Vehicle Driver Assistant System

Zihui Liu

zihui6@stanford.edu

Chen Zhu

chen0908@stanford.edu

1. Introduction

The driver assistant system has been implemented in many vehicles in the market to help protect both the safety of drivers and pedestrian. The related technologies are also used in developing the autonomous vehicles. Using the image processing techniques, we plan to build a vehicle driver assistant system based on MATLAB to provide drivers reliable analysis of the traffic information and assist the driver to identify the car information ahead including the vehicle manufacturer and the name of model.

2. Goal

Our goal is to use the video image processing techniques to build a robust system to achieve several functions below.
- Determine if the car is driving stable on the lane. If the car moves toward another lane without turning on the sign signal, there will be a warning to the driver as a reminder.
- Use the video image of the back of front car to determine car manufacturer and model.
- Traffic sign identification.

Extra possible feature depending on the progress of Project:

- Vehicle velocity & distance detection between car driving and the front car
- Voice assistant (report the road information and warning)

3. Methodology

The image processing techniques that we plan to implement in this project including image segmentation to process the dash line segments in video image to determine stability of driving, morphological image processing for traffic information extraction from the traffic sign & plate and front car make and model identifier, etc.

There are also some related studies and papers related to the project that we will work on and can provide good resources to our project. Raad, Ghazali and Loay (2014) introduced several vehicle detection and tracking techniques in traffic videos including motion vechicle detection and segemation approaches, camera calibration approaches, and vehicle tracking approaches [1]. Pruda (2014) implemented morphological operations, background substractions, edge detection and thresholding for vehicle detection in *Morphological Image Processing Approach of Vehicle Detection for Real-Time Traffic Analysis* [2]. And also there is a similar paper titled Automatic Vehicle Detection and Road Traffic Congestion Mapping with Image Processing Technique from Pradip and Ajay which introduced about their works in the related fields [3]. Some of their works are based on the analysis from the traffic camera similar to the project we will work on.

For the references, we will try to do some testing using the methods they introduced combined with the image processing techniques and choose the best method which is easy to process and give the most accurate result.

References

[1] R.A. Hadi, G. Sulong, L. George. VEHICLE DETECTION AND TRACKING TECHNIQUES: A CONCISE REVIEW. Signal & Image Processing : An International Journal (SIPIJ) Vol.5, No.1, February 2014

[2] Y. M. Prutha, S. G. Anuradha. Morphological Image Processing Approach of Vehicle Detection for Real-Time Traffic Analysis. International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 Vol. 3 Issue 5, May – 2014

[3] P.S. Maharjan, A.K. Shrestha. Automatic Vehicle Detection and Road Traffic Congestion Mapping with Image Processing Technique. International Journal of Computer Applications (0975 – 8887) Volume 114 – No. 16, March 2015