Background

Human transportation is now in an exciting era when cars will become electrified and autonomous. Many exciting engineering problems need to be solved to make this happen. In order to get students to learn about and work with the technology behind electric and autonomous cars we have set up a project where bachelor thesis students with different backgrounds work together to modify an existing Renault Twizy to be able to drive autonomously, at low speed, around the Chalmers Johanneberg Campus. The project is a collaboration with Zenuity.

Problem Description

For autonomous cars, safety of the environment within which it drives is of course of main priority. This means protecting other road users, such as pedestrians, cyclists etc, from harm. Of second priority is protecting the car itself from damage, such as running into walls. To guarantee such safety, the car needs to have a supervising safety system, that acts when safety issues arise; but only then, when no danger is imminent the safety system just observes the behavior of the car and does not interfere. It is of utmost importance that such a safety system behaves correctly, thus it needs to be developed in a very rigorous way.

This project will develop the safety system for the Autonomous Twizy. To make it manageable, the safety system will be “hard” in the sense that it emergency brakes whenever it determines that danger is imminent. Even for this simplified case, though, it is necessary that we use state-of-the-art techniques for guaranteeing system correctness.

Suitable background: TKAUT, TKELT, TKDAT, TKTFY, TKTEM

Group size: 3 to 6 students.
Number of groups: 1

Prerequisites: Strong programming skills are necessary.

Contact person: Martin Fabian <fabian@chalmers.se>
Supervisor: Martin Fabian <fabian@chalmers.se>
Examiner: Knut Åkesson <knut@chalmers.se>