Faculty of Engineering
Summer Research Program 2022-2023

Project Title: **Improving Vehicle Autonomy - a Virtual Reality Approach**

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Passionate on future transportation and ready for challenges in the era of Autonomous Vehicles? This project is 4U!

Background, objective, tasks and deliverables

One of the most vital challenges for vehicle autonomy is to ensure safety in automation. While technologies have advanced significantly, autopilot failures are continuously reported. Why machines do not function well? To what extent, should drivers trust the technology? This project sheds light and makes attempts on addressing these issues.

The main objectives are to 1) identify how human drivers adapt and intervene at different levels of automation and 2) identify the key disparity between the existing AV control and human driving behavior. The main tasks are 1) developing the experiment platform and 2) conducting human-in-the-loop analysis. The expected deliverables: 1) an autonomous vehicle model that supports the first-person perspective in the open-source autonomous simulation software CARLA (one of the world-leading platforms for AV tests, example view below); 2) an analysis of behavioral insights for improving AV control.

Prerequisites

- strong programming skills (e.g. proficiency in C++ & Python). Students have the opportunity to engage in short-term lab activities for eligibility assessment
- good knowledge in mathematics (e.g. kinematic physics of vehicle motions)
- good knowledge in statistics (e.g. capable of applying advanced data analysis)
- passionate in traffic/road/automobile engineering and computer-aided science
- basic research know-how (e.g. literature review, research formulation and justification)

Unique student benefits

- Hands on cool technologies such as virtual reality for real engineering applications
- A PhD researcher, as an associate supervisor, will provide personal mentonship for students including research guidance, technical assistance, and writing training