

## IVT – Assignments

Head: Prof. Dr. Kay Axhausen

Topic: Computer vision for measuring the allocation of road space in any city in the world

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)

Modelling sustainable mobility transitions at scale requires a precise knowledge of the present allocation of road space, as well as the overall street space. However, limited possibilities of acquiring this data pose a substantial limit to scalable modelling approaches. Although OpenStreetMap provides useful approximations in some places, its level of detail is often not sufficient, especially in emerging countries. In this work, you will develop a process for automated collection of data about streets and road space from globally available geo data such as public satellite images and OpenStreetMap data. You will utilize methods of computer vision to extract features from the satellite imagery and match them onto a network of street centerlines.

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

- Literature review on existing approaches to detect the allocation of road space using computer vision
- Implement a process to detect the allocation of road space from public satellite images, and OSM data (+possibly street-level imagery)
- Show the detailed allocation of road space for multiple cities from high-income and emerging countries, e.g., Zurich and Nairobi
- Compare your results with the existing process in SNMan and interpret the differences
- Integrate your work into the Python open-source software SNMan:  
<https://github.com/lukasballo/snman>

Recommended lectures and skills:

- GIS I/II/III
- Computer vision
- Python programming skills

Credits: 8-24 ECTS, the exact scope will be adjusted to reflect the credits