

## IVT – Assignments

Head: Prof. Dr. Kay Axhausen

Topic: Simplifying OSM networks for an easy reallocation of road space

Assistant: Lukas Ballo

Registration: [www.ivt.ethz.ch/en/studies/downloads/assignments.html#registration](http://www.ivt.ethz.ch/en/studies/downloads/assignments.html#registration)

Much work in transport research relies on accurate and widely available street network data. OpenStreetMap is available globally in a unified format and with no usage restrictions. However, in most places, it provides too much detail, making it complex and computation-intensive to model streets and travel. Therefore, many applications such as transport models or street network software perform some simplification prior to using the data.

However, although the exact simplification algorithm applied has potentially a large impact on the resulting conclusions, there is currently no comprehensive standard guiding how it should be done. In addition, researchers need to spend valuable time reinventing a solution to the same challenge.

In your work, you will review and compare the approaches that are currently used and compare their performance. Finally, you will publish your own open source software, providing an easy simplification of OpenStreetMap data for other researchers and practitioners. As a benchmark, your solution should be able to abstract a street network into nodes and edges where each intersection is represented by exactly one node and each street segment by exactly one edge, while preserving as much information as possible.

The tasks are (depending on final format/group size):

- Literature review of existing approaches for OSM network simplification
- Choosing meaningful quality metrics
- Comparing the performance and quality of the different approaches
- For master thesis:
  - o Developing your own simplification process using a combination of existing and possible simplification approaches
  - o Publishing your solution as an open-source Python package (or contributing your work to the SNMan software: <https://github.com/lukasballo/snman>)

Recommended lectures and skills:

- Experience with Python: GeoPandas, Networkx

Credits: 8-24 ECTS