Advance Physics Letter

"Design of Road Tracing System for Computer Vision"

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Abstract:-Based on real-time video to track lanes with minimal hardware and software requirements. The proposed system is designed using low cost cameras and processing power of an on-board laptop. The developed system tested on different drives fluctuating from a high speed drive on a high way to a low speed drive on the city roads. The system detected the lane and departure warning is around 95%under various lighting conditions and on many types of roads ranging from unmarked roads to national highways. This further will be used in developing computer vision system for auto pilot.

I. INTRODUCTION

Tracking is the problem of generating an inference about the motion of an object given a sequence of images. Good solutions to this problem have a variety of applications. In this paper we have presented a sensors system for a video based system. The influence of traffic density and the speed of driving play an important role on the driver's perception of the road. It is often observed that on roads with minimal traffic density, drivers tend to ignore lanes and traffic signboards. It is also observed that on roads with heavy traffic density, drivers pay more attention in ensuring a safe drive and less on the signboards. This Road Tracking Systems will alert the driver about the lanes and lanes departing of the vehicle which will be a great assistance to driver and for the application of computer vision. Although the term RTS refers to a wide range of systems and functions, the system discussed in this paper focuses on the development of lane detection, tracking system and development of auto pilot system.

The accuracy and the dependability of the results of RTS are determined by a number of factors like the location of the camera and the vehicle front lighting. This plays a major role especially during evening and night. The camera position too is very critical. If the camera is placed outdoors like on the bumper or on the roof top, then the image quality would greatly be affected by the climatic conditions. Positioning the camera within the cabin is ideal; even here the influence of various factors like the interference of the wipers in the image stream, fog formation on the windscreen and aesthetics need to be considered. Hence most of the manufacturers mount the camera along with the rain sensor.

II. METHODOLOGY

First edge pixels are search, or a line passing through enough number of color pixels, whichever comes first, is initiated from the bottom center of the image. This searching goes to both the side of the image upper left and right corners. By limiting the ranges of the video frame we avoiding the interference of the obstacles on the lane so that only the lower section which contains the marking of road is considered.

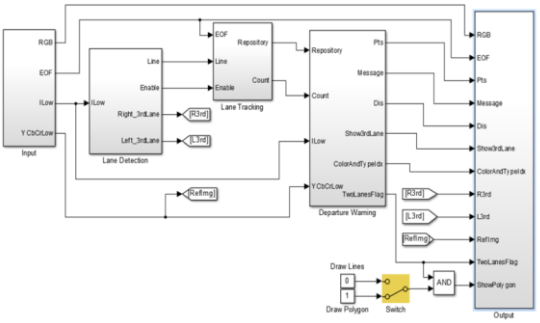

Figure 1 The matlab based model of Road tracking system

III. DESIGN PROCEDURE

RTS model notifies the driver if they are moving across a lane by detecting and tracking road lane markers in a video sequence. This information further can be used in auto pilot by applying suitable control in driving system. Using the Hough Transform, Hough Lines and Local Maxima Finder method the system perform the detection and tracking.

Where the lane markers might be difficult to see or are hidden behind objects, the system waits for a lane marker to reappear in multiple frames before it is consider as a valid marker. It uses the same process to decide when to begin to ignore a lane marker. The matlab based model of Road tracking system is shown in Figure 1. The overall system has main three sub system namely Lane Detection Subsystem (figure 2), Lane Tracking Subsystem(figure 3)and Departure Warning

Subsystem(figure 4).

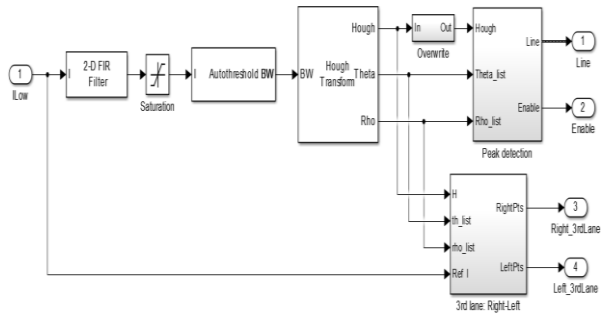

Figure 2 Lane Detection Subsystem

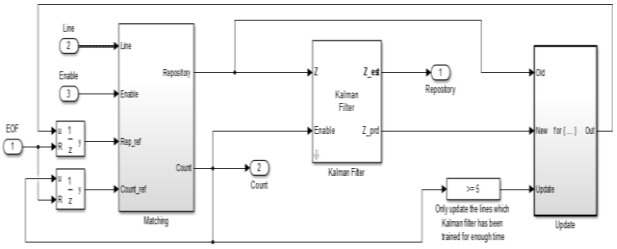

Figure 3 Lane Tracking Subsystem

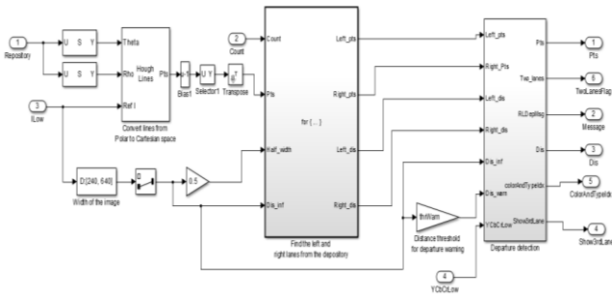

Figure 4 Departure Warning Subsystem

IV. RESULTS AND CONCLUSION

We have got significant accuracy for lane detection and warning system even in shadow and sunny road. The system was tested on different drives fluctuating from a high speed drive on a highway to a low speed drive on city roads. The general success rate of the considered system with regard to lane detection and departure warning is around 95%.The detection rate depends greatly on the lighting conditions. It uses a passive stereo camera pair mounted on the dashboard of the vehicle to capture 60Hz video images of the driver's head. These images are processed in real-time to determine the 3D position of matching features on the drivers face. The features are then used to calculate the 3D pose of the person's face (±1mm, ±1^o) as well as the eye gaze direction (±3^o), blink rates and eye closure. The technology has been developed for driver safety systems, particularly driver fatigue and inattention measurement. A real-time system requires the efficient use of computational resources and this is handled at a fundamental levelin thedistillation algorithm, such that the best statistical result isobtained given the computational resources available. The modularity of the cue processor allows the lane tracker to be extendible while being generic enough to be applied to a varietyof tracking problems.

Detecting and tracking lanes in a video fram can be done by multiplemethods (eg. Hough and Haar-like-features methods). Use ofthis methods alone is not enough to make the system reliablefor detecting and tracking. In cases of bad environmentconditions, image can be full of various noise (snow, fogand rain on the image). Besides environment conditions, highvehicle velocity can also affects the image (blur effect).

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