Developing the strategic Control of a Self-driving Bike

Background

In a research project, self-driving bikes are developed with the purpose to be used in test-driving experiments where vehicles’ safety systems for bike safety are tested. Among others, Volvo Cars, Autoliv, Veoneer, and AstaZero are partners in the project. The goal is to have the bicycle driving pre-defined trajectories carrying a dummy to look as similar as possible as a real biker to the vehicle’s sensor system. Several bikes have been built, and the basic functionality has been validated. It remains to develop necessary functions so that the bike can be integrated with the test environment at the test track at AstaZero, and to develop the support functions to facilitate the use of the bike.

Problem description

The aim of this master project is to build the strategic control system for the bike, so that it fulfills the soon to be released ISO 22133 standard and to validate the functionality on the test-site AstaZero. In that way, a control center can coordinate the bike together with other test objects (typically vehicles) so that testing is performed in a safe efficient way. The bike’s control system balances the bike at the same time as the commands from the center are followed. A large part of the algorithms and the code already exist, but it need to be generalized, integrated, and validated. Hence, there is algorithm development, implementation, and validation to be done.

Purpose and aims

- Develop and validate control system so that it complies with the ISO 22133 standard.
- Develop missing parts of control algorithms for the bike.
- Validate and demonstrate algorithms in test drives at the test-site AstaZero.

We are searching for one or two highly motivated student from the master program in Systems, Control and Mechatronics or a student with a similar background. Experience of real time control, programming and electronic design and building is of value. Having a driving-license is an advantage.

The master students will gain competences within real-time control, practical experience of mechatronic systems, test procedure of vehicle safety systems.

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