

BA, SA or IDP

Development of a Data Pipeline for Locating Charging Hubs for Battery Electric and Autonomous Trucks

Motivation

Increasing climate protection requirements and a worsening shortage of drivers pose major challenges for logistics, especially in long-haul transportation. One concept that addresses both problems simultaneously is hub-based freight transport, in which highway sections are handled autonomously, but drivers continue to transport goods on the urban parts of the route to the hubs at the highways. Hubs are also an ideal location to place charging infrastructure for battery electric trucks, which can then charge while waiting on the next transport order.

A central question in this system is where to locate these hubs for switching between manual and autonomous transport. Ideally, existing infrastructure is reused to lower the costs for building the hub system. Thus, hubs can be located at existing parking facilities, rest areas, or logistics centers near the highway.

Thesis topic

The aim of this thesis or IDP is to build a pipeline that uses publicly available data (e.g., from OpenStreetMap) to create a data set with possible locations for the mentioned charging hubs. For this, potential location types (parking facilities, logistics centers, ...) should be identified under consideration of the required infrastructure, which includes in addition to parking spaces also a sufficient connection to the electricity grid. You are encouraged to contribute your ideas and to enrich the data set with additional relevant information like grid connection costs.

What you get

- The possibility to benefit from a pioneering role and to contribute to the future of logistics
- The opportunity to implement your own ideas
- In case of excellent working performance: possibility to co-author a scientific paper (e.g., in *Data in Brief*)



Work packages

- Familiarization with the concept of electric and autonomous trucks in transfer hub-based transport
- Development of a concept for possible location types and outline of required input data
- Research on available data sources
- Implementation of the data pipeline
- Documentation of results and code base

Requirements

- Passion for e-mobility and energy-transition-accelerating technologies
- Initial programming experience in Python is advantageous
- Independent and structured way of working
- Very good German or English language skills

I am looking forward to receive your complete application with a CV, current overview of grades, a brief motivation, and any other documents. **The thesis or IDP can be conducted either in German or English.**

Contact

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Start date

From now

Workplace

FTM (Garching Forschungszentrum) or remote