ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Institute for
Dynamic Systems and Control
IDSC
Institut für Dynamische Systeme
und Regelungstechnik

Research-Oriented Teaching Assistant ("Hilfsassistent")

Software Implementation Support

Supporting Development of Online and Offline Software for SwissTrolley plus

Description:

The project «SwissTrolley plus» (www.ethz.ch/SwissTrolleyPlus, www.swisstrolleyplus.ch) is a cooperation of ETH Zürich and the industrial partners VBZ and Carrosserie HESS AG, in which a battery-assisted trolley bus prototype is developed and operated in Zurich's public transportation system. In the last few years, researchers at ETH have developed various control and learning algorithms for this bus with a strong emphasis on its hybrid drive train and a growing interest in its innovative thermal system.

The «SwissTrolley plus» in operation in Zurich.

The supervisory control software on the bus is running on a powerful embedded computer with a Linux operating system. The software is implemented in object-oriented Java, where the individual algorithms run in distinct threads and have unique execution timers and/or triggers. In order to be completely autonomous, the software handles automatic start-up and graceful termination of all threads, including state saving and loading. In addition, a notification service has been developed that allows to send alerts in case the software encounters unexpected events. A secured communication allows to monitor and update the software remotely. We follow strict development workflows and use continuous integration.

To develop new control algorithms, all input data, intermediate results, and output data is logged and automatically synchronized with a cloud server. This data is automatically post-processed, analyzed, and converted to several target formats. As a result, we can perform offline software in the loop simulations that offer a safe and flexible testing environment for new algorithms.

As a teaching assistant, your job will be very coding-heavy. It will include extending both the online and offline parts of the software with new features, as well as assisting in code maintenance, cleanup, and documentation. During your work on these topics, you will work in close collaboration with the project team at ETH and will (have to) gain a detailed insight in the workings of the online software. Your abilities for abstract thinking and a strong motivation for coding are key.

Prerequisites:

Experience in Java and OOP in general, experience with Git and GitLab (or GitHub).

Contact:

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