EE417 - COMPUTER VISION PROJECT PROPOSAL

Lane Detection and Distance Estimation with Monocular Camera

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1 - Problem Definition

Over the last few decades we have seen a rapid progress in computer vision particularly with the help of deep learning methods. However, most of the solutions that deep learning provides require large amounts of computer power, and for this reason traditional computer vision methods are preferred in resource constrained applications. In this project, we aim to estimate distances between objects in front of a moving vehicle and also detect the lane on which the vehicle runs. This will require first calibrating the camera of the vehicle to obtain intrinsic and extrinsic parameters. Our goal is to build fast and robust algorithms that do not require a lot of compute power and are able to run on edge devices like micro-controllers.

2 - Procedure

To this end, we plan on using Opencv python for most of our procedures like camera calibration, image processing, feature detection using hough transforms and distance estimation from monocular raspberry pi camera. We intend to go through the literature and implement the motion estimation. A paper that has motivated our work is the work by Chu Jiangwe et al on their 2004 paper: Study on Method of Detecting Preceding Vehicle Based on a Monocular Camera.

The project will be implemented on a raspberry pi with the pi camera module.