A) Calculating the location value of pharmacies at Zurich

B) Finding best places for new pharmacies at Zurich

The Value of the Location Value

The location value for pharmacies is key figure for many decision makers like pharmacy investors, pharmacy chains and the local government.

Among many factors that influence the revenue of pharmacies, the location ist the most important one.

But there is no fix rule to calculate this value. The location value is important but unknown.

Data acquisition and cleaning

Locations include category names, longitude and latitude, name and address.

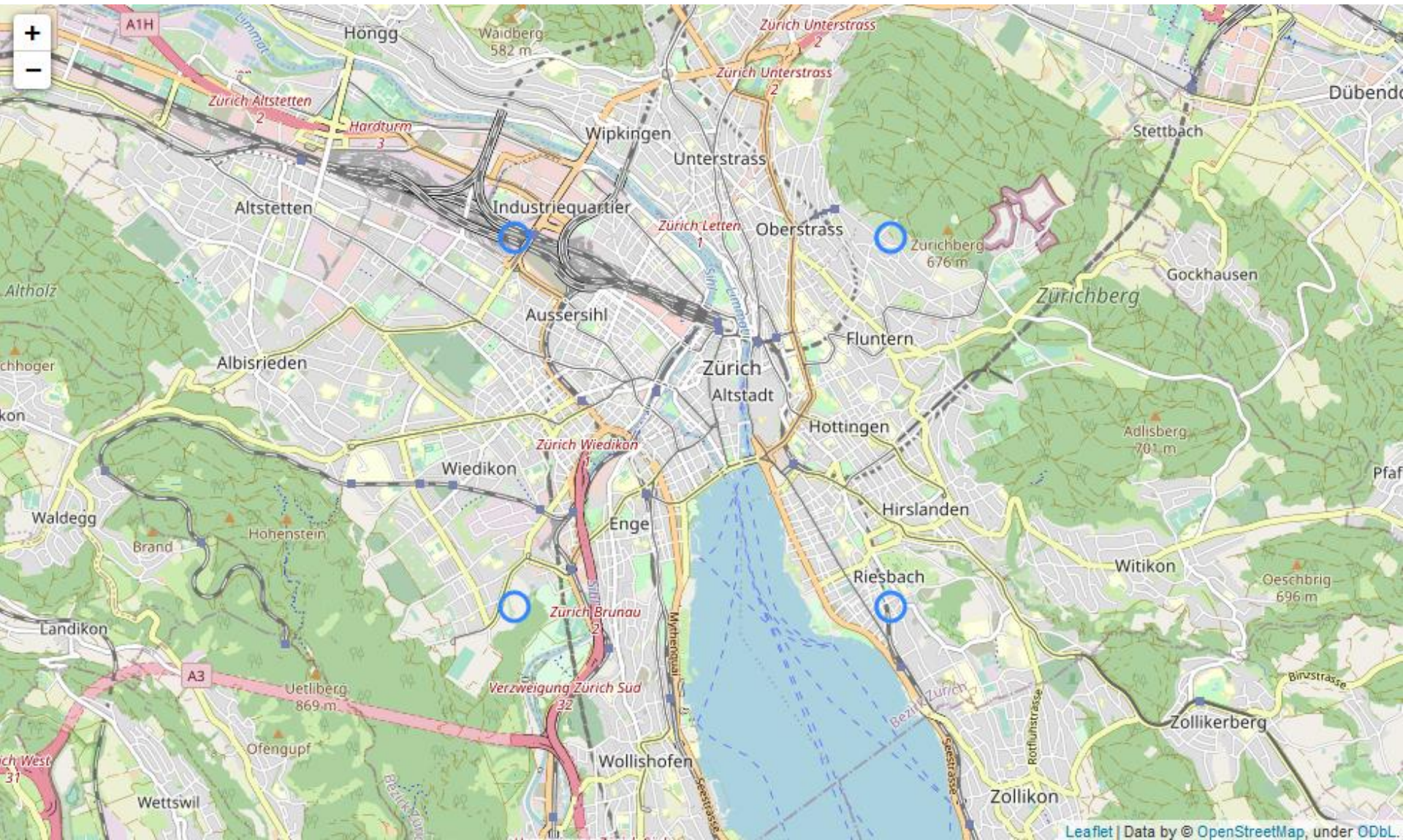This information is from Foursquare.

Foursquare results never have more than 50 objects.
- narrow are to search for results
- search for each category separately

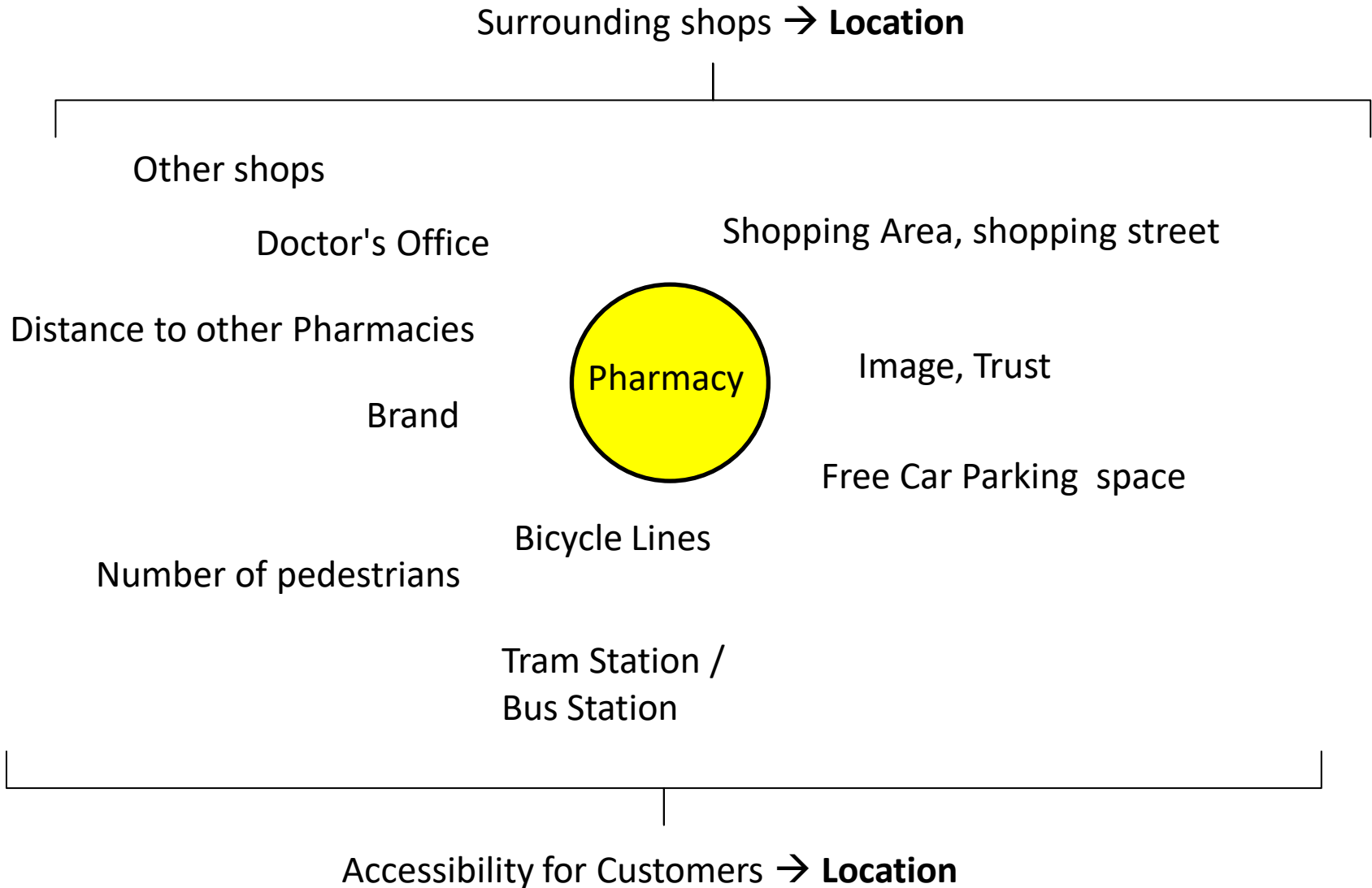Duplicate records from Foursquare were eliminated.

Methodology

1. Define a research area. The research rectangle is marked by four circles.

Methodology

2. Identify influences on the location value.

Surrounding shops → **Location**

Other shops

Doctor's Office

Shopping Area, shopping street

Distance to other Pharmacies

Pharmacy

Image, Trust

Brand

Free Car Parking space

Bicycle Lines

Number of pedestrians

Tram Station /
Bus Station

Accessibility for Customers → **Location**

Methodology

3. Identify positive and negative influences

Shops that add value
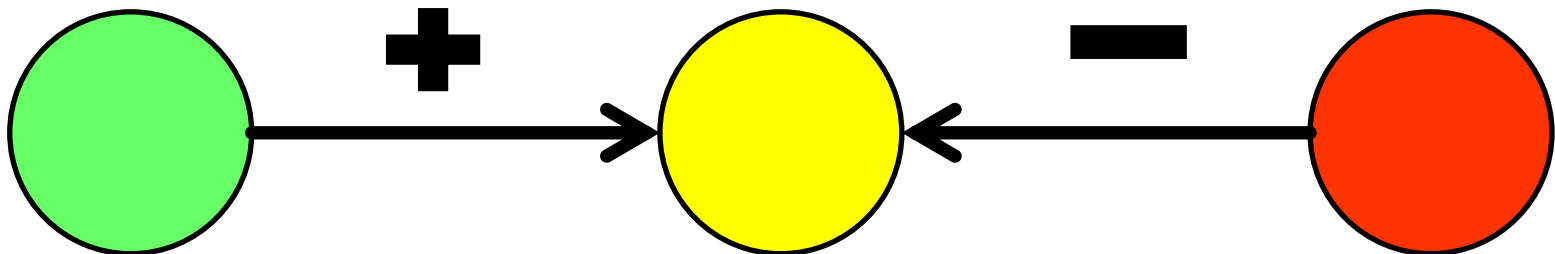
Shops that take value

-Beauty Saloons
-Doctor Offices
-Hospitals

-Other Pharmacies
-Perfume Shops

What influences the location value for Pharmacies?

Accessibility for Customers → **Location**

Methodology

4. Create attribute for color

green: positive force
yellow: negative force, competition
red: negative force

|	categoryId	categoryname	dotcolor
0	4bf58dd8d48988d10f951735	Pharmacy	yellow
1	52f2ab2ebcbc57f1066b8b23	Perfume Shop	red
2	58daa1558bbb0b01f18ec206	Medical Supply Store	red
3	4bf58dd8d48988d177941735	Doctor s Office	green
4	54541900498ea6ccd0202697	Health Beauty Service	green
5	5745c2e4498e11e7bccabdbd	Drugstore	green
6	4bf58dd8d48988d10c951735	Cosmetics Shop	green

Methodology

5. How to calculate the location value part 1

Influencers
and Distance
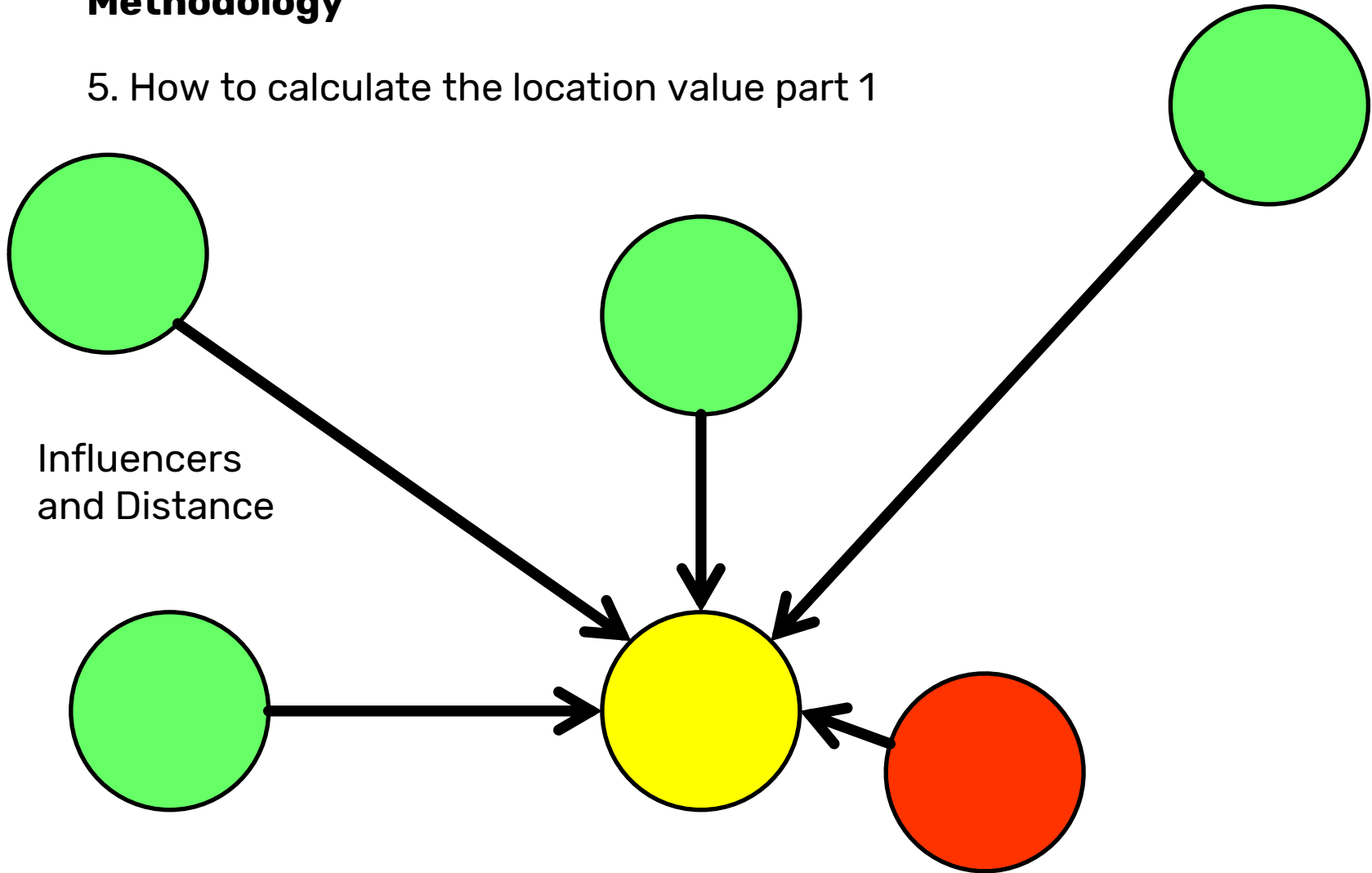
Is this Pharmacy in a good or bad location?

Methodology

5. How to calculate the location value part 2
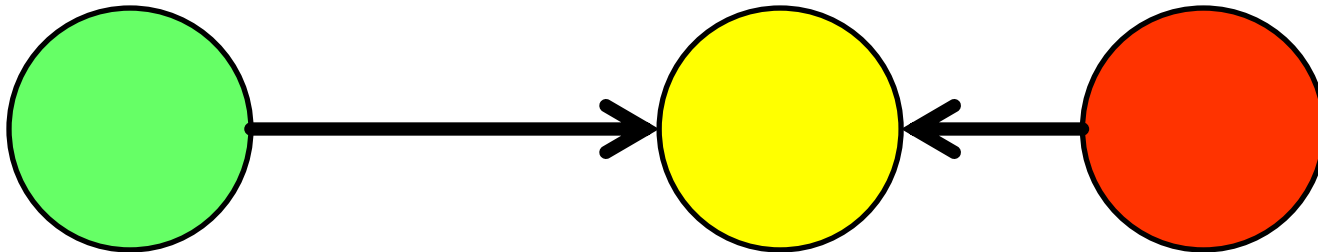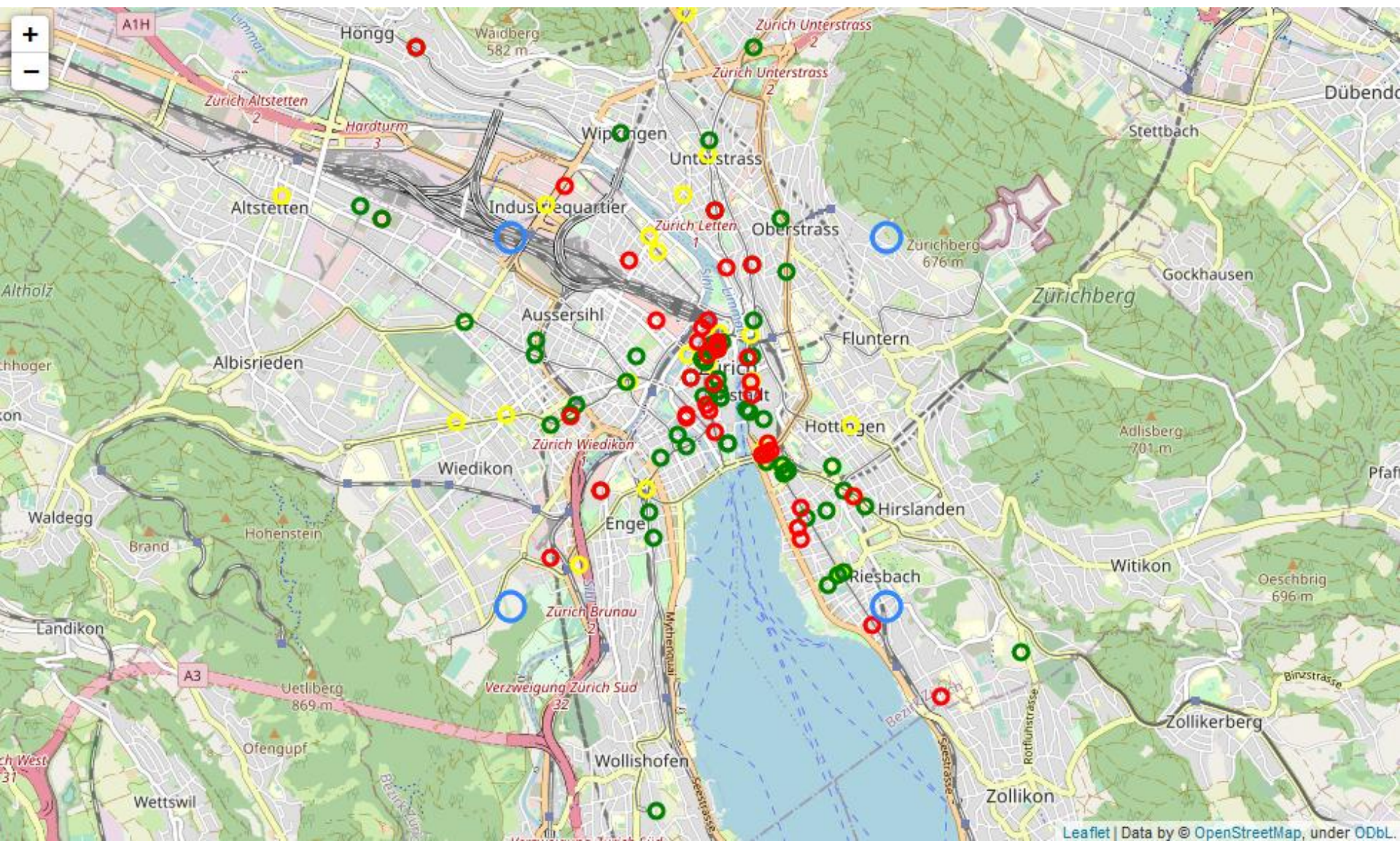
Calculating the Location Value
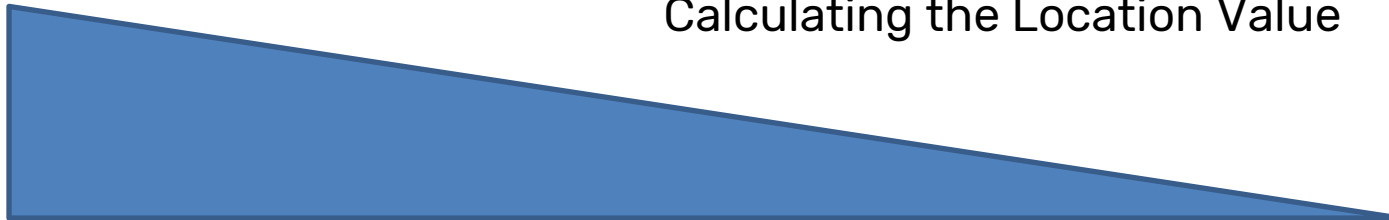
After trying Newton's Gravitation model, I decided to use a linear model.
A distance of zero has a force of 1 (or -1 in the negative case).
A distance of 400 meters of more has a force of 0

The sum of the forces is the total location value of the pharmacy.

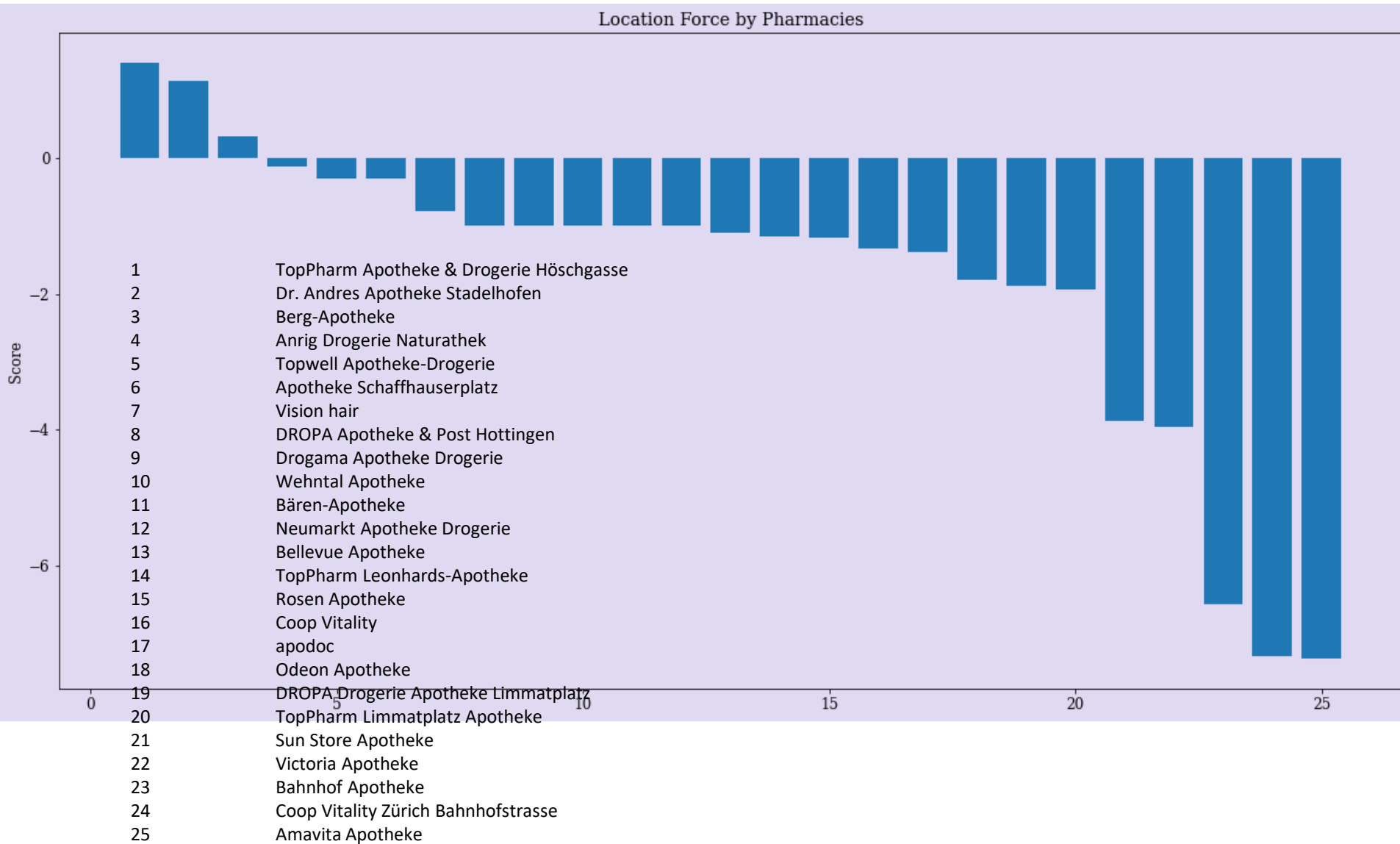# Implementation – the situation at Zurich

Yellow circles are existing pharmacies.

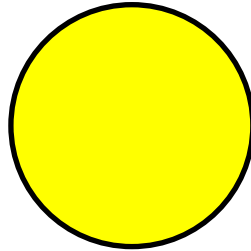# Result (A) - Location value calculated for pharmacies

	name	address	city	categories	lat	lng	dotcolor	force
17	TopPharm Apotheke & Drogerie Höschgasse	Höschgasse 50	Zürich	Pharmacy	47.357833	8.554642	yellow	1.400480
10	Dr. Andres Apotheke Stadelhofen	Goethestrasse 22	Zürich	Pharmacy	47.366116	8.548078	yellow	1.127280
8	Berg-Apotheke	NaN	Zürich	Pharmacy	47.373271	8.529176	yellow	0.318340
13	Anrig Drogerie Naturathek	Forchstrasse 26	Zürich	Pharmacy	47.363991	8.556103	yellow	-0.135609
9	Topwell Apotheke-Drogerie	Tessinerplatz 10	Zürich	Pharmacy	47.364583	8.531195	yellow	-0.301005
19	Apotheke Schaffhauserplatz	Seminarstrasse 1	Zürich	Pharmacy	47.391778	8.538677	yellow	-0.309384
20	Vision hair	Nordstrasse 89	Zürich	Pharmacy	47.388483	8.535689	yellow	-0.790753
12	DROPA Apotheke & Post Hottingen	Freiestrasse 55, Beim Hottingerplatz	Zürich	Pharmacy	47.369764	8.555808	yellow	-1.000000
94	Drogama Apotheke Drogerie	NaN	Zürich	Pharmacy	47.370014	8.508480	yellow	-1.000000
21	Wehntal Apotheke	NaN	NaN	Pharmacy	47.403184	8.536066	yellow	-1.000000
16	Bären-Apotheke	Kalkbreitestrasse 131	Zürich	Pharmacy	47.370567	8.514387	yellow	-1.000000
95	Neumarkt Apotheke Drogerie	Altstetterstrasse 145, Neumarkt Altstetten	Zürich	Pharmacy	47.388364	8.487370	yellow	-1.000000
1	Bellevue Apotheke	Theaterstrasse 14	Zürich	Pharmacy	47.366755	8.545925	yellow	-1.100178
11	TopPharm Leonhards-Apotheke	Stampfenbachstrasse 7	Zürich	Pharmacy	47.377046	8.543790	yellow	-1.149204
3	Rosen Apotheke	Niederdorfstrasse 11	Zürich	Pharmacy	47.373329	8.543857	yellow	-1.180184
15	Coop Vitality	Kalanderplatz 1	Zürich	Pharmacy	47.358388	8.523170	yellow	-1.334641
18	apodoc	NaN	NaN	Pharmacy	47.387632	8.519185	yellow	-1.388125
5	Odeon Apotheke	Limmatquai 2, Bellevueplatz	Zürich	Pharmacy	47.367740	8.545305	yellow	-1.798875
93	DROPA Drogerie Apotheke Limmatplatz	Limmatplatz 7	Zürich	Pharmacy	47.385119	8.531566	yellow	-1.886747
14	TopPharm Limmatplatz Apotheke	Limmatstrasse 119	Zürich	Pharmacy	47.383865	8.532567	yellow	-1.933191
4	Sun Store Apotheke	Löwenstrasse 31-35	Zürich	Pharmacy	47.375423	8.536251	yellow	-3.864038
2	Victoria Apotheke	Bahnhofstr. 71	Zürich	Pharmacy	47.374796	8.538618	yellow	-3.957979
0	Bahnhof Apotheke	Bahnhofplatz 15	Zürich	Pharmacy	47.377142	8.539919	yellow	-6.562144
6	Coop Vitality Zürich Bahnhofstrasse	Bahnhofstrasse 81	Zürich	Pharmacy	47.375954	8.539052	yellow	-7.323256
7	Amavita Apotheke	Bahnhofstrasse 108	Zürich	Pharmacy	47.376265	8.539795	yellow	-7.367706

Result (A) - visualization

Location Force by Pharmacies

#	Pharmacy
1	TopPharm Apotheke & Drogerie Höschgasse
2	Dr. Andres Apotheke Stadelhofen
3	Berg-Apotheke
4	Anrig Drogerie Naturathek
5	Topwell Apotheke-Drogerie
6	Apotheke Schaffhauserplatz
7	Vision hair
8	DROPA Apotheke & Post Hottingen
9	Drogama Apotheke Drogerie
10	Wehntal Apotheke
11	Bären-Apotheke
12	Neumarkt Apotheke Drogerie
13	Bellevue Apotheke
14	TopPharm Leonhards-Apotheke
15	Rosen Apotheke
16	Coop Vitality
17	apodoc
18	Odeon Apotheke
19	DROPA Drogerie Apotheke Limmatplatz
20	TopPharm Limmatplatz Apotheke
21	Sun Store Apotheke
22	Victoria Apotheke
23	Bahnhof Apotheke
24	Coop Vitality Zürich Bahnhofstrasse
25	Amavita Apotheke

Where would you open a pharmacy at Zurich ?

How many good areas can you identify ?
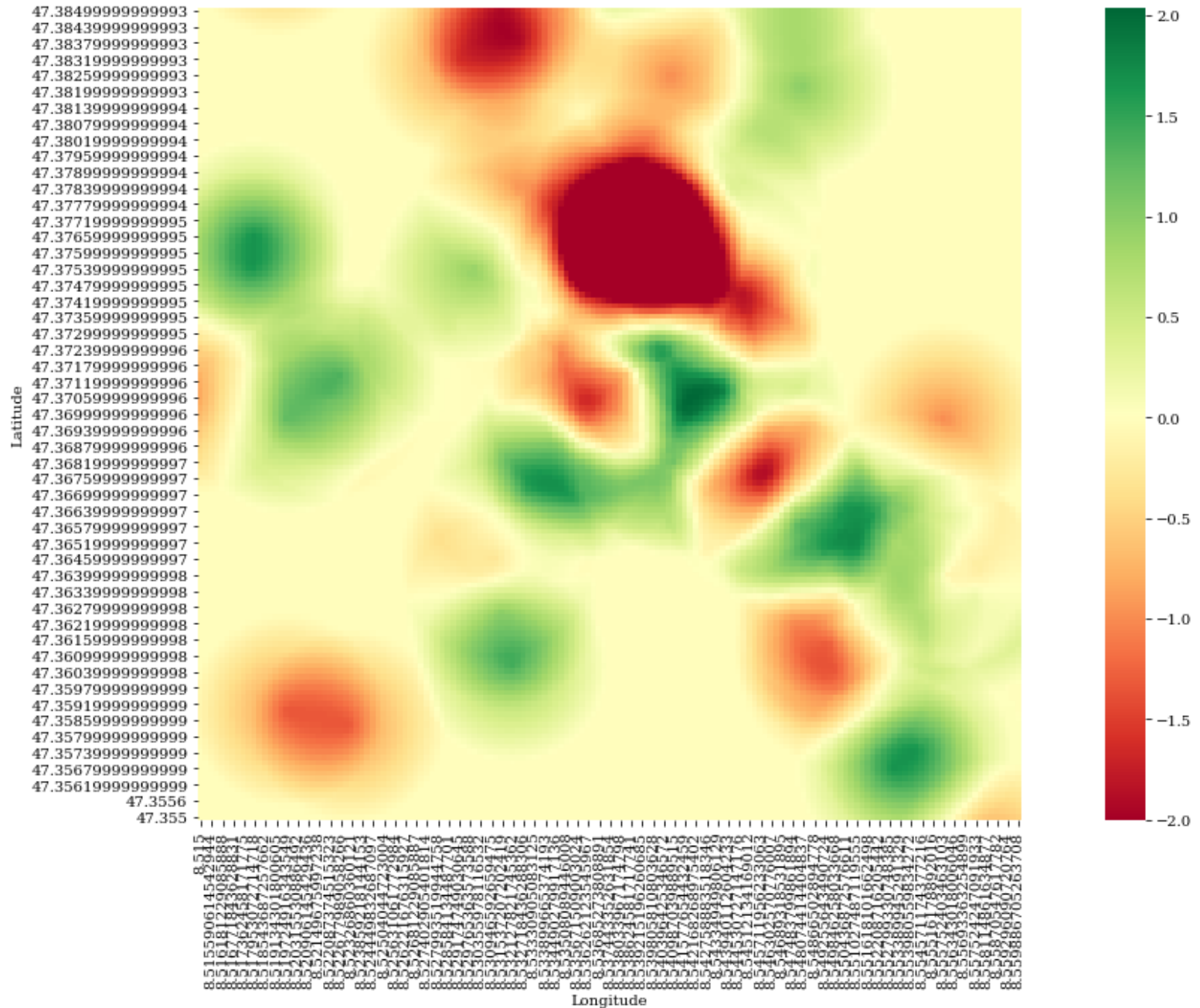
Implementation
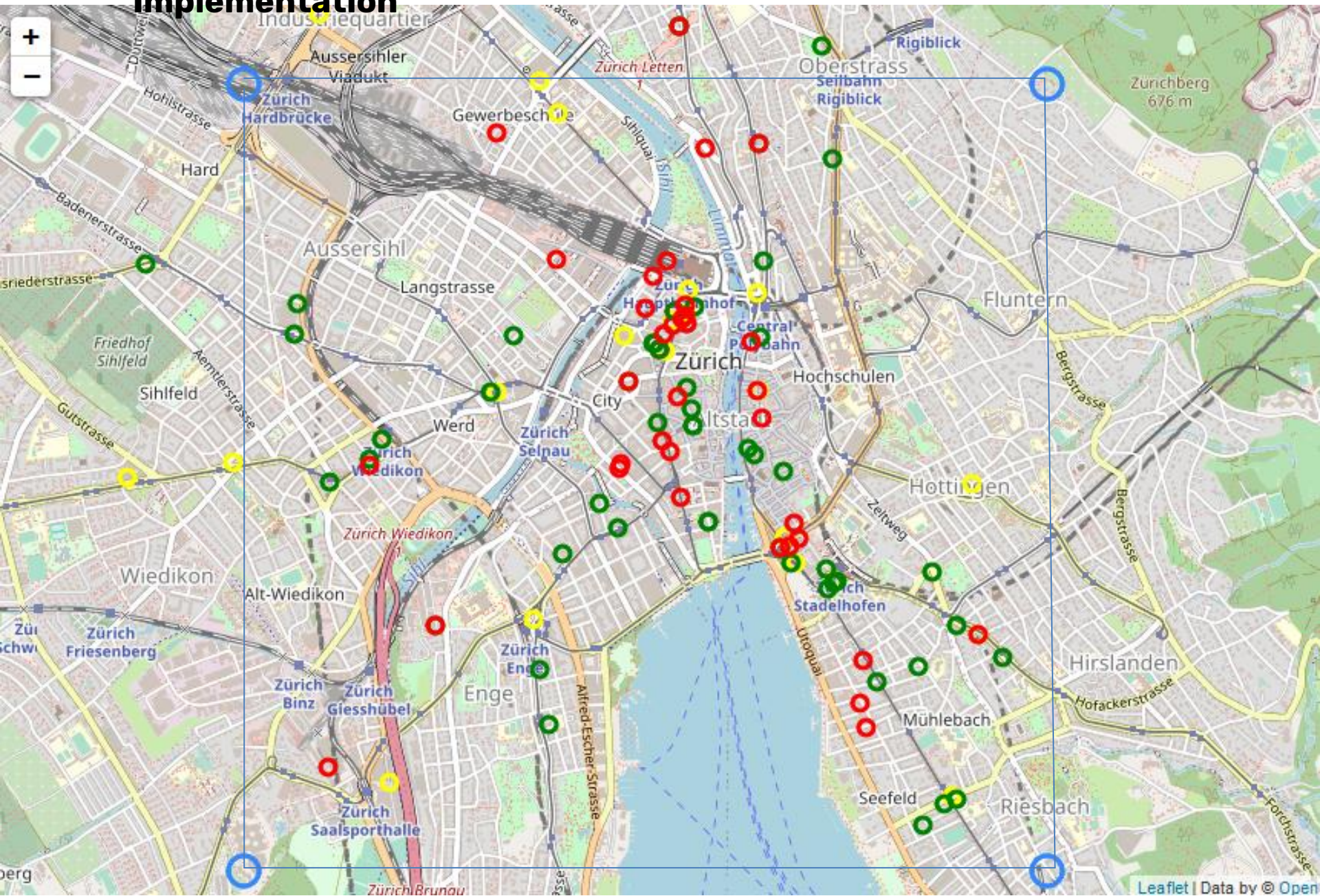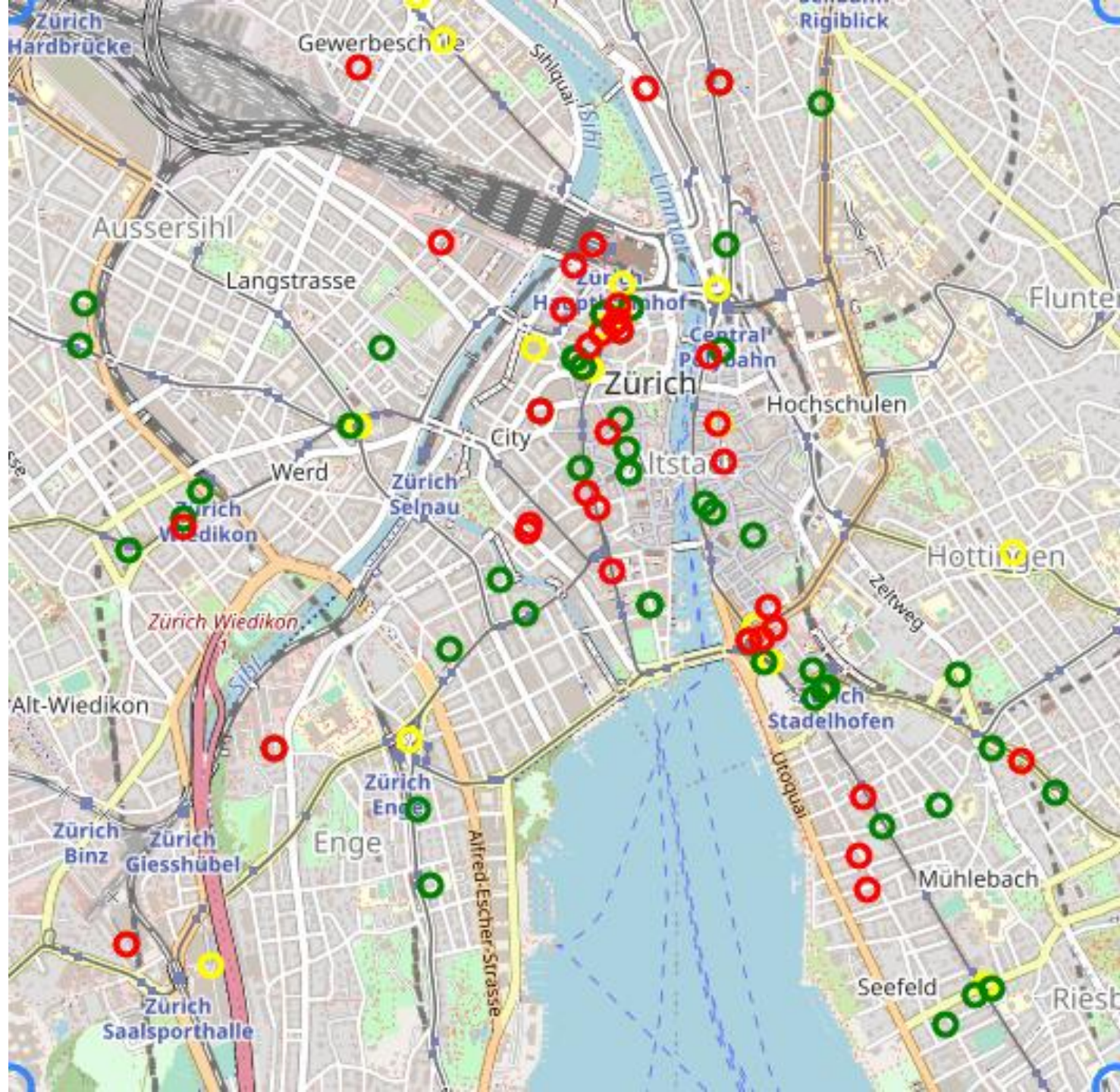
Implementation – Grid over Zurich
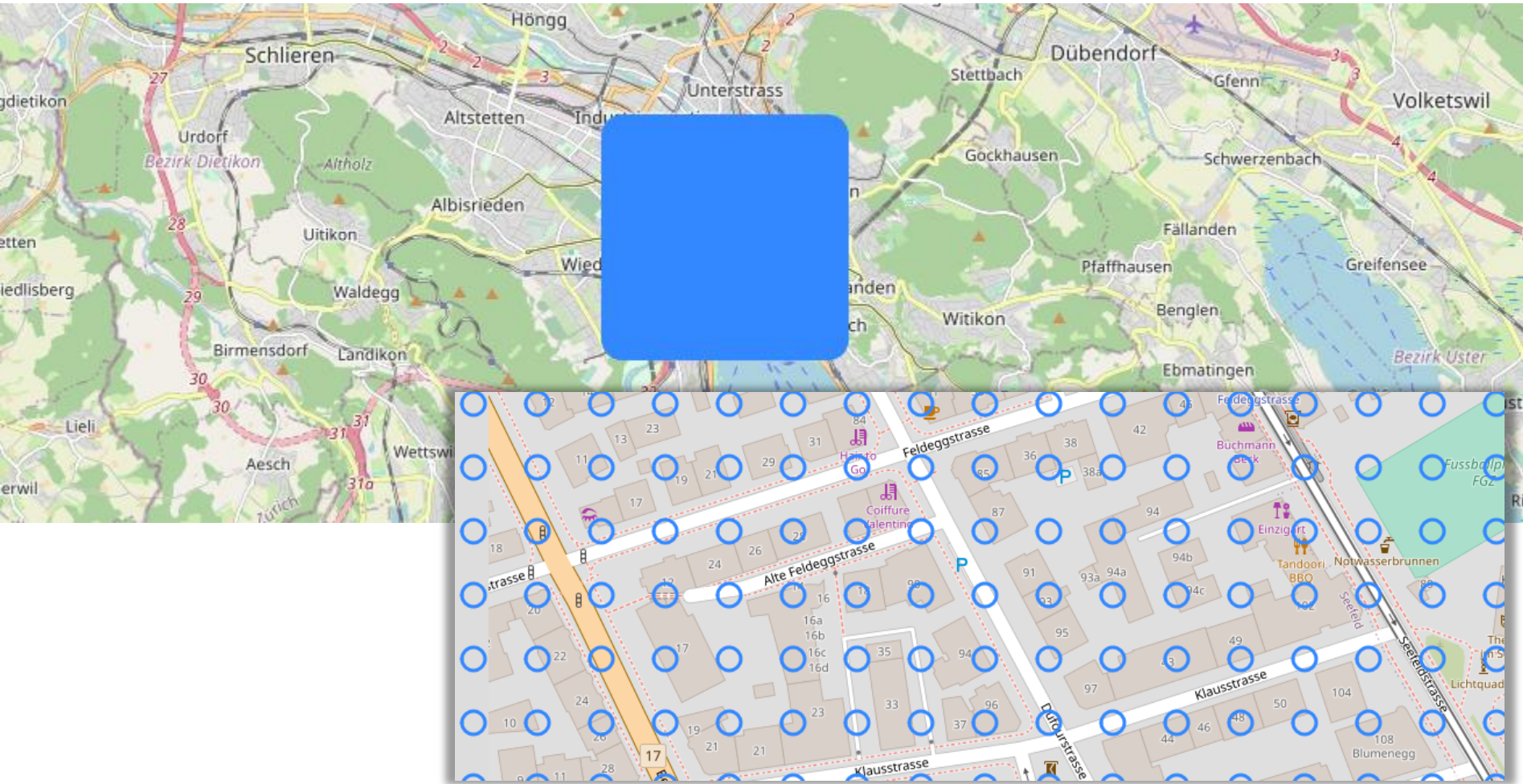
The cells in the grid have a distance of 22 meters. For each cell we calculate the force to all objects to calculate the total force for the cell.

Result - Heatmap shows the value of each cell

Result (B) - Heatmap and streetmap combined

Now we see
areas with a
good location
value.

How many?

Did you really see them here?

Conclusions and future directions

Built a powerful model for a fully automated location analysis.

The implementation can be adapted for other locations and fields.

Important is a good cooperation between business and data scientist for selecting criteria and calculation methods.

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Pascal Keller