Examining the Limits of Predicting Human Mobility Behavior

Masterthesis

As Electric Vehicles (EVs) become more popular, their batteries' storage capacity can help to support the electric power grid, which faces instability issues due to increased renewable energy generation. To integrate this capability seamlessly without limiting user mobility, however, foreseeing the mobility patterns of individual users becomes relevant. Yet, not all users adhere to uniform mobility habits and therefore, the performance of predictive algorithms may vary for particular users or user groups.

Enabling an efficient development and operation of smart charging services making use of predictive algorithms calls for a quantification of users' predictability, in particular answering the research questions:

- How accurately can human mobility behavior be predicted?
- What user attributes may predefine a user's predictability?

Attempting to answer these research questions, the following tasks should be conducted in the term of six months:

- Researching the literature to determine the state of the art relevant to predicting human mobility behavior and its limitations
- Descriptive analysis of real mobility data from EV drivers
- Definition of suitable metrics to quantify the predictability of user's mobility behavior
- Implementing and evaluating standard algorithms to predict mobility behavior with respect to the defined metrics
- Documenting all elaborated steps and findings in a written manuscript

If this topic sounds interesting to you, please send a short written application, your curriculum vitae, and your latest certificate of grades via e-mail to Karl Schwenk (karl.schwenk@mercedes-benz.com). Note that the master thesis is associated with a six-month employment at Mercedes-Benz AG in Sindelfingen, Germany with an earliest start in October 2023.