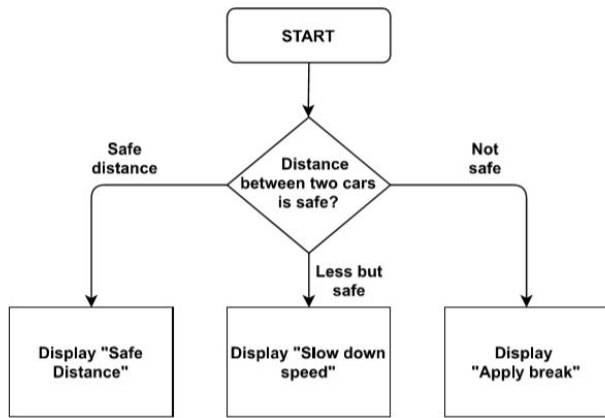
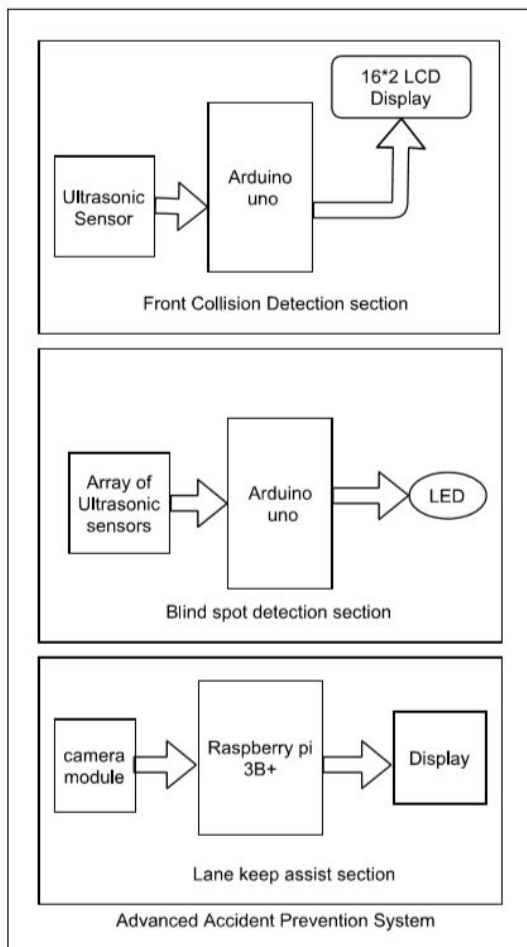


fig. Flow chart for Front Collision Detection



VI. FLOW CHARTS

1. Front collision detection :
2. Blind spot detection :

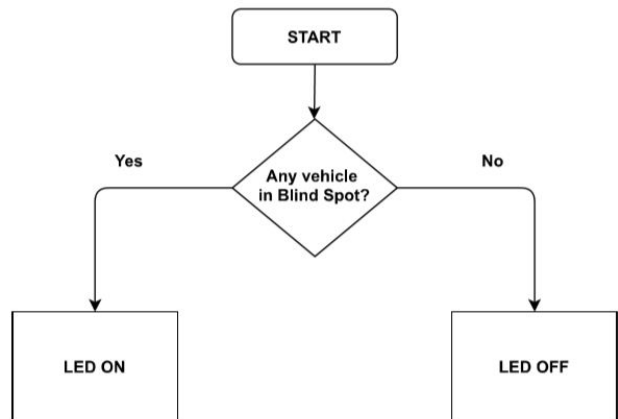


fig. Flow chart for Blind spot Detection

3. Lane keep assist :

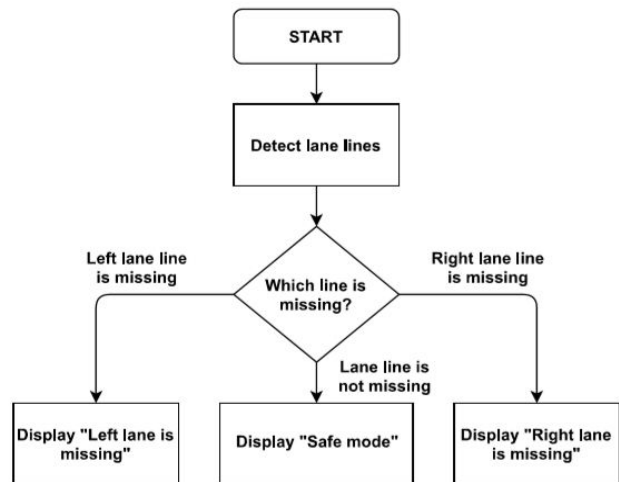


Fig. Flow chart for Lane keep assist

VII. ADVANTAGES

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

VIII. RESULT

The result for the feature front collision is as shown below,

1. The result for the distance is more than the Safe level.



2. The result for the distance is less than a safe level but secure.

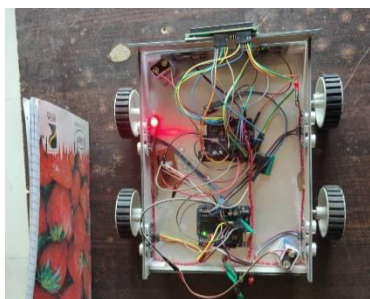


3. The result for the distance is less than a safe level and not secure.

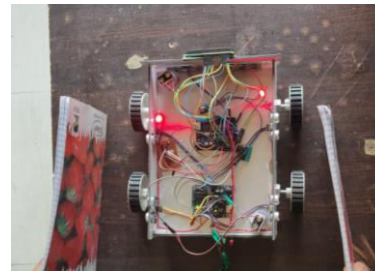


The results for Blind Spot Detection feature:

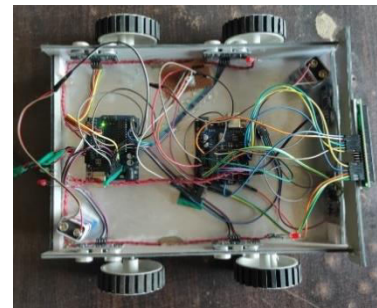
1. When an object is present in a blind spot for only one side of the vehicle, only one LED for the respective side will glow.



2. When an object is present in both side's blind spot of the vehicle, both LEDs will glow.



3. When both blind spots are clear (No object is present), both LEDs will OFF.

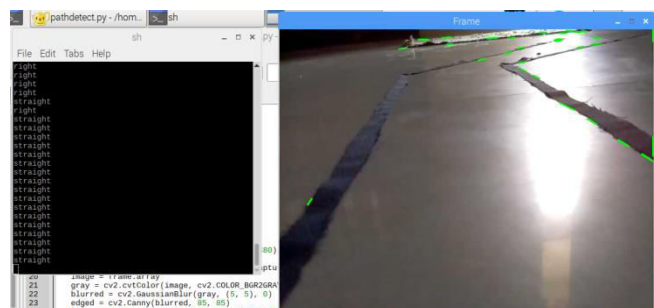


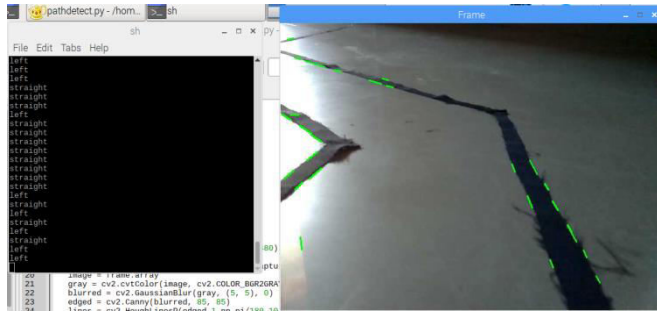
The result for the feature lane keep assist is as shown below,

1. Track for reference to check output for Lane keep assist feature is as shown below :



2. As per the lane system will display message whether keep vehicle straight in lane or move vehicle in left or right direction.





IX. CONCLUSION

The purpose of this paper is to reduce accidents to save human lives which can be done by or reduced by using three of the features provided above which are front collision warning, blind spot detection and lane keep assist.

X. REFERENCES

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