Projektförslag för kandidatarbete inom Elektroteknik (E2) EENX16:

EcoPilot: An Energy Efficient Highway Autopilot

Bakgrund

Overland freight transport is projected to grow from today’s 32 000 to 83 000 billion ton-kilometer in 2050. At the same time, authorities are working towards making the overland transport safer, CO₂ neutral and more transport efficient for a more sustainable future. This puts very high demand on efficient, next generation’s transport solutions, in terms of capacity, autonomous functionalities and energy usage. Designing an intelligent energy management strategy that can navigate in traffic has a high potential for improving the energy efficiency and safety without having any requirement for structural changes in the vehicle.

Problembeskrivning

The aim of this project is to develop a controller (EcoPilot) that simultaneously applies the functionalities of autonomous driving and energy-saving controllers. The controller will use dynamic models to predict the energy consumption, highway traffic flow and the own vehicle trajectory. These models will then be used optimize the vehicles performance over a certain time into the future. The result will be a controller that is able to navigate safely in highway traffic while minimize the energy consumption. There is also a possibility to implement the finished controller on miniature electric truck to test its performance in a real scenario.

The project includes the following tasks:

- Develop a dynamic motion model and a powertrain model for the vehicle.
- Design constraints for the vehicle so that it avoids collisions with the traffic.
- Develop an intelligent controller that accomplishes the above-mentioned tasks.
- Demonstrate the results in a simulated environment and/or in real life using a miniature electric truck.

Målgrupp: TKAUT, TKMAS, TKELT, TDAT, TTFY, TKMED
Gruppstorlek: 3-6
Antal grupper: 1
Förkunskapskrav: 
Kontaktperson: nikolce.murgovski@chalmers.se
(Handledare och Examinator kan meddelas senare när projekten är tilldelade)
Projekt Rapport: Svenska eller Engelska