



Abschlussvortrag Research Track Nimi Jithin

„Prediction of Thermal Disturbance Variables Affecting the Range Of Electric Vehicles“

The change in weather patterns observed throughout the world in previous years is a clear indicator of climate change. Fossil fuels are one of the major contributors towards increased greenhouse gas emissions which is one of the driving factors of climate change. The energy transformation policy proposed by Germany aims at reducing its emissions significantly in the coming decades. Internal combustion engine based vehicles, which are a major source of CO₂ emissions are now being replaced with Battery Electric Vehicles (BEV) which draws on renewable energy resources. Although BEV's present a very attractive alternative to classical fossil fuel based vehicles, they are not devoid of drawbacks namely their limited range. Environmental conditions, battery's state of charge, driving patterns are some of the many factors affecting the range of BEV. The goal of this paper is to predict the ambient outside environment conditions or more concretely the thermal disturbance variables like outside temperature, humidity and solar radiation using model predictive control. Knowledge acquired about these future trajectories can be used to optimize the overall system performance. Machine learning techniques like random forest, weighted k-nearest neighbor, multiple linear regression along with feature engineering techniques are used for a better prediction of these variables. Subsequently the evaluation of the prediction is quantified with a proper evaluation metric like Root Mean Squared Error (RMSE) and Coefficient of Variation Root Mean Squared Error (CVRMSE). Model could predict temperature and velocity with an RMSE of 0.61(°C) and 5.27 (km/h) respectively.

Betreuer der Arbeit: Prof. Dr. Andreas Rausch, Prof. Dr. Rüdiger Ehlers

Datum: Montag, 08. Juni 2020, 17:00 Uhr

Ort: Online-Meeting über BBB

Link: <https://webconf.tu-clausthal.de/b/sim-uc9-rvy>