

The chair of Energy Process Engineering and Conversion Technologies for
Renewable Energies offers a Master thesis within the following topic:

***OpenStreetMap based route synthetization approach for
service sector mobility fleets***

Wissenschaftlicher Mitarbeiter
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The offered master thesis builds on a concluded research project, which analysed the electrification of waste disposal vehicles in Berlin. Inside the project a vehicle route synthetization approach based on the Open Source routing Machine and Vroom was developed, compare Schmid et al ¹. The approach uses address data of individual vehicle stops, finds the optimal route and its distances between all stops. Finally, it generates a simple vehicle profile with vehicle speed and acceleration values. It is available on GitHub ².

Within the offered master thesis, a detailed literature review on state-of-the-art route profile synthetization approaches shall be done. Next optimization possibilities of the approach using OpenStreetMap and stochastic concepts shall be identified and implemented. This can be the integration of traffic lights or speed limits on individual route stages to make the synthesised route profile more realistic and dynamic. Finally, the developed approach shall be analysed using an energy demand simulation ³ with real-life waste disposal vehicle address data (provided by the supervisor) and compared to other approaches identified in the literature and the original approach.

The thesis is divided in following steps:

- Detailed literature review on state-of-the-art route profile synthetization approaches
- Familiarization with implemented synthetization approach (Python & Methodology)
- OpenStreetMap: What kind of data is available, how can it improve and be integrated into the route synthetization
- Python: Development of improved OSM based route synthetization approach and integration of stochastic concepts
- Comparative study of current, your improved and literature based approaches using an energy demand simulation with real-life waste disposal vehicle address data

Key requirements:

- High degree of independent and responsible work
- Very good programming skills (preferable Python) and object-oriented approaches
- Very good knowledge or high motivation to learn the usage of OpenStreetMap data

¹ <https://depositonce.tu-berlin.de/handle/11303/11818>

² <https://github.com/fabmid/Refuse-Collection-Vehicle-Route-Optimization>

³ <https://github.com/fabmid/Refuse-Collection-Vehicle-Energy-Demand-Simulation>

- Experience in system modelling and simulation