



**FACULTY  
OF INFORMATION  
TECHNOLOGY  
CTU IN PRAGUE**

## ASSIGNMENT OF BACHELOR'S THESIS

**Title:** Car chasing simulation in Carla  
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**Study Programme:** Informatics  
**Study Branch:** Knowledge Engineering  
**Department:** Department of Applied Mathematics  
**Validity:** Until the end of summer semester 2020/21

### Instructions

\*Get familiar with the literature on

- a) physics simulation systems for autonomous driving,
- b) autonomous driving for other vehicles (or trajectory) tracking,
- c) 3d detection of objects in a vehicle surrounding.

\*In Carla, create a scenario with two vehicles: followee, follower. The followee will be driven by an automatic agent on a pre-programmed trajectory. The follower will have an on-board stereo-camera.

\*Design and test an algorithm controlling the follower to track the other vehicle and keep the predefined distance as close as possible. The input will be

- a) 3D position of the followee,
- b) detection of the followee in the camera image,
- c) raw camera image.

In cases (a-b) evaluate the algorithm with both exact and perturbed data.

\*(Optional). Test the algorithm on the RC platform developed in the department of cybernetics FEE. The followee (another manually driven RC car) can be equipped with a special target to ease the perception part of the problem.

### References

1. A. Dosovitskiy, G. Ros, F. Codevilla, A. Lopez, V. Koltun. {CARLA}: {An} Open Urban Driving Simulator. Proc. Annual Conference on Robot Learning, 2017.
2. Hu et al. Joint Monocular 3D Vehicle Detection and Tracking. In ICCV, 2019.
3. L. Novák, Vehicle Detection and Pose Estimation for Autonomous Driving. Master's thesis, FEE CTU in Prague, 2017.
4. F. Jan, Trajectory Tracking for Autonomous Vehicles, Master's thesis, FEE CTU in Prague, 2018.

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