TU Clausthal

Bachelor-, Master- und Doktorandenseminar
des Instituts für Informatik

Development of an Algorithm for Planning Driver-individual Self-Learning Deceleration Strategy in Adaptive Cruise Control

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Introduction

In addition to the purchasing cost, the driving range is currently a significant barrier to the establishment of electric vehicles (EVs). A possible solution to overcome this barrier is using applicationoriented and -optimized driving strategy to extend the EVs' driving ranges. In comparison to the conventional oil-based combustion vehicles (CVs), the EVs have another concept of powertrain by using an electric motor instead of the internal combustion engine. Based on this concept, the EVs have more diverse and flexible deceleration strategies with the help of coasting, mechanical braking or recuperation. Recently, how to realize an energy-efficient deceleration of the EVs becomes a popular issue. To solve this issue, many research projects proposed diverse approaches. However, these approaches ignore the individuality of driver intention, driving route and the vehicle state. An interesting issue is now how to integrate this individuality into the deceleration strategy of the EVs.

Scope

In the scope of this master thesis, an algorithm for planning a driver-individual optimal deceleration strategy of EVs should be developed. This algorithm should satisfy the individual driver's intention consisting of preferred travel time, acceptable energy consumption and desired driving comfort. Additionally, the individual route profile and vehicle state should also be considered in the algorithm. The algorithm will be later used in an intelligent driver-individual adaptive cruise control (ACC) system. The new ACC system should be finally evaluated and benchmarked with the conventional ACC as well as the human driver based on the real measurement data.
The following procedures are included:

- A concept of the algorithm that fulfills the above requirements
- A prototypical implementation based on this concept
- An evaluation and benchmark between the new concept and the conventional approaches

Requirements

All necessary knowledge can be acquired within this work. The following knowledge is advantageous:

- Major of Mechanical Engineering, Mechatronics or Informatics
- Programming experience with MATLAB/Simulink
- Initiative und independent Working

Chances

This project opens the possibility to work in a real-world industrial project. Furthermore, the validalgorithm will be later used as a component in an intelligent driver-individual ACC.

Donnerstag, den 05.04.2018, 15:00 Uhr in Raum 124, IfI (C 10), Arnold-Sommerfeld-Str. 1

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