



Restaurant Delivery Clusters in Berlin

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Food Delivery Options for Independent Restaurants

Self Organized

Example: Domino's, traditional restaurants in some developing countries

⇒ Labor costs too high

Via Apps

Example: takeaway.com, Uber Eats, GrubHub

⇒ Reliant on large corporations to protect restaurant's interests



Possible Solution: Local Network

Entity:

- Contractor company servicing local area restaurants
- Cooperative of restaurants themselves

The point is :

- It is local only
- Restaurants interact with customers directly online
- Delivery service contracted by restaurants in the background



Data Sources

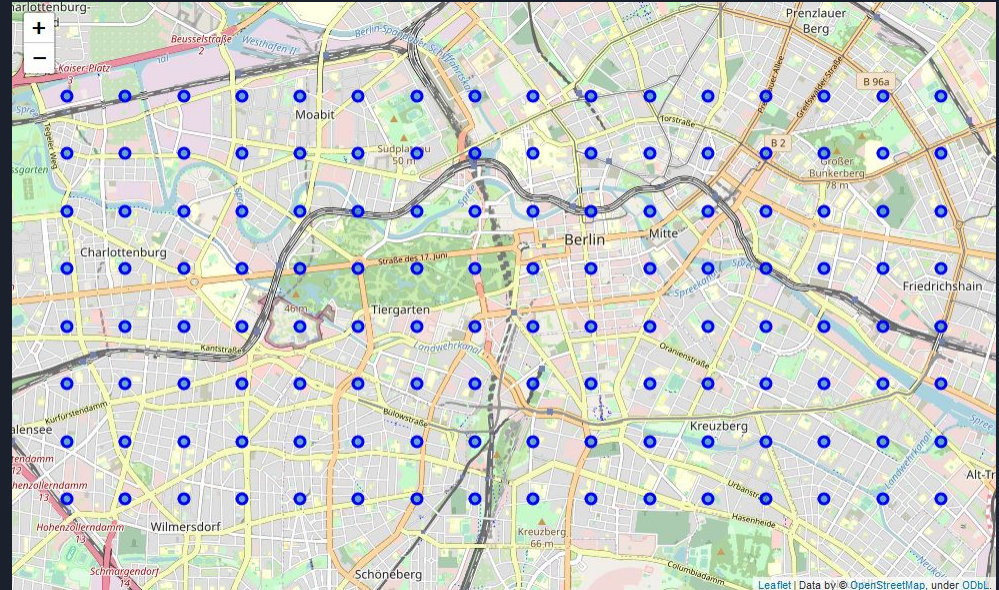
- Foursquare API (**explore**)
 - Name
 - Category
 - Id
 - Coordinates
- OpenStreetMap Nominatim (**geopy**)

Grid over Berlin

Foursquare limits number of results
per location



Solution: explore many points!



Data in dataframe and map

```
all_areas.head(10)
```

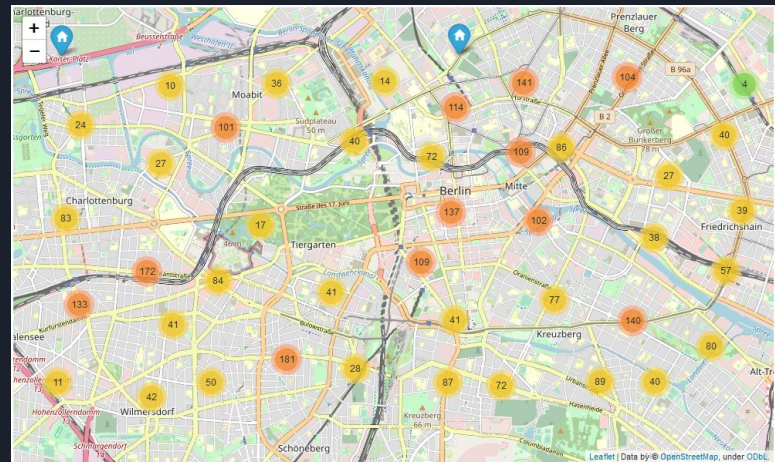
| | id | name | categories | lat | lng |
|---|--------------------------|---------------------|-----------------------|-----------|-----------|
| 0 | 51b0b687498eb7911a3f5d5d | Viet's | Vietnamese Restaurant | 52.486826 | 13.298148 |
| 1 | 50083606e4b0a467c6a67a52 | Il Gusto | Italian Restaurant | 52.487640 | 13.299763 |
| 2 | 515ad070e4b0e1f513f0b28b | Steinecke | Bakery | 52.493167 | 13.305096 |
| 3 | 4b5c51f4f964a520dd2a29e3 | Trattoria Taormina | Trattoria/Osteria | 52.491707 | 13.301395 |
| 4 | 4dd3a22cb0fbf653b6413b4c | Grillhaus Wedo's | Snack Place | 52.488470 | 13.301182 |
| 5 | 4e2680c93151a5765fc70e27 | Wasserperle | German Restaurant | 52.491629 | 13.299931 |
| 6 | 51727692e4b093e579db5055 | Das Knusperhäuschen | Bakery | 52.491535 | 13.293843 |
| 7 | 49fadd5e4b0f9485431228c | LECKERBACK | Bakery | 52.486170 | 13.297124 |
| 8 | 56670809498eb82ce7def90 | Genazvale | Caucasian Restaurant | 52.489803 | 13.312004 |
| 9 | 4b0919a7f964a5203d1423e3 | Parkcafé Berlin | Café | 52.490966 | 13.314369 |

```
all_areas.shape
```

```
(2942, 5)
```

```
print('There are {} unique restaurant categories.'.format(len(all_areas['categories'].unique())))
```

```
There are 120 unique restaurant categories.
```

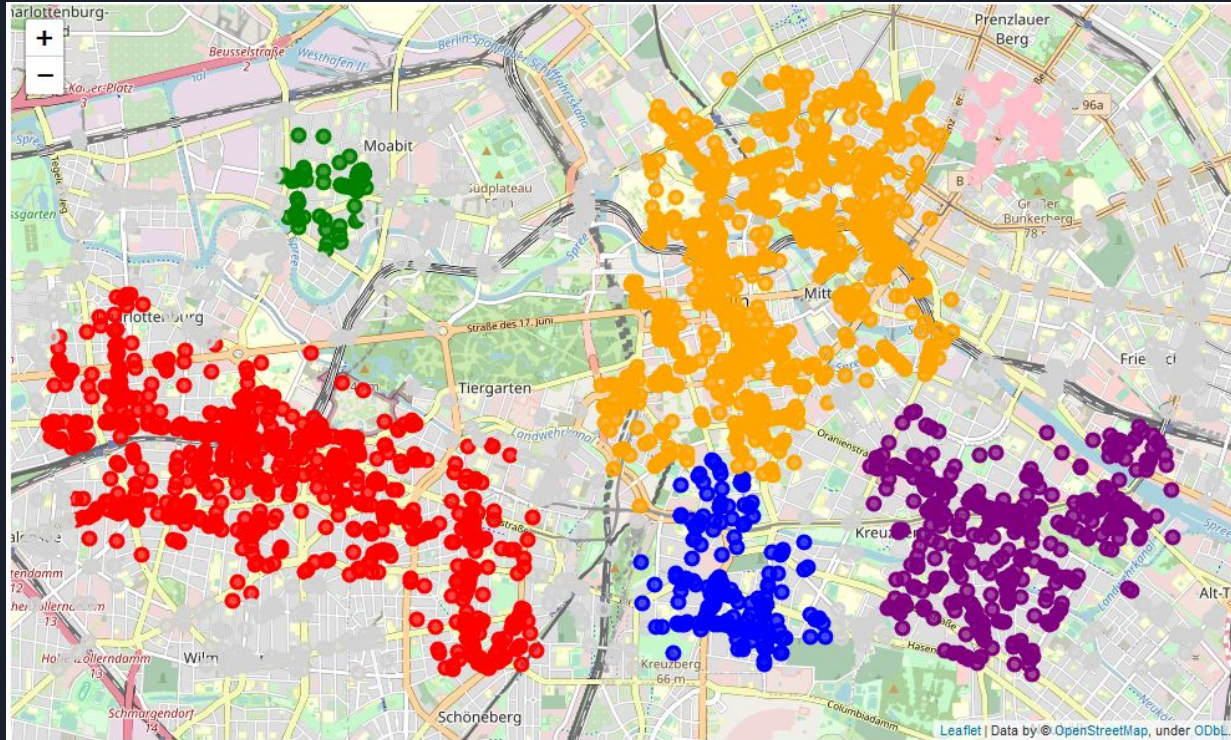


HeatMap: visual clusters

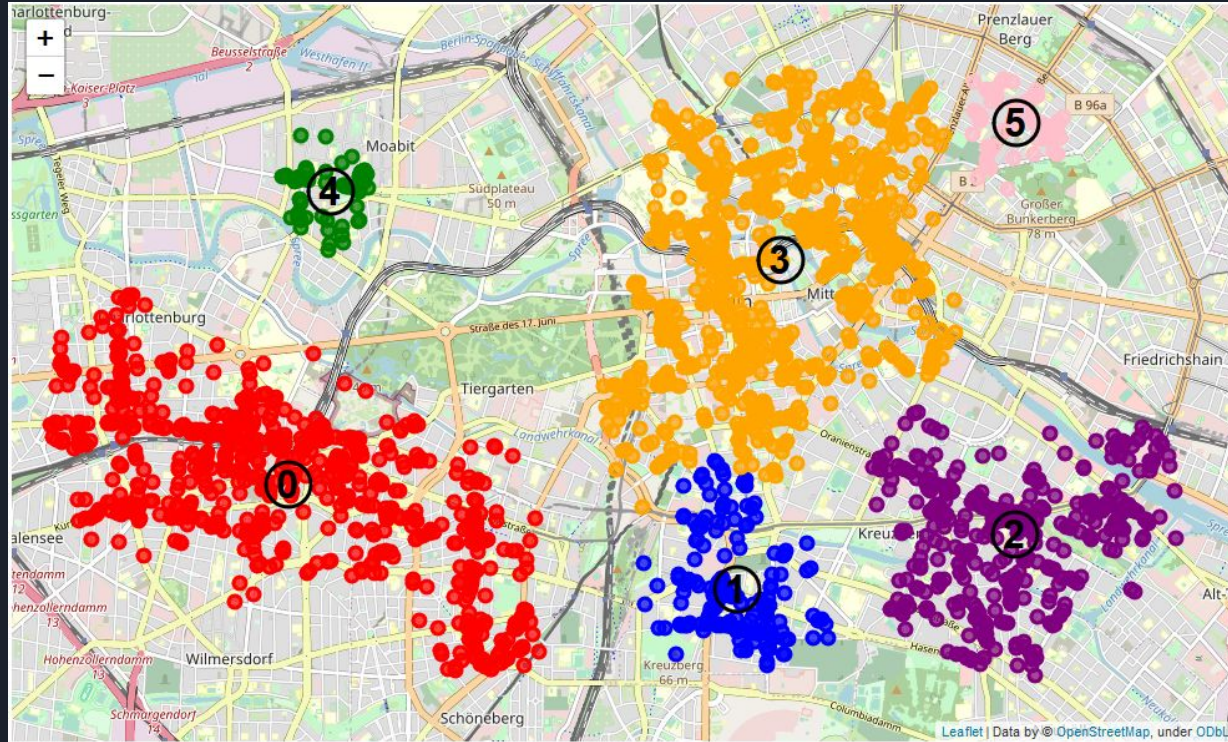


DBSCAN

High density clusters separated from noise



6 Candidate Regions for delivery service



Winner: Region #3!

Most populous

| Region | |
|--------|-----|
| 0 | 690 |
| 1 | 182 |
| 2 | 407 |
| 3 | 875 |
| 4 | 62 |
| 5 | 72 |

Low deviation from alternatives

| | 1st Most Common Category | 2nd Most Common Category | 3rd Most Common Category | 4th Most Common Category | 5th Most Common Category | 6th Most Common Category | 7th Most Common Category | 8th Most Common Category | 9th Most Common Category | 10th Most Common Category |
|--------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------|
| Region | | | | | | | | | | |
| 0 | Italian Restaurant | Café | Bakery | German Restaurant | Vietnamese Restaurant | Restaurant | Burger Joint | Chinese Restaurant | Indian Restaurant | French Restaurant |
| 1 | Café | Italian Restaurant | Bakery | Asian Restaurant | Vietnamese Restaurant | Indian Restaurant | Pizza Place | Bistro | Sushi Restaurant | German Restaurant |
| 2 | Café | Italian Restaurant | Bakery | Pizza Place | German Restaurant | Vietnamese Restaurant | Restaurant | Turkish Restaurant | Indian Restaurant | Falafel Restaurant |
| 3 | Café | Italian Restaurant | German Restaurant | Bakery | Vietnamese Restaurant | Restaurant | Sushi Restaurant | Breakfast Spot | Bistro | Vegetarian / Vegan Restaurant |
| 4 | Bakery | Café | Italian Restaurant | Pizza Place | Asian Restaurant | Burger Joint | Breakfast Spot | Vietnamese Restaurant | Fried Chicken Joint | Indian Restaurant |
| 5 | Café | Vietnamese Restaurant | Italian Restaurant | Bakery | Breakfast Spot | Deli / Bodega | German Restaurant | Pizza Place | Sushi Restaurant | Doner Restaurant |



Conclusion

Urban settings \Rightarrow high density of restaurants desired for best chance of success

- More restaurants to approach for cooperation
- Quicker service to consumers

Further areas of possible exploration:

- Categories more popular for delivery
- Survey of restaurant owners