

GeoPython 2018

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Areas-of-Interest in OpenStreetMap and Python

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Background

- Master thesis by Philipp Koster on “Big Geospatial Data Analytics and Processing Using Python and Open Source Tools“
- Use case (1 of 2) "Areas-of-Interest" (AOI) with OpenStreetMap data
- Combines research on Spatial Analytics and Open Data @GeometaLab



Light orange style for “highly frequented and worth seeing areas“ in Basel on Google Maps

About the Thesis (Part Use Case 1 of 2)

Implement Areas-of-Interest (AOI) with a robust and open source relational database (and explore it's limits)

AOI defined here as "Urban area at city or neighbourhood level with a high concentration of POI, and typically located along a street of high spatial importance"



AOI with PostgreSQL + PostGIS

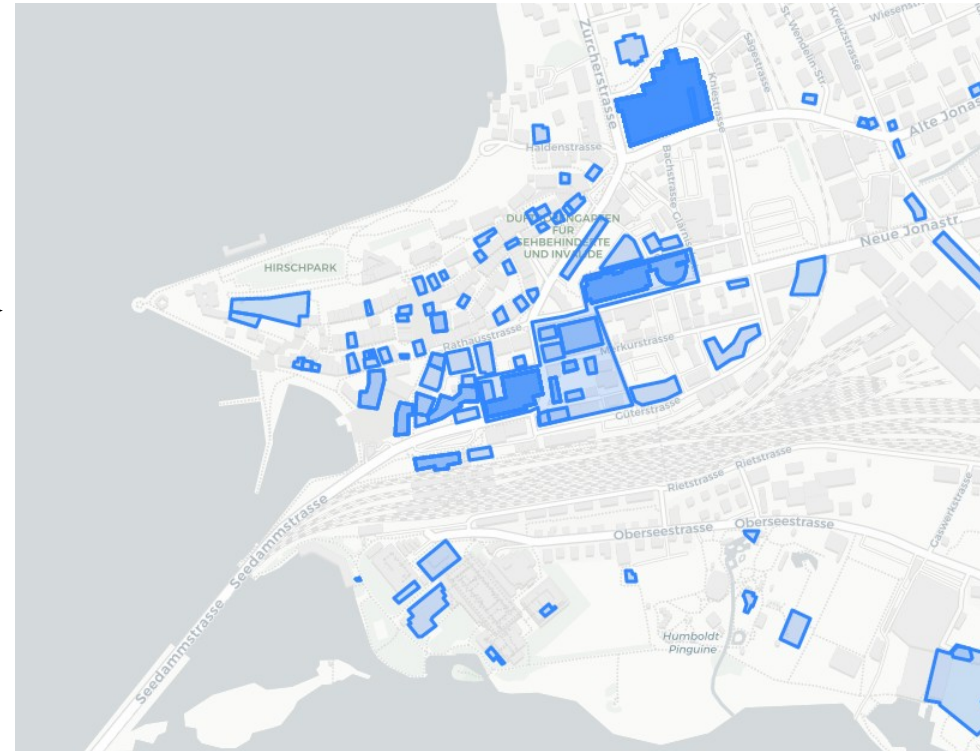
1. Select POI by tags

```
shop_tags = ['mall', 'bakery', 'beverages', 'butcher', 'chocolate', 'coffee',  
'confectionery', 'deli', 'frozen_food', 'greengrocer', 'healthfood',  
'ice_cream', 'pasta', 'pastry', 'seafood', 'spices', 'tea', 'department store',  
'supermarket', 'bag', 'boutique', 'clothes', 'fashion', 'jewelry', 'leather',  
'shoes', 'tailor', 'watches', 'chemist', 'cosmetics', 'hairstylist',  
'medical_supply', 'electrical', 'hardware', 'electronics', 'sports',  
'swimming_pool', 'collector', 'games', 'music', 'books', 'gift', 'stationery',  
'ticket', 'laundry', 'pet', 'tobacco', 'toys']
```

```
amenity_tags = ['pub', 'bar', 'cafe', 'restaurant', 'pharmacy', 'bank', 'fast_food',  
'food_court', 'ice_cream', 'library', 'ferry_terminal', 'clinic', 'doctors', 'hospital',  
'pharmacy', 'veterinary', 'dentist', 'arts_centre', 'cinema',  
'community_centre', 'casino', 'fountain', 'nightclub', 'studio', 'theatre',  
'dojo', 'internet_cafe', 'marketplace', 'post_office', 'townhall']
```

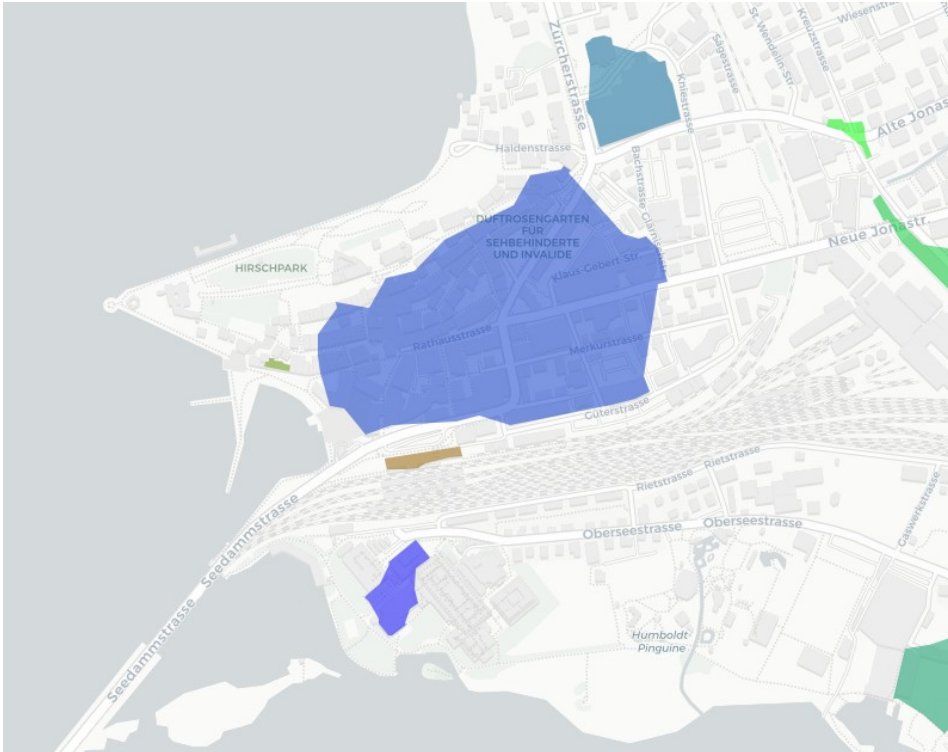
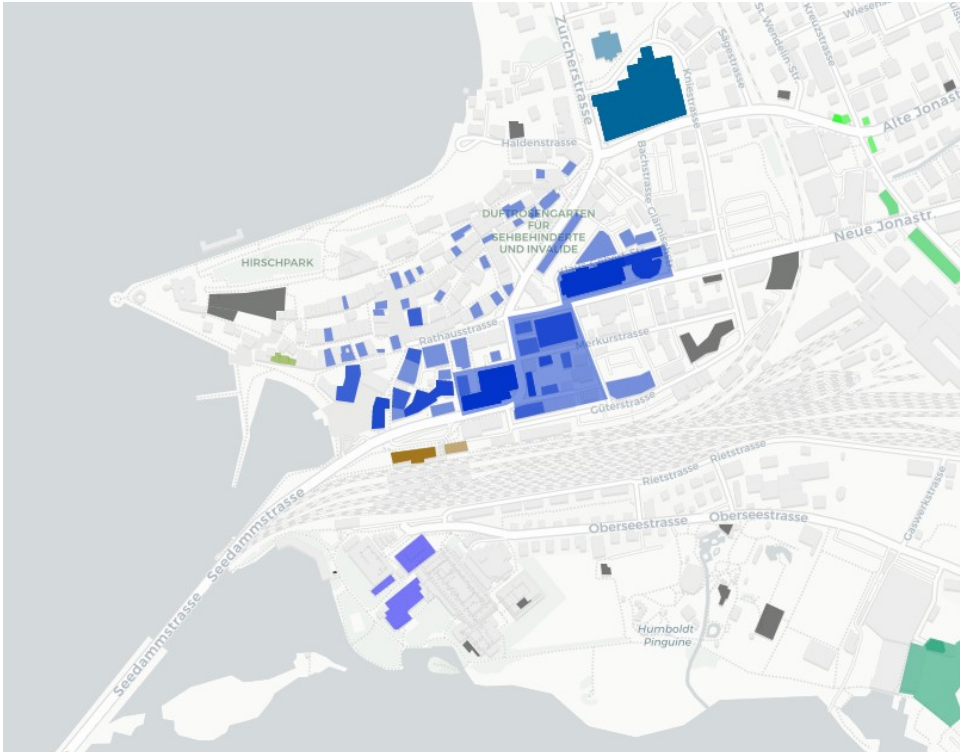
```
leisure_tags = ['adult_gaming_centre', 'amusement_arcade', 'beach_resort',  
'fitness_centre', 'garden', 'ice_rink', 'sports_centre', 'water_park']
```

```
landuse_tags = ['retail']
```



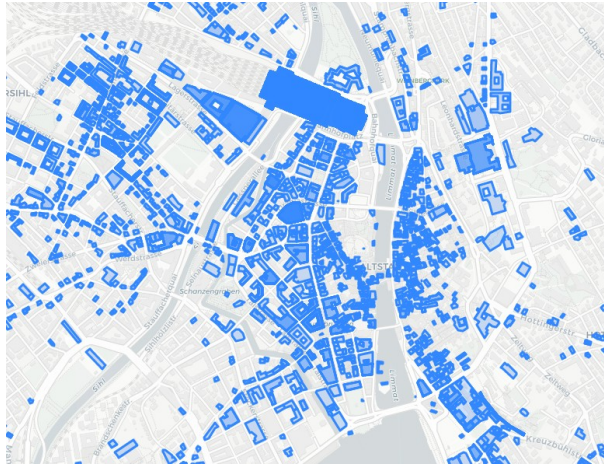
AOI with PostgreSQL + PostGIS (cont'd)

3. Concave hull around clusters

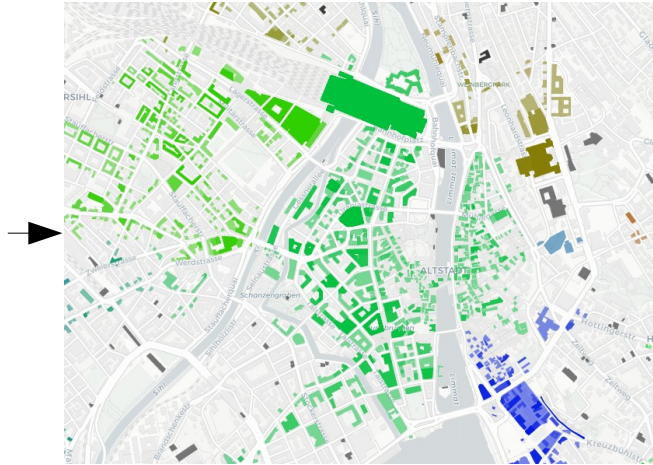


AOI of Zürich

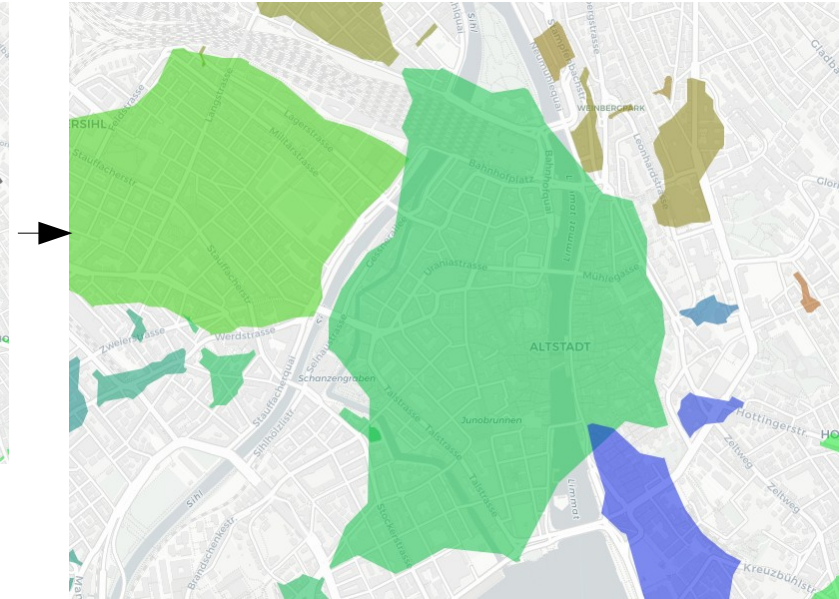
1. POI



2. Cluster



3. Concave Hull



“Network Centrality” Algorithm

1. Select street network (processed with OSMnx, Python lib for street networks)



“Network Centrality” Algorithm (cont’d)

2. Calculate network centrality (with OSMnx)



Status and Next Steps

- Status: Experimental Webapp with Jupiter
- Finish AOI with PostgreSQL + PostGIS
- Do the same with Apache Spark + Python



- Final results to be expected September 2018
- Next report July at SotM 2018 <https://2018.stateofthemap.org>





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Questions? Thoughts?

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Credits: Philipp Koster

