



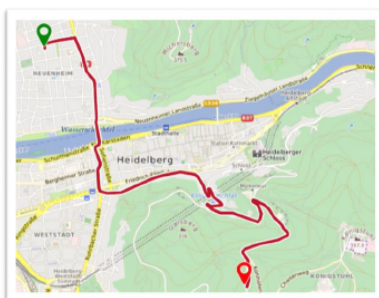
HEIDELBERG INSTITUTE
FOR GEOINFORMATION
TECHNOLOGY

Leveraging the potential of User Generated Geoinformation for sustainable Smart Cities

heigit.org

Contact:
zipf@heigit.org
Twitter: @GIScienceHD
github.com/GIScience

Core Areas



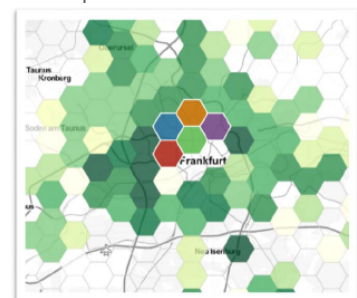
Smart Mobility

Location-based Services
& Navigation



Geoinformation for Humanitarian Aid

Supporting Disaster management



Big Spatial Data Analytics

Data Mining &
Machine Learning
using open GI

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We offer



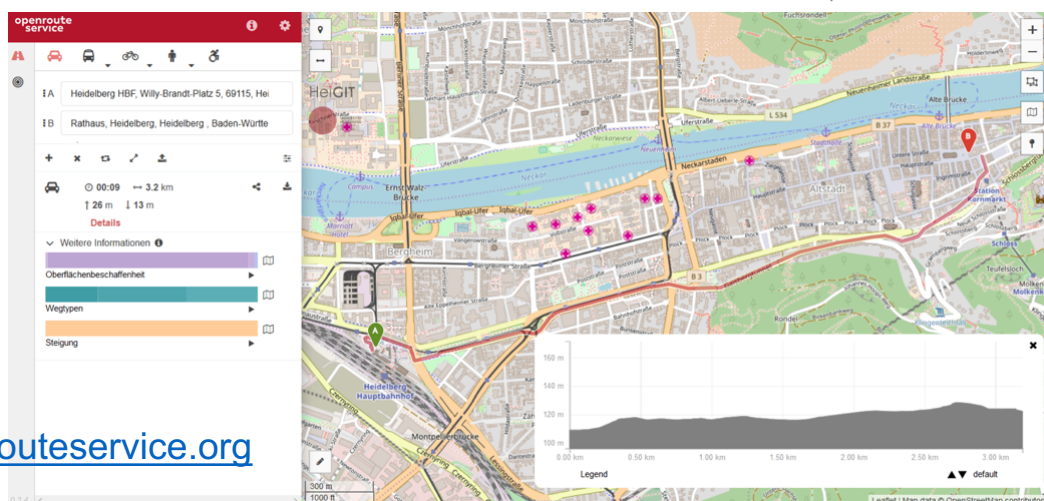
- Service APIs for LBS/Routing & OSM Quality Analysis
- Development & improvement of tools, services, methods & data
- Data products (based on OSM & other data)
- Research
 - on new methods, workflows & services
 - also via Heidelberg University, GIScience Research Group

Around these topics:

- OpenStreetMap & user generated geodata processing & analysis: esp. data quality assessment & enhancement
- LBS, Routing, Navigation
- Disaster management, humanitarian aid, health & environment


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openroute service




openrouteservice.org

<http://heigit.org>






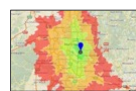
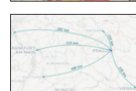





LBS ecosystem:



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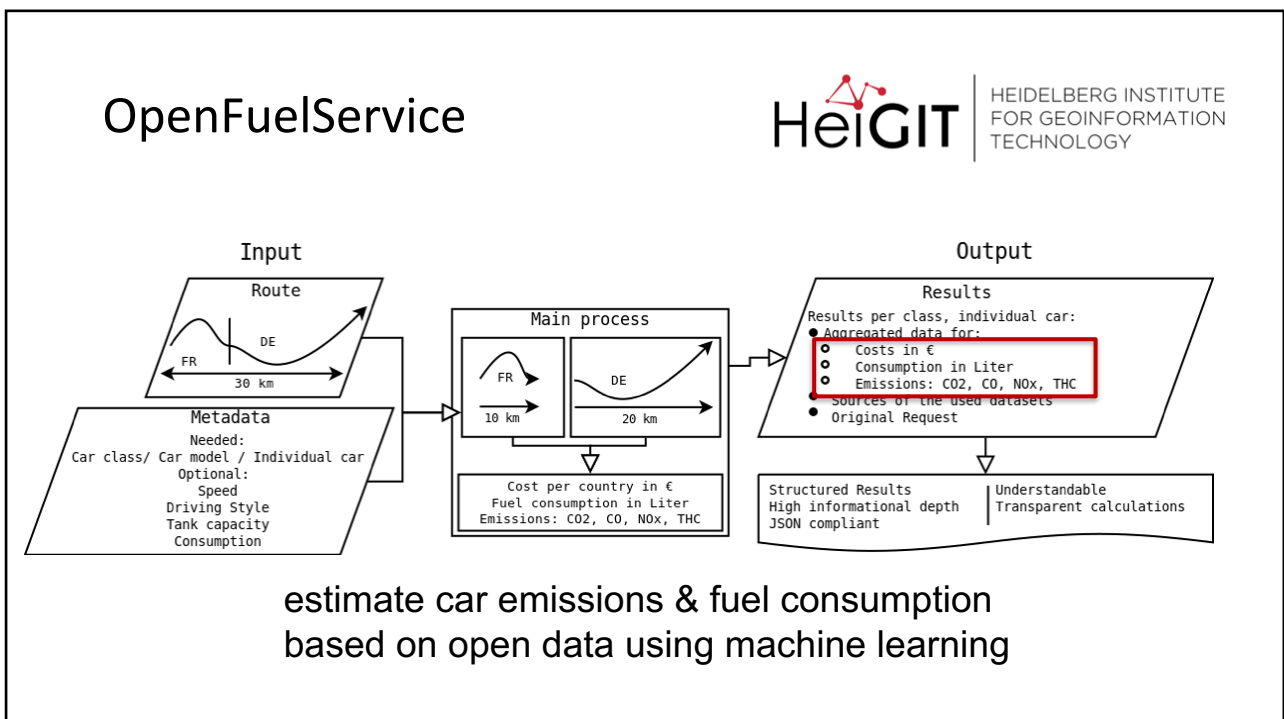
Service APIs

- /directions     
- /isochrones
- /matrix 
- /geocoding 
- /poi 
- /maps 
- /optimize 

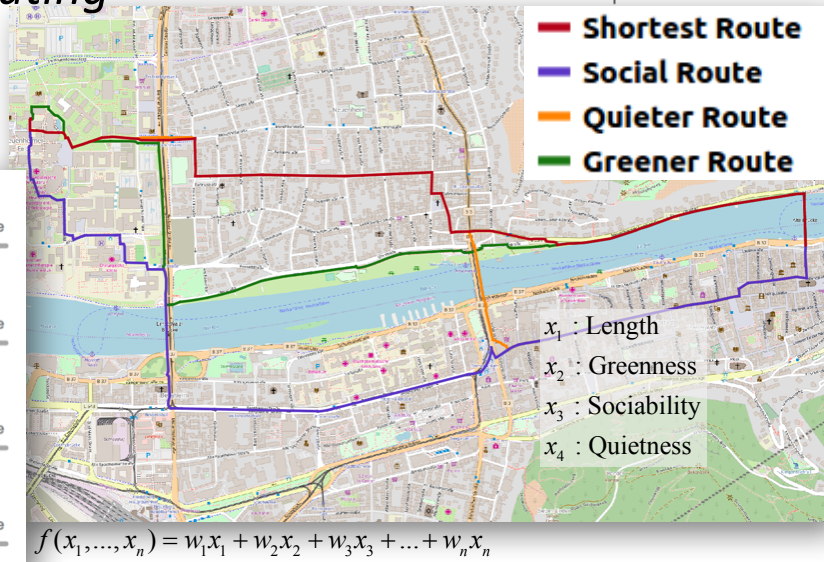
Libraries & client frameworks:

- Python
- R
- JavaScript
- Java
- QGIS: ORStools
- Realtime OSM data extraction
- Disaster Routing
- Maps.openrouteservice.org
- ...

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Multi-Criteria Personalized Pleasant Routing



- Prefer shorter routes
 1/10 score 5/10 score 10/10 score
- Prefer streets with green areas
 2/10 score 10/10 score
- Prefer streets with social places
 1/10 score 5/10 score 10/10 score
- Avoid noisy streets
 2/10 score 10/10 score

Landmark Navigation in ORS



- Calculate Landmark candidates from OSM et al.
- Generate natural speech instructions for navigation
- LM Saliency calculation based on

- Type of feature
 - hotel, shop, artwork,...
- Uniqueness in region
 - type based
- Relation to decision point
 - before/after turn, along
 - proximity
- Visibility



Rousell A., Zipf A. (2017): [Towards a landmark based pedestrian navigation service using OSM data](#). ISPRS Internat. Journal for Geo-Information. 6(3), doi:10.3390/ijgi6030064

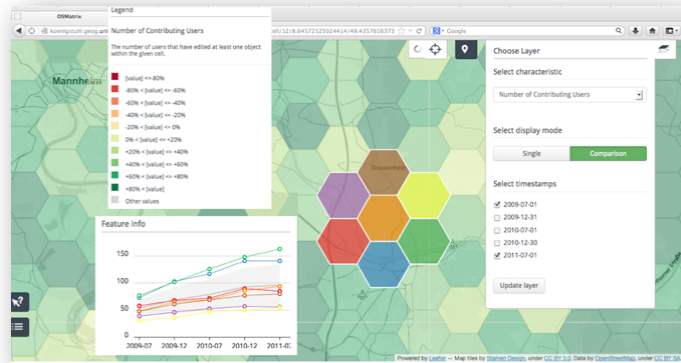
Analysing Data Quality of user generated Geoinfo



- Completeness
- Lineage
- Logical Consistency
- Positional Accuracy
- Attribute Accuracy
- etc...

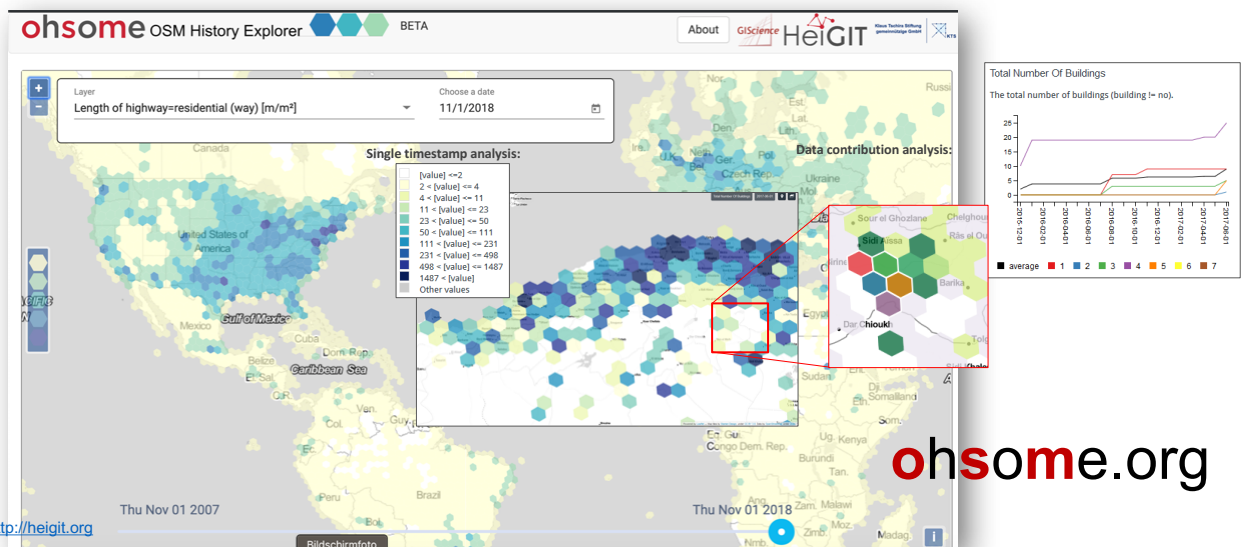
Our framework:

ohsome.org
OSM-HISTORY
ANALYTICS PLATFORM



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ohsomeHeX: OSM History Explorer

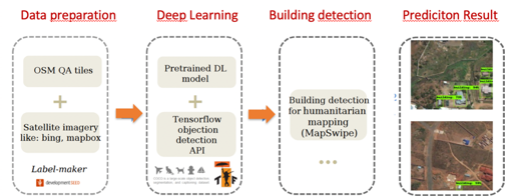


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Improving OSM Data Quality

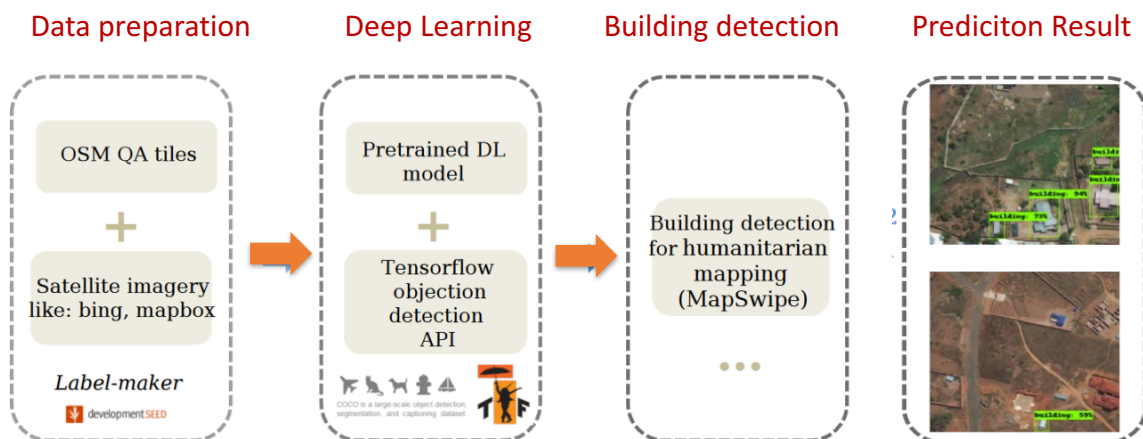


- Generate better data from OSM through innovative methods & technologies
- Examples:
 - DeepVGI framework
Deep Learning fusing OSM, Remote Sensing, MapSwipe microtasking etc.
 - Research projects & prototypes using deep learning combining OSM, Social Web, Remote Sensing, Crowdsourcing etc.
 - Derive data products (e.g. OSMLanduse)



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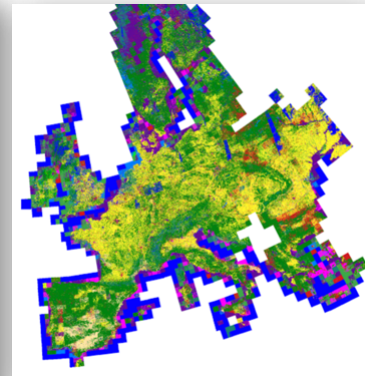
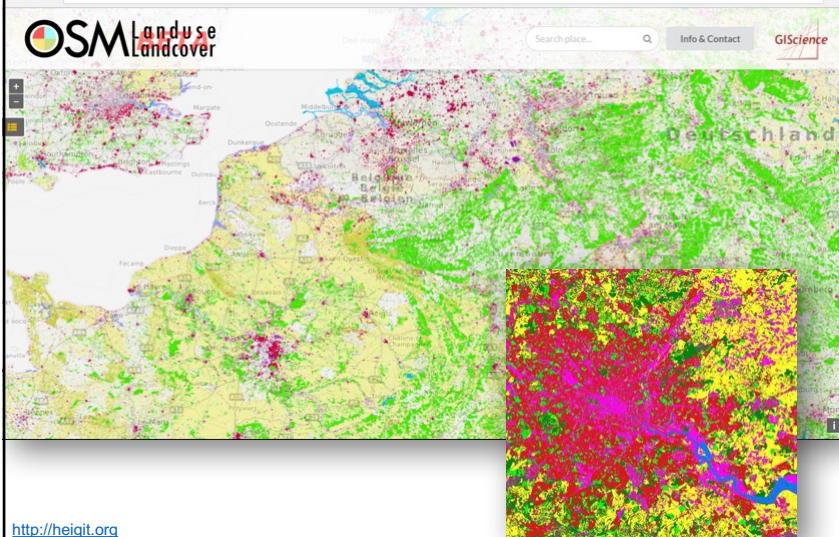
DeepVGI -



Deep learning combining multiple spatial data sources
e.g. for Building (type) Detection

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Landuse data from OSM OSMlanduse.org



- Mimic CORINE classification globally & up2date
- Use machine learning with OSM & remote sensing imagery
- 10 meter resolution for Europe

Contact



- Prof. Dr. Alexander Zipf
 - Chair of GIScience, Heidelberg University
 - Managing Director at HeiGIT gGmbH



zipf@uni-heidelberg.de / zipf@heigit.org

<https://uni-heidelberg.de/gis>

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Berliner Straße 45, 69120 Heidelberg, Germany

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