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Lane Detection with Directions Assistance

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Abstract **- Advanced driver assistance systems are being currently being developed to help driver in their driving to reducing accidents on roads. Car safety and road safety is the most important issues currently. Errors done by humans are the main cause of accidents on highways. And also Drowsiness of driver is also the main cause of accidents. Automated systems are used in many sectors of various industries which are in turn helping the process to finish fastly and helping to save human life [2-4]. They produce results with perfect accuracy without being prone to errors. This system is also automated and uses various processes and algorithms as a combination which helps us to drive a car tension free and reduces accidents by a huge margin.**

Index Terms - Lane Detection, Directions, Assistance

INTRODUCTION

In this paper we present lane detection system which helps us to go in the direction of the road and lane. It uses modules such opencv and numpy which are used as modules for computer vision. To get the perfect output we divide the video into frames and then this is processed according to the method mentioned below which gives us the lane. This process is robost, simple and cost efficient which can be used in any kind of veichle.

LITERATURE SURVEY

Literature survey is the most significant for advance in the improvement process. Lane detection and tracking is one of the key features of advanced driver assistance system. Lane detection with directions assistance is one of the most difficult problem in computer vision. Various lane detection techniques are explained in this paper. The performance of different lane detection and tracking algorithms is also compared and studied.

Robust road lane detection from shape and color feature fusion for vehicle self- localization[5]. In this paper, the main advantage is that it detects vehicles and positions them in accordance with other vehicles. There exists a small problem in this also that it is slow in detecting the co- ordinates and may take time to position vehicle in some cases. So it may not be very efficient.

Real-time lane detection for autonomous navigation[6]. In this paper, the main advantage is that it is easy to code and cost of making is less. However, While curve fitting, If the roads are small, the value may go out of bound and the system may fail. So this may cause a problem where there are steep turnings.

A Study on Real-Time Detection Method of Lane and Vehicle for Lane Change Assistant System Using Vision System on Highway [7]. In this paper, the main advantage is that it is easy to code and cost of making is less and also properly Detects vehicles and positions them in accordance with other vehicles.. However, It is slow in detecting the co- ordinates and may take time to position vehicle in some cases.

Vision Based Road Lane Detection System for Vehicles Guidance[8]. In this paper, the main advantage is that in this paper, the main advantage is that it is easy to code and cost of making is less. However, While averaging, If the roads are small, the value may go out of bound and the system may fail.

These all are not good when it comes to the safety and efficacy of the road lane detection system.

METHODOLOGY

This project produces an output which detects the lane and also tells us in which direction to steer. These days automation is becoming the main thing where companied are investing more. Even many people are preferring cars to be automated so that they can prevent accidents and less stress on them.

WORK FLOW

Camera calibration is very essential as the camera adjusts itself according to the angle of the road. This is done to prevents unwanted areas of the road and to get a very clear view of the lane. Following that, the lane video is taken as input and it is divided into frames using cv2 module. This is done because it is easy to process a frame rather than processing a frame. Now each frame is converted to grayscale as grey images are faster to process and easy to get output. Now to each individual frame unwanted noise and parts are removed. We can do this by taking a birds eye view of the road and applying thresholding and blurring the image. Gausian filter and thresholding are applied to the frames to reduce the noise even more. Next, Canny edge detection algorithm detects the place where there is change in colour and them draws an edge there. It correctly finds the place where there is change in colour and then it draws a thick line there. Now hough transformation is applied to the given frame and what this does is that it iterates through every edge drawn by canny edge detection algorithm and then iterates through that every edge. It draws many lines

and than selects the thinnest line and then used that thin line and draws the line using the equation xcos(theta)+ysin(theta)=r which is the form of straight line equation. Now the curve fitting is done so that the curve is fitted in the drawn lines. It uses the points such as (x1,y1) , (x2,y2) and ……(xn,yn) and then fits the curve curve by using that equation f=ax+b by taking multiple points of x and y. At last the lane lines and curve is drawn and then the direction is given so that the person can go according to that direction while driving.

Curve fitting with lane detections and directions:

RESULTS AND DISCUSSIONS:

Output which tells us in which direction to steer (turn right)

Output which tells us to go straight is the road is straight. It also tells us how far we are from the center of the lane and warns us if we deviate.

These are done with the help of process mentioned above. Each frame is processed and noise is removed accordingly as mentioned above.

This is the output before edge detection and noise will be removed and then the frame will be processed and curve fitting will be done. We will get perfect output.

We can clearly see that road lane was detected and lane was drawn according to the process mentioned above,the main algorithm used in this are canny edge detection and hough transformation and also it was done using modules such as numpy, openCV and mathplotliv.These all come together to produce an efficient output,which help (or)assist the driver in any type of working conditions.The camera can be placed any where because of camera calibration and efficient algorithms.

CONCLUSION

In this paper, we have presented a system which will be even able to work when there is less light or when there is more traffic. It also tells us the curvature of the road and distance from the centre of the lane to our care. It tells us to go left or right based on the lane and the road. It also gives us a warning when we deviate from the lane. If the road is straight it tells us to go straight and if its turning towards left or right it tells us that corresponding direction accordingly. Camera calibration also is done which allows camera to calibrate itself according to the road. This is done by pre defining a set chess board images and adjusting the camera accordingly. This system is very efficient and usable in any kind of vehicle and detects the lane perfectly and steers us in the right way.

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