Autonomous driving is one of the most important topics on the agenda of automotive industry and automotive pre-development. While currently many automated driving assistance functions enter the market, i.e., automated emergency braking, lane keeping assistants, automated parking, or steering assistants, the big vision for the future is a car which drives completely autonomous.

Hella Aglaia Mobile Vision GmbH is one leading company for driver assistance software solutions and actively forms the future for intelligent sensor-based driving for autonomous cars. The company maintains its own vehicle platform for developing and testing software for autonomous driving (see images below).

Perception of the surrounding environment is the key to develop autonomous cars. Therefore, vehicle prototypes are equipped with a lot of different sensors (camera, RADAR, LiDAR, ultrasonic, map data …) that are used to perceive the environment, followed by an interpretation of the acquired knowledge and a planning of subsequent actions of the car.

In this student project, an autonomous driving challenge – the parking pilot – will be analyzed in detail. Therefore, different sub-functions should be implemented. Based on data from different sensors, features shall be identified and extracted. Data fusion and a localization of the car on an offline map of a parking lot shall be implemented and free parking spaces shall be identified. Optionally (depending on the group size), the planning of further actions can be implemented. The main challenge of the project is to deal with the characteristics of different sensors. What is each sensor able to “see”? What can I do when I “see” nearly nothing?

The prototypical algorithm will be implemented in Cassandra (a C++ based rapid-prototyping framework). Besides problem analysis and software implementation, the contents of the project include gaining practical knowledge about automotive sensors, project management and team work, processes in the automotive industry (e.g. Automotive SPICE) and testing issues. The certificate of performance requires a written report, a presentation, and the developed software.

The project is led by Prof. Dr. Hellwich (TU Berlin), Dr. Saß, Mr. Czarnian and Mr. Dammeier (all Hella Aglaia Mobile Vision GmbH employees).

Prerequisites for participation: You are a master student of computer science, electrical engineering, mathematics or similar. You already had some practical experience with programming in C/C++. Further, you visited relevant lectures with focus on topics such as image processing, signal processing, robotics, or computer graphics. Please note that a minimum of 6 students is needed for the project to take place.

The first project meeting will take place on 19th October 2017 at 10:00 o’clock in room MAR 6.051.

Contact: Prof. Olaf Hellwich (olaf.hellwich@tu-berlin.de)