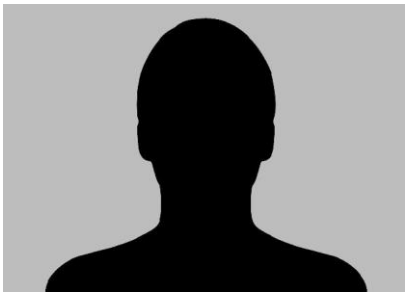
Zurich University
of Applied Sciences

School of Engineering

InES Institute of Embedded Systems

Data collection for the Formula Student racing car



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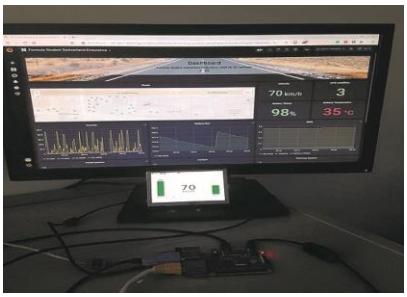
This bachelor's thesis deals with sensor data acquisition for the Formula Student ZHAW team. Formula Student is an international design competition for student teams with the goal of building a racing car. Last year, the ZHAW decided to build its first self-designed electric formula racing car and to participate in the first competitions.

This work involves designing a system that is responsible for the first step of reading and capturing all vehicle-relevant sensor data during the drive from the Formula Student ZHAW vehicle. The data are taken directly from the car control unit ECU via a self-defined interface. The Formula Student ZHAW team chose the Autobox III from dSpace as the car ECU. The Autobox III is used for the automatic control and monitoring of the vehicle components. The ECU can read information such as the current engine speed, battery or engine temperature, current battery capacity or other sensor data.

A Raspberry PI computer accesses the ECU interface and processes the raw data. The most important information is made available to the driver via a screen in the vehicle. All read sensor data is stored in a database on an external server.

During a race, the pit crew should have the possibility to monitor and analyze the vehicle in real time. For this purpose, a web application was implemented which manages the individual races and can create a user-defined dashboard for each race. In addition, the dashboard can draw the driven track on a map.

View on the dashboard, which displays the real-time data of the racing car.



Complete system during a simulation.