

Diploma Thesis Review

- supervisor -

Name of student: Burak Aydin

Thesis topic: Trajectory determination and control for autonomous racing

Supervisor: Doc. Ing. Martin Hromčík, Ph.D.

The goal of the diploma project was to investigate, design, implement and validate selected algorithms for determination of trajectory from visual data for the student autonomous formula races. The motivation comes from the fact that an action group on autonomous racing was established in 2019 at FEE CTU at the eForce student formula racing team.

The main result of the thesis is a set of approved fundamental procedures that can be used to estimate the vehicle offset from the path (centerline) based on the assessed relative positions of the left and right cones (distinguished by colors) in the field of view of an anticipated stereo camera system. The routines are programmed in MATLAB, as well as the comprehensive simulation environment which the student developed to evaluate the trajectory determination algorithms and validate their performance. I believe the procedures can be readily compiled into the onboard system of an autonomous formula once an instrumented prototype is available. As an additional result, the student investigated a selected model predictive control algorithm for dynamical stabilization and control of the vehicle; the single track model was used for this task.

Regarding consultations and cooperation with the student, the fact is that at the beginning the communication was rather tough for me and my recommendations and tasks were not addressed by the student. It improved significantly in the course of the time however; and the resulting thesis turned out to be very good in my opinion.

Based on the above arguments, my suggestion is **grade B, very good.**

2020/05/06

Date

Signature