International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 07 | July - 2021 ISSN: 2582-3930

# ADVANCE DRIVER ASSIST SYSTEM

**Lakshmikanth[1], Manohar M[2], Meghana AK[3], M Jayavignesh[4], Satish B A[5]**

[1]*Electrical & Electronics Engineering, DSCE* [2]*Electrical & Electronics Engineering, DSCE*
[3]*Electrical & Electronics Engineering, DSCE* [4]*Electrical & Electronics Engineering, DSCE*
[5]*Electrical & Electronics Engineering, DSCE*

---

**Abstract -** Advanced driver assistance systems that are made of electronic systems usually assist drivers in parking as well as driving functions. Vehicle Safety Systems are one of the fastest growing safety application areas in recent decades due to the desire to reduce vehicular accidents and fatalities in modern vehicles. With the development in the field of intelligent driving, the research on key technologies has made significant progress. Here we discuss about different vehicle safety system that are currently available and their future developments. These systems are intended to provide security and monitoring services in real time based on the concept of recognizing the type of accident and analysing the required solution using sensors . Hence ensuring the safety of the vehicle and its occupant is very important. That are designed to enhance the safety of driving a vehicle. The main role of advance driver assistance system is to prevent number of injuries and prevent number of deaths.

***Key Words***: optics, photonics, light, lasers, templates, journals

## 1. INTRODUCTION

Safety of on-road vehicles is one of the major concerns in automotive systems now a days . Since studies show that about 1.2 million deaths are taking place due to road accidents worldwide. Table below shows the crash survey due to various circumstances.

The main reasons of road accidents are classified as human associated, vehicle associated, road associated, environmental associated factors ,but studies show that most percent of road accidents are caused by human errors. Few seconds early warning can prevent 99% of those.[1]

| SrNo. | CRASHES DUE TO VARIOUS FACTORS | PERCENT |
|---|---|---|
| 1. | Driver Factors | 57% |
| 2. | Poor Visibility | 27% |
| 3. | Vehicles problems + Driver factors | 6% |
| 4. | Roadway factors | 3% |
| 5. | Roadways + Driver + Vehicle factors | 3% |
| 6. | Vehicle factors | 2% |
| 7. | Roadways + Vehicle factors | 1% |

Table1.Crashes Survey Due To Various Factors

Ministry of Road Transport and Highways has released its annual publication on 'Road Accidents in India, 2018'.The report provides a brief overview of Road accidents in India. It underlines the commitments made by India at the second global high-level conference on Road Safety in Brazil in 2015 to halving deaths and injuries from accidents by 2020.

India, however, ranks 1 in the number of road accident deaths across the 199 countries reported in the World Road Statistics, 2018 followed by China and the US. As per the WHO Global Report on Road Safety 2018, India accounts for almost 11% of the accident-related deaths in the World.

Hence it is necessary to determine the necessary controlling measures to reduce the cause of accidents which are mainly due to human factors.. The objective of this paper is to provide some of the in-vehicle technological systems that are available on current production models, utilizing a standard format.

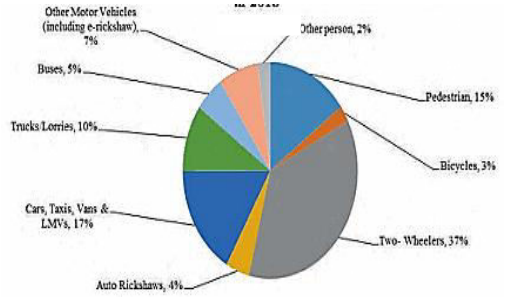


Figure1: Chart of percentage share of road user categories in persons killed.

## 2. NEED FOR ADAS

Systems which support driver are very essential and would improve road safety thus reducing the main cause of road accidents.Safety systems can be classified into two types: 1)Reactive/Passive 2)Proactive/Active.

Passive systems protect driver once an accident has occurred , eg. seat belts, air bags, padded dashboards. Active systems are of main attraction and have gained large development in modern vehicles. Examples are Adaptive cruise control, Lane keeping and Automatic braking. Such systems are generally known as ADAS's and are getting extremely prevalent in automotive industries.

According to the surveys done, ADAS's can prevent accidents by knowing the category of ADAS system to be used for the given type of crashes or accident. The main goal of ADAS is to restraint the demand and to plan quality support systems which will explain with information needs and performance ability of solitary drivers which is been discussed in the paper.[14][1]

## 3. PROPOSED ARCHITECTURE

Below Block diagram depicts the proposed architecture.

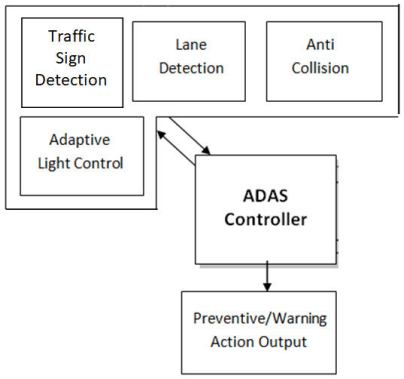


Figure 2. proposed system architectural block diagram

## 4. SAFETY CONTROL TECHNIQUES

- ***Anti-Collision System:***

Anti Collision System for autonomous vehicles is a research of broad and current interest. The purpose of this system is to securely keep vehicles from colliding into obstacles present on their way.

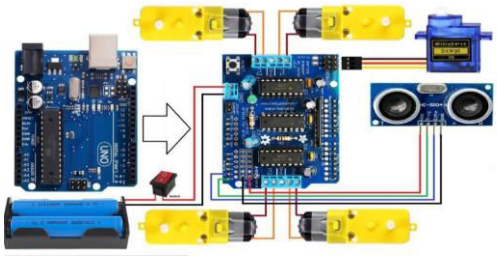

Figure 3. Circuit diagram of anti collision

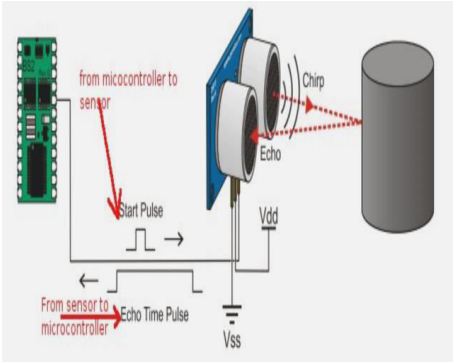


Figure 4. working of anti collision

The basic principle behind the working of ultrasonic sensor is as follows: Using an external trigger signal, the Trig pin on ultrasonic sensor is made logic high for at least 10µs. A sonic burst from the transmitter module is sent. This consists of 8 pulses of 40KHz.

The signals return back after hitting a surface and the receiver detects this signal. The Echo pin is high from the time of sending the signal and receiving it. This time can be converted to distance using appropriate calculations.

When the prototype is powered on, both the motors of the prototype will run normally and the vehicle moves forward. During this time, the ultrasonic sensor continuously calculate the distance between the vehicle and the reflective surface.

This information is processed by the Arduino. If the distance between the vehicle and the obstacle is less than 15cm, the vehicle stops and scans in left and right directions for new distance using Servo Motor and Ultrasonic Sensor. If the distance towards the left side is more than that of the right side, the vehicle will prepare for a left turn. But first, it backs up a little bit and then activates the Left Wheel Motor in reversed in direction. Similarly, if the right distance is more than that of the left distance, the vehicle prepares right rotation. This process continues forever and the vehicle keeps on moving without hitting any obstacle.[8][9] Figure 4 [9]

- ***Adaptive Light Control:***

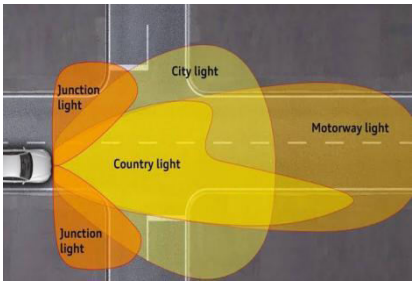


Figure 5. Beam of light

The headlight beam plays a major role during the night travel. High beam from the headlight causes a dangerous situation during night driving. It causes temporary blindness for the drivers that may lead to collision or sometimes it may lead to accident. Pedestrian crossing the road may get hurt. Almost 30% of accidents occurring due to headlight glare.. Adaptive headlights are an important safety feature which improves the visibility and makes your vehicle easier for other driver's to see.

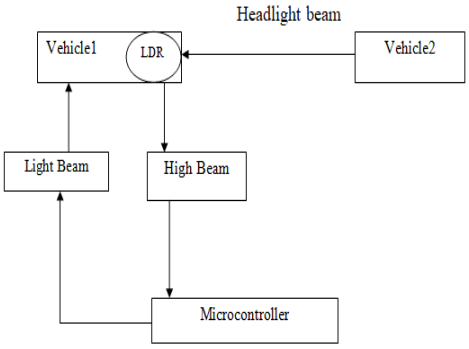


Figure 6. Block Diagram

Adaptive light control system adjusts the brightness of the headlight beam in response to visibility conditions. In our system we have used LDR sensor to sense light. Whenever light falls on LDR the resistance value decreases as a result voltage also drops. So during day time in presence of light and when the light from the opposite vehicle falls on the reference vehicle the LDR sensor senses the light in the form of analog signals, these signals are given to aurdino where the received signals are converted to digital signals for processing. This digital signal is compared with the threshold value if the value is beyond the threshold value the headlight beam dims. When

there is absence of light on the vehicle then the brightness of headlight beam increases.

- ***Lane Detection:***

Lane detection might be a basic component of self-driving cars and autonomous automobiles. it's one among the first critical exploration issues for driving scene smart. Once lane positions are discovered, the vehicle will perceive where to drive and keep away from the risk of running into different lanes or getting off the road. This will stop the car user/car system from drifting off the driving lane. drifting off the driving lane.

The mission that we wish to acknowledge is that of real-time lane detection during a video. There are various ways we will achieve lane detection. We will use the learning-based tactics, like training a deep learning model on an interpreted video dataset, or practice a pre-trained model. Be that as it may, there are less difficult ways to deal with too. During this project, we'll show you approaches to attempt to that without using any deep learning model.

However we'll utilize the common OpenCV library in Python .In this way, to distinguish a track, we should recognize the white patterns on either side of that lane. There are various different things inside the scene of that lane patterns. There are automobiles on the road, road-side fences, street-lights, etc. Furthermore during a video, a scene changes at every frame.

This mirrors real-life driving states pretty much. In this way, prior to tackling the lane detection problem, we've to search out how to disregard the unfortunate things from the driving passage. One thing we will do straightforwardly is to limit a part of interest. Rather than working with the entire frame, we will work with only a neighbourhood of the frame. Within the image below, aside from the lane markings, everything else has been hidden within the frame.

Here, a frame mask might be a NumPy array. When we need to utilize mask to a picture, we basically change the pixel values of the needed region in that picture to 0 or 255, or the other number. Given below is an sample of image masking. The pixel values of a particular region within the image are set to 0.

We will first apply a mask to all or any the frames within the video. Then, we'll apply image thresholding followed by Hough Line Transformation to detect lane markings.[12] Figure. 7 [13]


Figure7. The Lane Detection Process

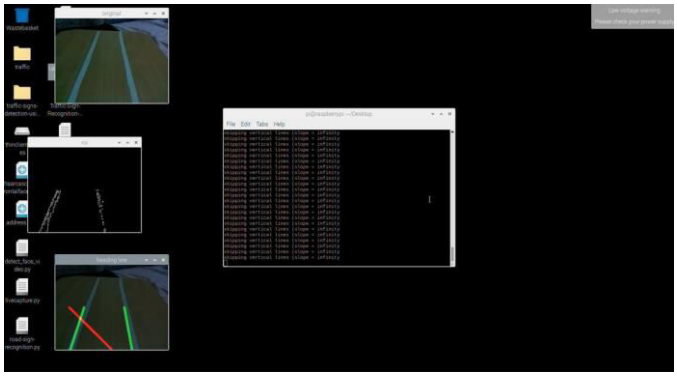

Figure 8. Pictures of lane assistant.

- ***Traffic Sign Detection:***

The train script is designed to access the dataset which compiles of around 50,000 images from 43 classes. The script is written in python, using a many of libraries: * OS – This is needed for linking python script to correct directory where dataset is located.

* Matplotlib – It is needed for displaying data from the training model.

* Tensorflow and keras – These libraries are used to create the artificial neural network model.

* Numpy – It is needed for turning images into an array, which can be assigned to the model to retrieve a prediction.

The first step is to load the model, using model.load(). The second stage is to iterate through the frames from the pi camera using opencv and then resize the frame to the same size as the input sizes used in the training stage, 32 x 32 pixels. Once this is done the new resized frame is put through the model using model.predict(), which gives a matrix as output, each element of matrix is a float from 0 to 1, the element index is same as the class it is representing, hence first element is class one and the value is the prediction of certainty of the image being from that class. E.g. [1.0, 0.0, 0.0,…] shows the prediction is 100% for class one and zero for others. In real cases though the output will show certainty for multiple classes and not always 100% hence the added if statement of if the certainty is more than 95% or 0.95 then return the index. This index is put through a list of lists with actual names of the classes, E.g. ‘20 mph speed’ or ‘turn left’.

The images attached below shows the process from start to finish. The first image shows the training in process. After that is done a print out of the model made is shown. The third image shows the prediction from the training script, it is the last stage of training script. If we look in the folder the training script is in, a graph and a model has been drawn. The graph should look like graph image here, this shows the history of training from start to finish.

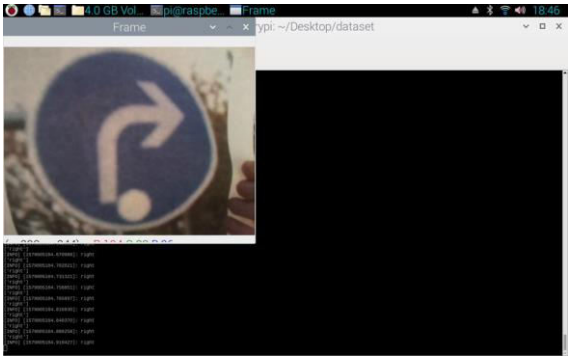

Figure 9. Traffic sign detection

## 5. ADVANTAGES AND DISADVANTAGES

- ***Advantages:***
  - Pre indication or alerting can save lives up to 99%.
  - Improves road safety for everyone.
  - Traffic lane detection alerts drivers about pedestrians crossing, reducing/increasing speed and more.

- ***Disadvantages:***
  - There can be a time sometimes ADAS can make wrong judgements.
  - Vehicles with ADAS have more cost repair which also make insurance costlier.
  - Growth in ADAS can creates new challenges which in turn creates challenges for the industries in terms of price pressure ,complexities or difficulties in testing the ADAS systems.

## 6. APPLICATIONS

1. Lane departure warnings.
2. Traffic sign detections.
3. Surround the complete view.
4. Park assist.
5. Road vulnerability detection.
6. Interior camera.
7. Driver monitoring systems.

## 7. CONCLUSION AND FUTURE SCOPE

In this paper we have discussed different types of specifications, vehicle systems and different sensors. They are used in different alternative and also shows the system how to collect and gather the information in order to increase the safety of vehicle and other advanced features.

An unimaginable improvement have been made in vehicle systems to improve automatics technology which in turn made better performance, safer operation and easy to drive. Since cars are the best ,easy and efficient method to travel around the world, it is necessary to make specifications in it and to utilize the facilities and technologies offered.The vehicle can be extended with some other specifications needed for the assistance of Driver.

So far in this report we have discussed about training model, well its just a prototype it just alerts driver it does not take any actions. But in future when the industries, shift towards self driving vehicles, we can actually try to develop a system that can be implemented in automated vehicles and that would react themselves on behalf of driver by predicting the safer action to be taken using many specification.

## REFERENCES

[1] ADVANCED DRIVER ASSISTANCE SYSTEM (ADAS) CHAUDHARI PRIYANKA RAMNATH, PROF.S.Y.KANAWADE

[2] AKIRA JINOSHI,"DRIVER ASSISTANCE (LANE KEEP ASSIST SYSTEM)", PRESENTATION TO WP-29 ITS ROUND TABLE GENEVA, 2004.

[3] DANIELE BAGNI, ROBERTO MARZOTTO, PAUL ZORATH,"BUILDING AUTOMOTIVE DRIVER ASSISTANCE ALGORITHM WIT XILINX, FPGA PLATFORMS.", XCELL JOURNAL FOURTH QUARTER 2008.

[4] MR.MUSTAFA SURTI, # PROF. (DR.)BHARATI CHOURASIA, "REAL TIME LANEDETECTION SYSTEM USING PYTHON ANDOPENCV ON RASPBERRY PI",INTERNATIONAL JOURNAL FOR RESEARCH IN ENGINEERING APPLICATION &MANAGEMENT (IJREAM) ISSN : 2454-9150 VOL-05, ISSUE-06, SEP 2019 .

[5] ABDULHAKAM.AM.ASSIDIQ, OTHMANO. KHALIFA, MD. RAFIQUL ISLAM, SHEROZKHAN, "REAL TIME LANE DETECTION FORAUTONOMOUS VEHICLES ", PROCEEDINGS OF THE INTERNATIONAL CONFERENCE AND COMMUNICATIONENGINEERING 2008 , MAY 13-15, 2008KUALA LUMPUR, MALAYSIA .

[6] HTTPS://WWW.INSTRUCTABLES.COM/AUTONOMOUS-LANE-KEEPING-CAR-USING-RASPBERRY-PI

[7] HTTPS://TOWARDSDATASCIENCE.COM/DEEPPICAR-PART-4-LANE-FOLLOWING-VIA-OPENCV-737DD9E47C96

[8] INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN COMPUTER AND COMMUNICATION ENGINEERINGVOL. 7, ISSUE 9, SEPTEMBER 2018COPYRIGHT TO IJARCCE DOI 10.17148/IJARCCE.2018.797 35 ARDUINO BASED FORWARD COLLISION DETECTION WARNING SYSTEMORJI E.Z1OLEKA C.V2, AND NDUANYA U.I3COMPUTER ENGINEERING DEPARTMENT, ENUGU STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, ENUGU, NIGERIA1,2,3

[9] VEHICLE COLLISION SAFETY DETECTION SYSTEM SRAVAN AKUTHOTA, SAI KRISHNA N, RAKESH, D. DEVA HEMA.

[10] ADAPTIVE DRIVER ASSISTANCE USING AUTOMATIC HEADLIGHTS SURAJ M. GEND , SNEHAL A. JADHAV , POOJA R. SARODE , ANMOL SHARM

[11] AUTOMATIC VEHICLE HEADLIGHT MANAGEMENT SYSTEM TO PREVENT ACCIDENTS DUE TO HEADLIGHT GLARELAKSHMI K, NEVETHA R, ILAKKIYA S N, GANESAN R

[12] HTTPS://WWW.INSTRUCTABLES.COM/AUTONOMOUS-LANE-KEEPING-CAR-USING-RASPBERRY-PI-AND/

[13] HTTPS://TOWARDSDATASCIENCE.COM/DEEPPICAR-PART-4-LANE-FOLLOWING-VIA-OPENCV-737DD9E47C96

[14]SYSTEM INTEGRATION TESTING OF ADVANCED DRIVER ASSISTANCE SYSTEMS ANDERS CIORAN DEGREE PROJECT, IN AUTOMATIC CONTROL ,STOCKHOLM, SWEDEN 2015.