Leibniz-Institut für ökologische Raumentwicklung

Call for Master Thesis Opportunity

Topic: <u>Quantifying urban greening along urban mobility networks with open source street-level images</u>

Masterarbeit Thema: Quantifizierung der städtischen Begrünung entlang städtischer Mobilitätsnetzwerke (öffentlicher Nahverkehr, Fahrradwege, Fußwege) unter Verwendung offener Plattformen für annotierte Straßenbilder

Keywords: Big Data, Open Data, Mapillary, Street-Level-imagery, Machine learning, Urban Mobility

Background:

Extraction of urban greening at smaller scale is often remain difficult in absence of precise and updated data sources. Several efforts have been made to extract detail geometrical information in combination of image detection and machine learning approaches. However, with the promise of open source platforms still need to be investigated further in order to conceptualize the potentials of automated workflow in use of open data.

Objective:

Exploring the possibilities to quantify urban greening along urban mobility networks (public transit, bicycle route, walk way) using open data platforms for (annotated) street-level images

Specific Tasks:

- Systematic Literature review
- Extraction of relevant geolocated images and their annotations (vegetation, buildings and others as percentage, see screenshots) using open source API (example: https://www.mapillary.com/developer/api-documentation/)
- Development of an automated workflow for the extraction process that can support in geospatial analysis of mobility networks in urban scale
- Test the workflow for one or more pilot cities in different context and function and make the extracted dataset available for further research

Expected Output:

- State of art in using open data for extraction of urban green features from street-level images
- Prototype toolbox (scripts) for automated extraction of information on urban green features
- Results on case studies: Urban green provision along urban mobility networks
- Challenges and limitation to potential application of open data platform in assessment of urban public infrastructure to promote eco-friendly urban mobility
- A written master thesis

Key Requirements:

Familiar with open data platforms and willingness to explore on large spatial data extraction workflow using GIS environments. Some knowledge on scripting and statistical languages like Python, R as well as good English skills for review of international literature.

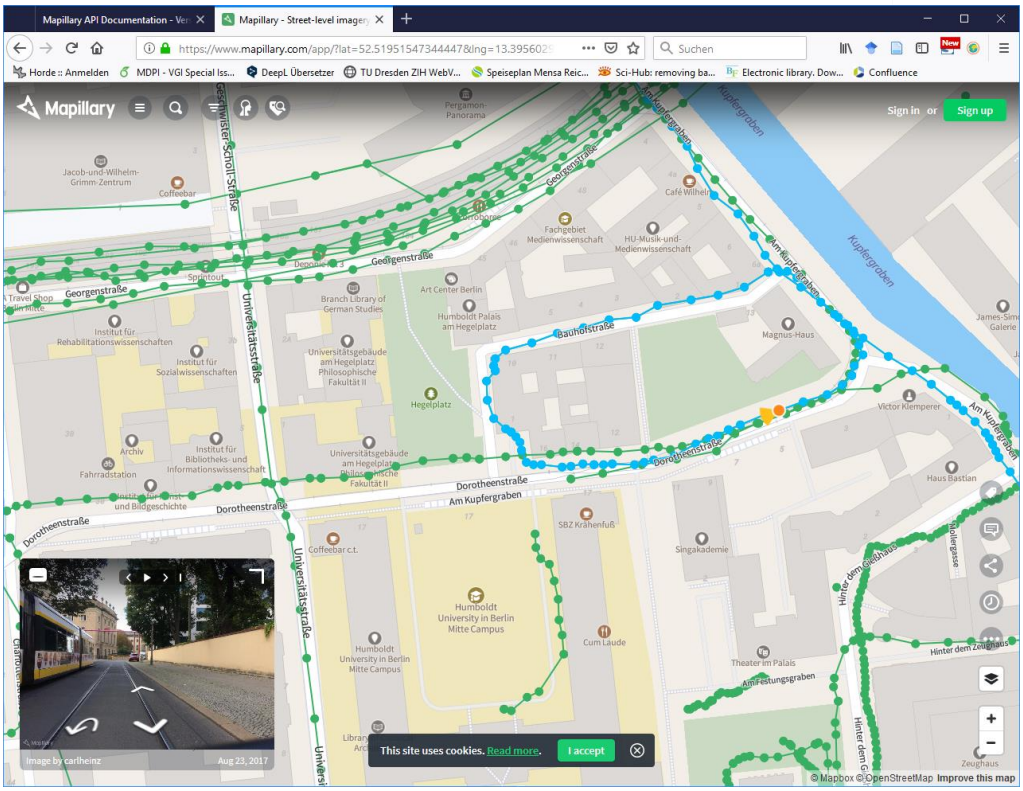
Time to Begin:

At earliest possible date (2021)

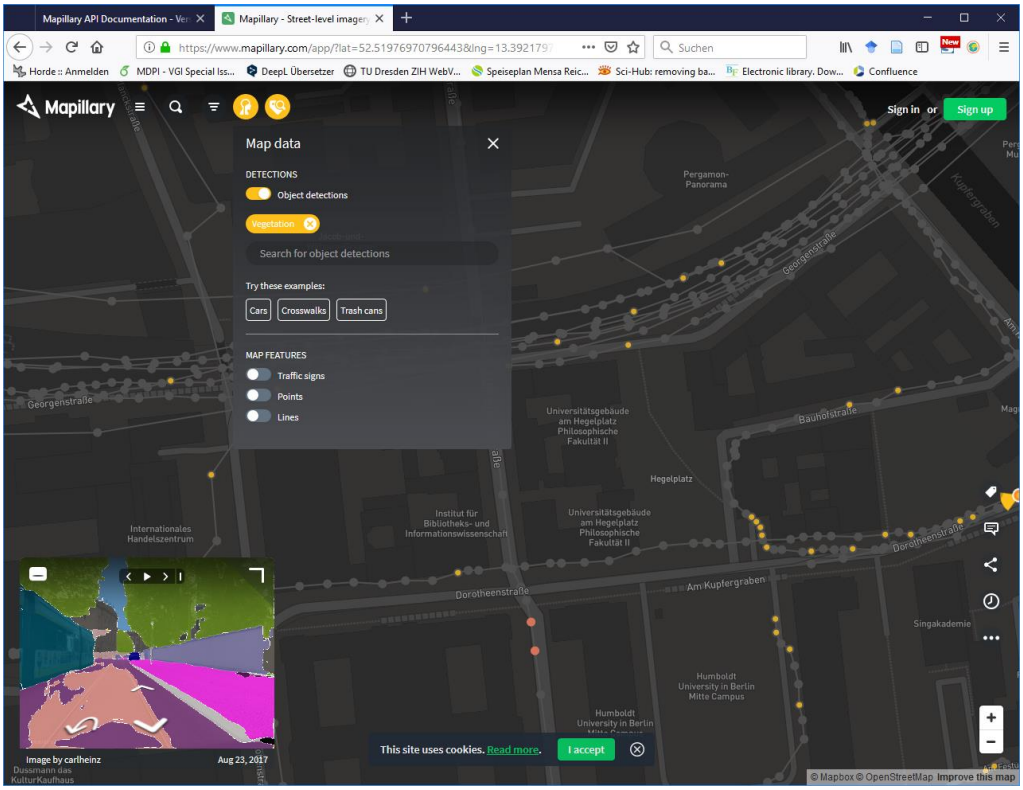
Contact Person at IÖR:

Dr. Robert Hecht, Tel. +49-0351/4679-248, E-Mail: r.hecht@ioer.de,

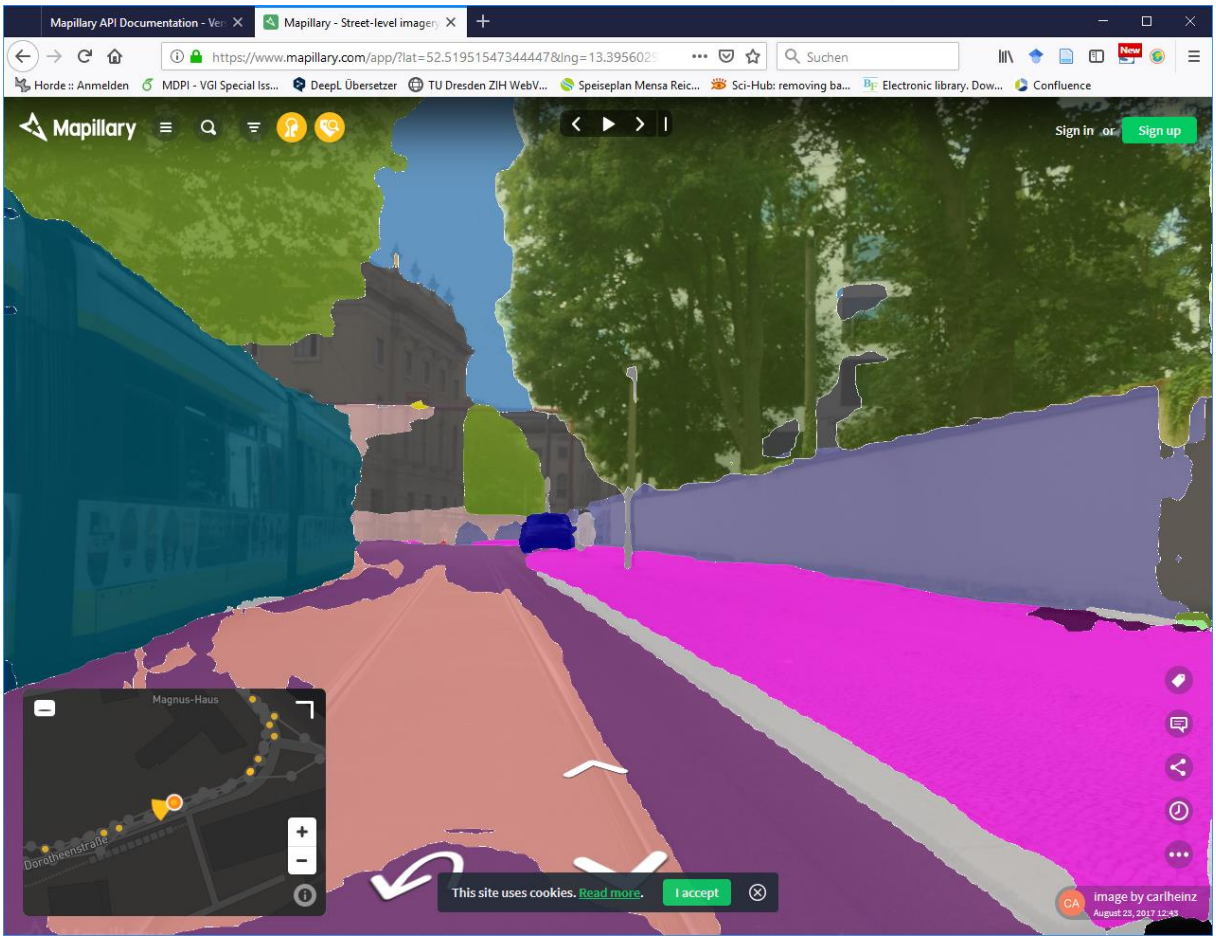
Dr. Sujit Sikder, Tel: +49-0351/4679-273, E-Mail: s.sikder@ioer.de



Mapillary Landing Page (Source: www.mapillary.com)



Images with vegetation features (Source: www.mapillary.com)



Enlarged Image with vegetation features (Source: www.mapillary.com)