Literature survey

This section summarises the most relevant research related to the construction and function of a driverless car and all the necessary information  related to its implementation. It also describes the current work being done in this area and the existing models along with the limitations and features of this project.

# Introduction

Due to the recent advancement in the technology of Radar, LIDAR, neural networks and image processing it has become easy to introduce automation even in vehicles. Autonomous cars have control systems that are capable of analyzing sensory data to distinguish between different cars on the road, which is very useful in planning a path to the desired destination.

Among the potential benefits of automated cars is a significant reduction of traffic accidents, relieve travellers from driving and navigation chores, freeing commuting hours with more time for leisure or work; less fuel consumption, producing less air pollution and a lower carbon footprint from road travel.

We are implementing features such as object detection traffic signal detection and roads and detection currently. The papers demonstrate the algorithms and processes which are being used to implement the modules as mentioned above. The structure used in these papers has been implemented by us.

# Existing research

### Video Image Processing for Moving Object Detection and Segmentation using Background Subtraction By Answara Mohan and Resmi R, Department Of Electronics and Telecommunication, India

This paper proposes a method of object detection using background subtraction. Segmentation  helps  in  detecting  various features of moving objects for further video/image processing. In  this  paper  object  detection  and  segmentation  is  proposed and  they  are  compared  using  background  subtraction algorithm (object detection) and segmentation algorithm (edge detection and thresholding).

This paper takes video sequences an input. These videos are spliced into frames and each frame is converted into grayscale. Background subtraction is then perform on this frames in order to distinguish the object. Morphological operators used to enhance the object’s density and shape.

### Road-sign Segmentation and Recognition in Natural Scenes By Yang Siyan(Shaanxi  Radio & TV University, Xi’an, China) and Wu Xiaoying  Miao Qiguang(School of Computer Science and Technology, Xidian University, Xi’an, China)

The  detection  and  recognition  of  road-sign  is  an important part of achieving intelligent vehicle. In the system, the  HSI  space is used to  detect  the  road-sign  which  has  been proposed. After  detection, a Proposed method for segmentation to get all road-signs in the image. Then the the  ratio  of  the  size  of  road-sign  and  the  size  of  the  rectangle is used which is minimal and contain the road-sign to define the shape of the road-sign. Finally, in order to achieve real-time, the  hu  moment  of  road-sign is abstracted  and  use  SVM  for  recognition  in  our

system.  Hundreds  of  images  have  been  tested,  and  the  system show high ratio of ecognition and process rapidly.

# Features to be adopted

We have implemented the background Subtraction algorithm in order to distinguish a new object between a background and foreground image. We have then used  morphological operators in order to clearly define the image.

For road sign detection the image when first be converted from RGB to hsv and we shall be using the system of highlighting the red yellow and blue areas in order to distinguish the traffic signal shape much better as compared to  remaining part of the image. This will help in identifying the road sign more easily after converting the image into grayscale and comparing its shape with the known shapes of road signs.

# Limitations

We have not protected the camera from environmental factors such as dust, foggy weather, rain or  darkness. therefore the system might not be able to detect objects in these kind of surroundings.

From the above literature survey we can conclude that the current autonomous car technology uses a combination of Radar, LIDAR or proximity sensor technology to detect objects and decide movements. With our model we propose a system which uses image processing as an alternative to the above mentioned technologies. Based on the literature survey done, our project incorporates all the necessary features required by a driverless car such as object detection, road sign and traffic signal detection using the algorithms and procedures explained in the chosen papers.