Enhanced Lane and Obstacle Detection Technique for Intelligent Vehicles

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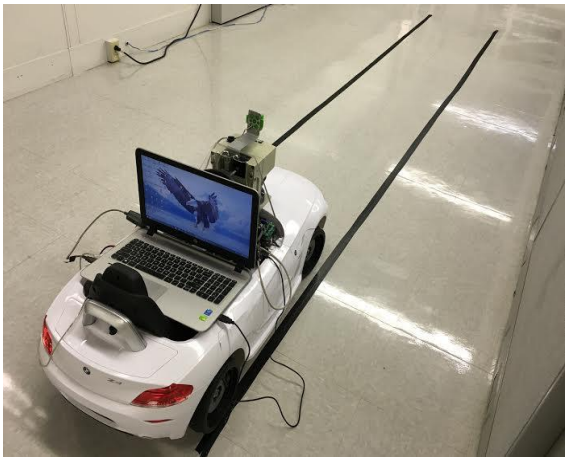
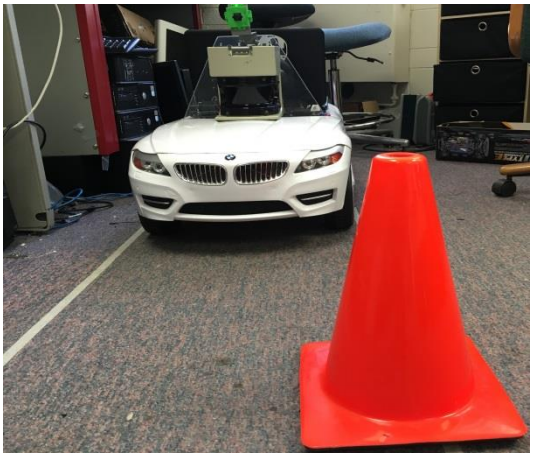
Abstract

This poster presents methods developed for lane and obstacle detection methods developed for intelligent vehicle applications. The techniques are developed under Matlab and Open CV for C/C++ and Python. This lane detection system is based on a single 180 degrees fish eye camera and for the obstacle detection a SICK LIDAR LMS-291 S-O5 laser sensor is used. For the lane detection, a lane marking technique is utilized. And for the obstacle detection, the laser range sensor is adopted to use incoming stream of scan data, with coverage of 180 degrees in front of the vehicle. If an obstacle is detected at any point in the region of interest, we can determine the distance and angle of the obstacle so we can calculate enough clearance to avoid obstacle. For the implementation of lane detection systems, we are using Hough line transform and Shrink Lane Pixel Detection Method (SPDM) to detect lane markers. The Shrink Lane Pixel Detection Method (SPDM) is a new algorithm to detect lane pixels based on a shrinked image. This method detects the edges using canny edge detection. After that, the distortions found in the image are filtered. To enhance the classification performance, the number of pixels required to process the image to find the lane markers is reduced. Based on the detected lane markers, the relative position of the vehicle is determined. This new model parameterizes the relationship between points of left and right lane boundaries, and can be used to detect all types of lanes.



(a) experimental test scenario conducted for lane tracking



(b) experimental test performing obstacle detection