



Demonstrator for semi-autonomous driving

Introduction:

We are currently developing a model car, which will serve as a demonstration and simulation platform for traffic control algorithms in a semi-autonomous driving setting. Basically, it is a modified 1:24 scale model car, which is upgraded by a 32bit ARM cortex M3 microcontroller, a motor driver, power management circuitry and a number of sensors: magnetometers, IR distance sensors, current/voltage sensors and odometry. The car should be able to drive autonomously inside a small model world, follow the streets, avoid crashes, etc. and should be able to be controlled remotely by a control station (e.g., a computer or another microcontroller). Beside the basic functionality, such as accelerating, flashing when turning, turn the lights on, the demonstrator should simulate more complex behavior such as mass inertia, driver reaction time and sensor failure. The communication to the control station is done in real-time via ZigBee or Wi-Fi.

Content:

This work consists of three parts:

- First, there will be a paper research about existing autonomous driving technologies and traffic simulation in general.
- Second, you have to analyze the soft/hardware requirements of the demonstrator and create a mathematical model, which will be used to verify your practical work and serves as a guideline for implementation.
- The last part of this work will be to develop the hardware for the demonstrator and the control station, i.e. the circuit, the PCB, etc. as well as the first software layer, e.g., the drivers. This also includes modifying the mechanics, for example, designing and 3D-printing the servo steering system.

Requirements:

- Good knowledge in hardware design
- Good programming skills in C/C++
- Experience with Cadsoft Eagle /Altium Designer and microcontrollers (32 bit ARM)
- Self-reliance, ability to work in team

Contact:

If you are interested in working with us, please send your CV and transcript of grades to:
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