Project Work – Fall 2007

Synchronization and Communication for Coordinated Motion Control

The topic of coordinated motion control (of vehicles) is important for a number of commercial, scientific and military purposes. Ongoing development within the field is facilitated by increasingly sophisticated navigation, actuation, communication, and computer technology.

A key aspect of motion coordination is synchronization. Is synchronization achieved through a leader-follower algorithm (open-loop) or through some consensus algorithm (closed-loop)? Which variables need to be communicated to achieve synchronization, and what are the resulting requirements for the communication topology? How robust is the synchronization and communication scheme to failures?

Specifically, the project work will encompass the following tasks:

- Perform a thorough literature study of state-of-the-art synchronization and communication (information-sharing) concepts for coordinated motion control.
- Comment, compare and contrast the main approaches in the literature.
- Suggest alternative strategies or modifications to existing ones.

The goal of the project work is to get a thorough overview of the research field, and to familiarize with main theoretical design and analysis tools. The project report must be written in English.

The project work should be continued through subsequent thesis work (during the spring of 2008), where the main goal is to suggest and investigate new synchronization and communication concepts. Target systems include mobile robots and marine vessels. It might be possible to perform scale-model experiments to validate the proposed schemes. An important goal of the thesis work is to publish some of the results (e.g., at an international conference).

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