



Advanced Driver Assistance System [ADAS System]

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ABSTRACT

This project will provide information about An Advanced driver assistance system car which is developed by using Arduino nano micro-controller. In this system, various sensors are embedded to increase safety during the driving process on road. Some of the sensors are Ultrasonic sensor, IR Sensor & many more Technology with a servo motor. This car will be able to move on its own & can turn left and right if it detects an object in front of it. The car and its components get commands from a program. A lot of INDIAN car companies are focused on this technology (ADAS Technology) on wide scale . So, from this paper presents to build a Advanced Driver Assistance System car model but on minimalistic basis which basically will be focused on main features such as, Automatic emergency braking, Lane Assist, Obstacle Avoidnce. The car will detect the lane path and perform the above functions. Our system will be able detect thje object on the way of the vehicle & alert the driver from the collapes from each other. This system is also alert the driver and sence the vehicle is goes out of the road or departed from the road. The use of this system 7 the application of this system is like blind spot monitoring, lane assist and also forward collision warning. The maion purpose of this system is to increase the road safety and proper traffic management. Also some vehicle accidents are caused due to driver laziness. To avoid this problem, this system eill assist the driver with a high degree of comfort and provide alertness in some dangerous situations.

INTRODUCTION

A Advanced Driver Assistance System (Also known as Autonomous car or Driver less car) which operates without human intervention & can perceive its surroundings .The deployment of automated driving system is considered a key measure to reduce the number of accidents and improve road safety as most of the accidents ocured due to human error. In the developed world road facilities is a major concern. Most of the accidents are caused due to excessive road transportation & inept speed. The Advance Driver Assistance system aims at compensating for human limitation in driving & it will assist the driver in driving process. In india the Road accident are on the rise and top due to increases of vehicles. Among all the measure causes of accidents are due driver error, over speeding and overtaking, etc. The Advanced Driver Assistance asystem is provide the warnings to car & driver. It controls and sence the speed, lane as well as the driver blindness and sleepness. Which cause the accidents on the road so this system is collision avoidance, pedestrain crash avoidance mitigation , alert driver to other cars or danger, lane departure warning system, automatic lane centering & show what is in blind spots. The advance driver assistance system is one of the fastest growing segments in automotive electronics.

LITERATURE REVIEW

There are several methods to provide safety while driving like collision avoidance using IR Sensors, lane change assistance system. The primary downside is that the IR sensor used to determine the presence of other vehicles, pedestrians, and some other objects to avoid crashes and accidents. In case of reliability ultrasonic sensors are better than IR sensors and the maximum range of ultrasonic sensor is about 20cm while for the IR sensors it is only between 1-5 meters and also depends on type of IR sensor used to the operating range will also vary.

The proposed method to detect objects like vehicles and pedestrian by using the Pi camera module which is useful for collision avoidance among vehicles and with some other objects. But in smoky and dust conditions the Pi camera will not be suitable for capturing images due to poor visibility it will result in blur images which is not sufficient for object detection while driving and makes the driving tougher.

There are several distinct level of ADAS , from simple blind spot warning sensors to lane departure warning system , self parking and more , The ultimate extension of ADAS will someday be vehicles that are truly autonomous Aka *self driving* and which will not require a human driver. But even now ,years before we reach fully autonomous cars, ADAS safety features are making driving safer and safer everyday.

PROPOSED METHODOLOGY

The proposed system supports the drivers by strengthen their sensing ability, warning in case of error & reducing the controlling efforts of drivers for example it assist the lane with IR sensor, detect the object in case it will come in front of the car and driver will be not attention that time then, by using the ultrasonic sensor it will take take the emergency break immediately. And some sensors are also embedded within the car system to make the driving more safely like ultrasonic sensor to find the distance between the vehicles and prevent the vehicle to vehicle collisions. In that we can also install the LCD display to see the speed of the car.

The RFID tag contains the tag Id which is read by the reader. Each ID is assumed with the particular speed limit in common. So then the car entre into that particular region the speed is reduced to the limit which is read from the tag. The Ultrasonic sensor is used to find the obstacles nearer to the vehicle and to take particular actions like application of brake when the vehicle is closer to other vehicle. So the sensors are mounted on the front side as well as left & right side of the car to prevent collision. The user can be blind or deaf or dumb or any of the three disabilities combinations or a normal person. The switch can be also used at the receiver side to select only a needy output for reducing the power usage.

WORKING PRINCIPLE

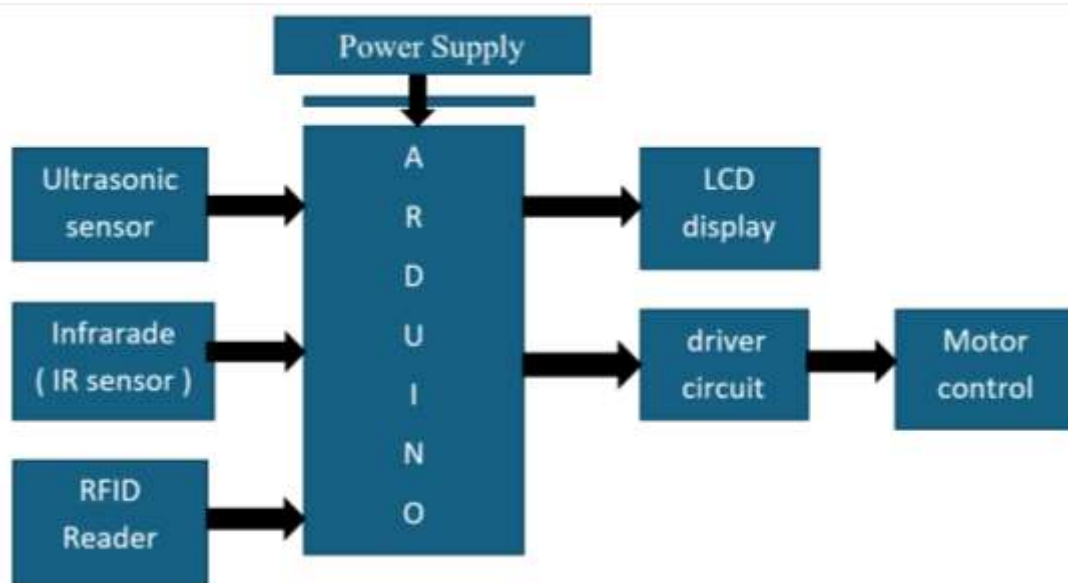


Fig. Block diagram of Working of the ADAS System Car.

In short explanation & the working of this system is, for automatic emergency braking & for the driver monitoring system & adaptive cruise control. We can install the Ultrasonic sensor & IR sensor in front of car to detect the speed & driver drowsiness detection and parking assist. Also w can install 2 Dc motor for running the car. To run motor we can use motor driver circuit. The will be the Arduino based self driving car. The main purpose this system to provide easy drive to driver. If in case the drowsiness will detect the it will taken an action like slow speed of vehicle & automatic emergency breaking. Also it sense the speed, lane, front car distance & blind spot monitoring. We worked on Arduino nano & we programed the commands taken in emergency & crucial condition. That result, it sense the speed & driver drowsiness detection and parking assist. We are also install the LCD display to display the speed of car, it turn right or left as well as start or stop, etc.

RESULT

If in case the the other vehicle will come in front of the car and the driver will not seen then it will be sense and take action where in that is required. It will provide comfort to driver in long journey and routes will sense the lane or the track and follow lane without driver drive with the help of IR sensors. The main purpose of this system is avoid the accident and follow the rules of traffic such as in case the red signal will be there and the zebra crossing will be there then it will be sense. With the help of Ultrasonic sensor it sense the object come in front of the car & take action like emergency breaking to avoid collision.

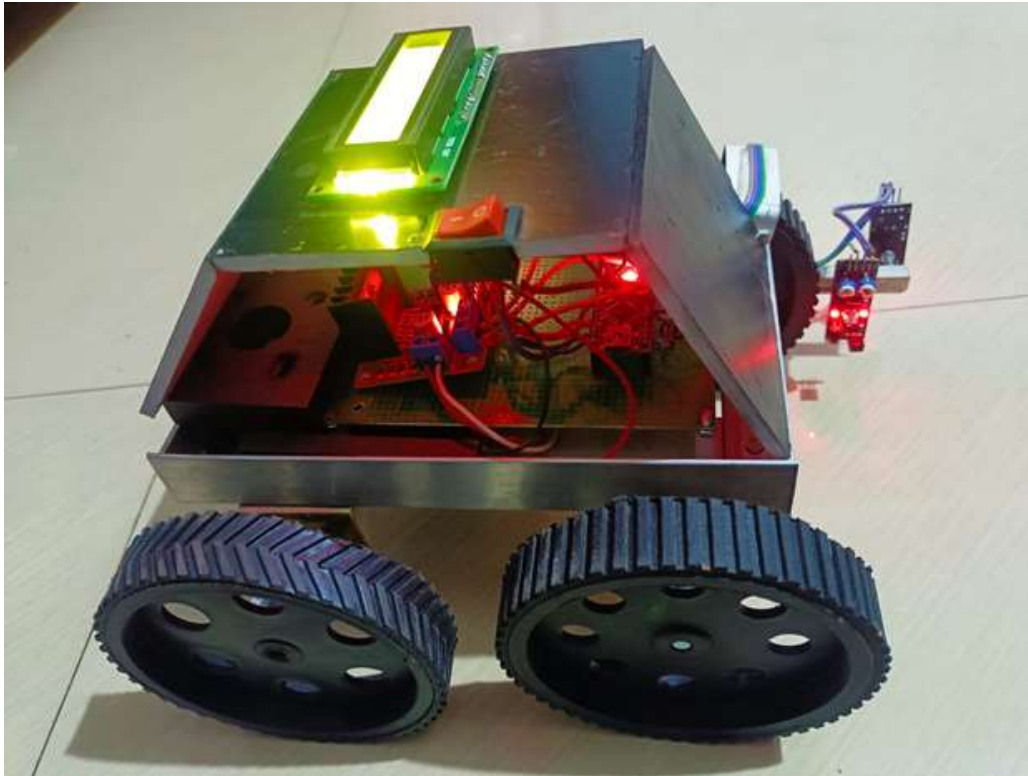


Fig. Show the Hardware Model of ADAS System Car

FUTURE SCOPE

In the future, radio frequency identification tags will find their own space in environment. Nowadays the vehicle traffic & usage become very high.

The future scope of our system is to avoid fire accidents, smoke detection with help of sensors. We have planned to use pneumatic cylinders interfaced with embedded parts to reduce speed of the car. The driver will be assisted more than today's trend in their comfortable journey. We can also try to implement the narrow range of sensors replacing by wide range of sensors with low frequency & power.

CONCLUSION

In this paper, the drawbacks obtained by conventional methods are recognized and modified. The conclusion of this project is this methodology will be embedded in all types of vehicles such as low range vehicles and high range vehicles also. This system is durable and ensures the safety of the passenger, driver as well as the public. The average performance of this system will be near to 95%. A vehicle with a high degree of comfort can be designed using this method. In the future, it can be interfaced with modern technology for better & improved performance of this system.

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