Capstone Project

New Indian Restaurant in Berlin

Problem Definition

- A person wants to open an Indian Restaurant and looking for good location in Berlin where -

    1. Locations is less crowded with restaurants
    2. No Indian restaurants in vicinity
    3. Locations is close to city center (as possible

- The objective is to find a solution using Google Map and Foursquare API location data.

Data Understanding

- To find a solution of above problem we would be looking for the data of neighborhoods:-

1. Number of existing restaurants
2. Number of Indian restaurants
3. Distance of Indian restaurants
4. Distance of neighborhood from city center

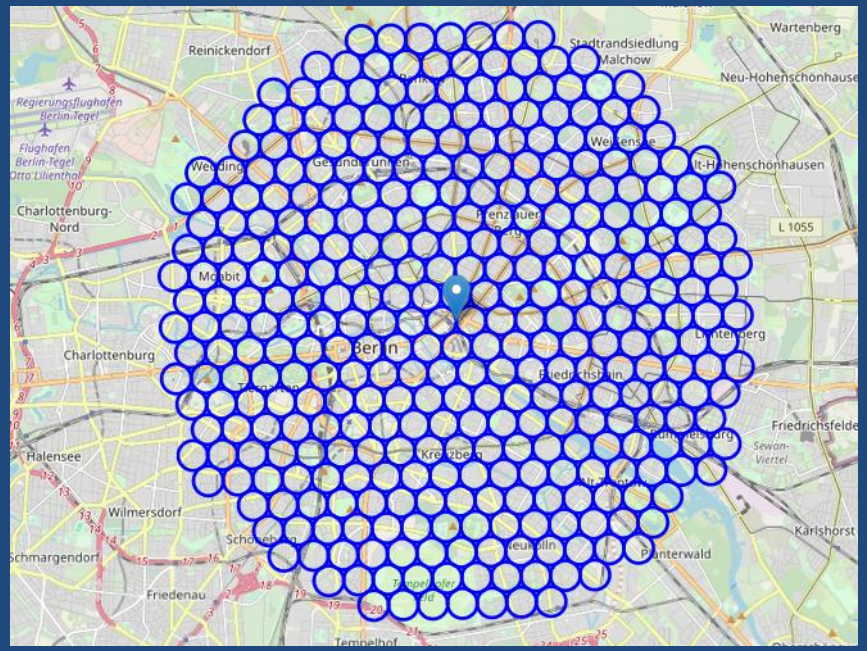
Defining Neighborhood

- We will define our neighborhoods as a circular areas with a radius of 300 meters, so our neighborhood centers will be 600 meters apart
- This will create hexagonal grid of circular candidate area, equally spaced, centered on city center (Alexanderplatz) and within ~6km from city center will be created .

Hexagonal grid of cells around city center

1. Using Google Maps API Coordinates of city center (Alexanderplatz, Berlin) [52.5219184, 13.4132147]

2. Algorithmically 364 neighborhood centers generated and visualized



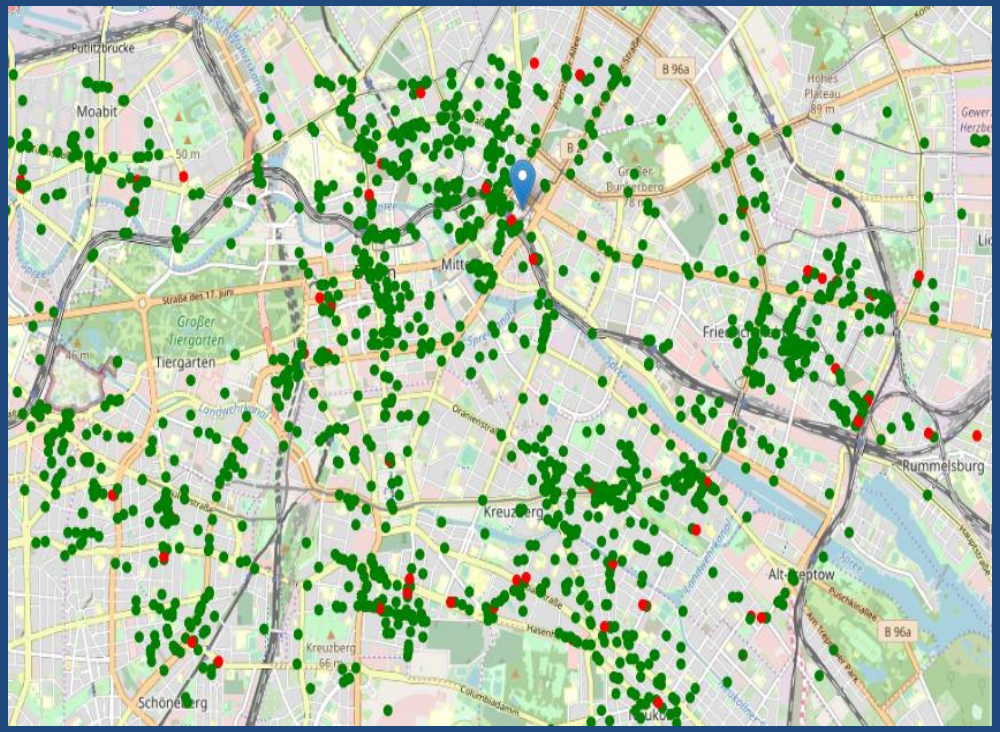
Foursquare API

- **Use of Foursquare API to get information on restaurants in each neighborhood**

- **Total Restaurants : 1582**
- **Indian restaurants : 62**
- **Indian restaurants(%) : 3.92%**
- **Avg. No. of restaurants : 3.80**

Visualization of Foursquare Data

- Green color : Restaurants
- Red Color : Indian Restaurants
- Restaurants : 1582
- Indian Restaurants : 62



Methodology

- We will put our efforts on exploring the areas of Berlin that have
  - Low restaurant density,
  - Less number of Indian restaurants.
  - Our Analysis area Limit will be ~6km around city center

Methodology

- **Step 1:** We will collected the required data: location and type (category) of every restaurant within 6km from Berlin center (Alexanderplatz).

- **Step 2:** In second step our analysis will for calculation and exploration o**f** restaurant density

- **Step 3:** In third and final step we will cluster our locations and focus on most promising areas within those clusters of locations that meet some basic requirements

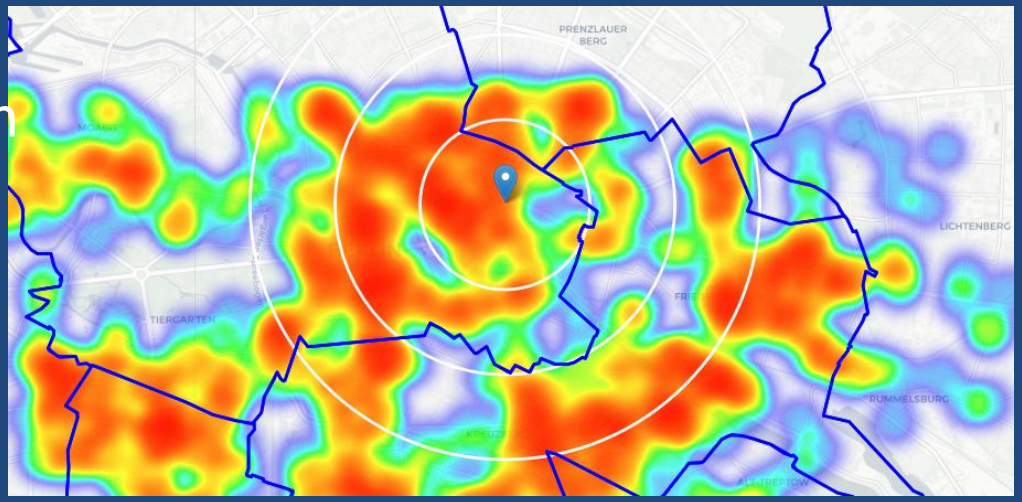
Analysis

Number of restaurants in every candidate area

	Address	Latitude	Longitude	X	Y	Distance from center	Restaurants in area
0	A 100, 12099 Berlin	52.470194	13.388575	390541.280176	5.814557e+06	5992.495307	3
1	09R/27L, 12101 Berlin	52.470314	13.397404	391141.280176	5.814557e+06	5840.376700	0
2	09R/27L, 12049 Berlin	52.470434	13.406234	391741.280176	5.814557e+06	5747.173218	0
3	Oderstraße 174, 12049 Berlin	52.470552	13.415063	392341.280176	5.814557e+06	5715.767665	0
4	Warthestraße 23, 12051 Berlin	52.470670	13.423893	392941.280176	5.814557e+06	5747.173218	1
5	Altenbraker Str. 15, 12053 Berlin	52.470788	13.432722	393541.280176	5.814557e+06	5840.376700	7
6	Karl-Marx-Straße 213, 12055 Berlin	52.470904	13.441552	394141.280176	5.814557e+06	5992.495307	5
7	Hessenring 34, 12101 Berlin	52.474683	13.375159	389641.280176	5.815077e+06	5855.766389	0
8	Kleineweg 125, 12101 Berlin	52.474804	13.383989	390241.280176	5.815077e+06	5604.462508	0
9	09L/27R, 12101 Berlin	52.474924	13.392820	390841.280176	5.815077e+06	5408.326913	0

Density of Restaurants Heatmap

Density of restaurants with Borders of Berlin boroughs on our map and a few circles indicating distance of 1km, 2km and 3km from Alexanderplatz

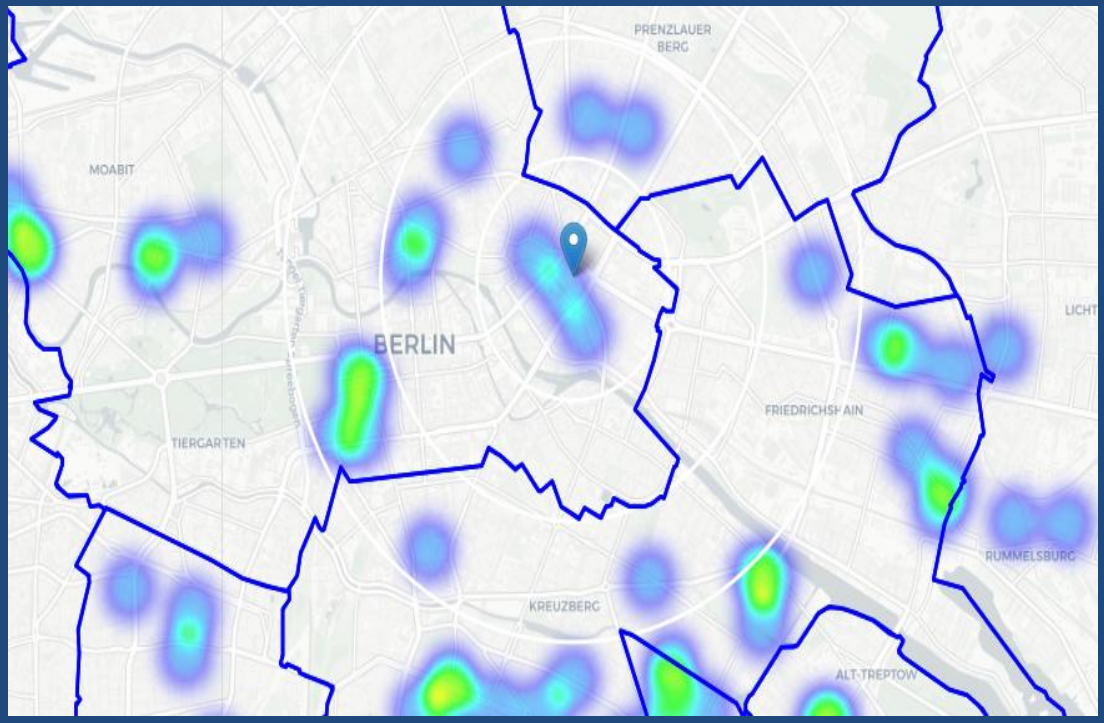


Density of Indian Restaurants Heatmap

1. Indian restaurants represent a subset of ~4% of all restaurants in Berlin

2. Higher density of Indian restaurants in north and west from Alexanderplatz,

3. Low Indian restaurant density positioned east, south-east and south from city center.



our analysis will focus on areas *south-west, south, south-east and east from Berlin center* - This places our location candidates mostly in boroughs **Kreuzberg and Friedrichshain** .

Kreuzberg and Friedrichshain closest to city center(Alexanderplatz)

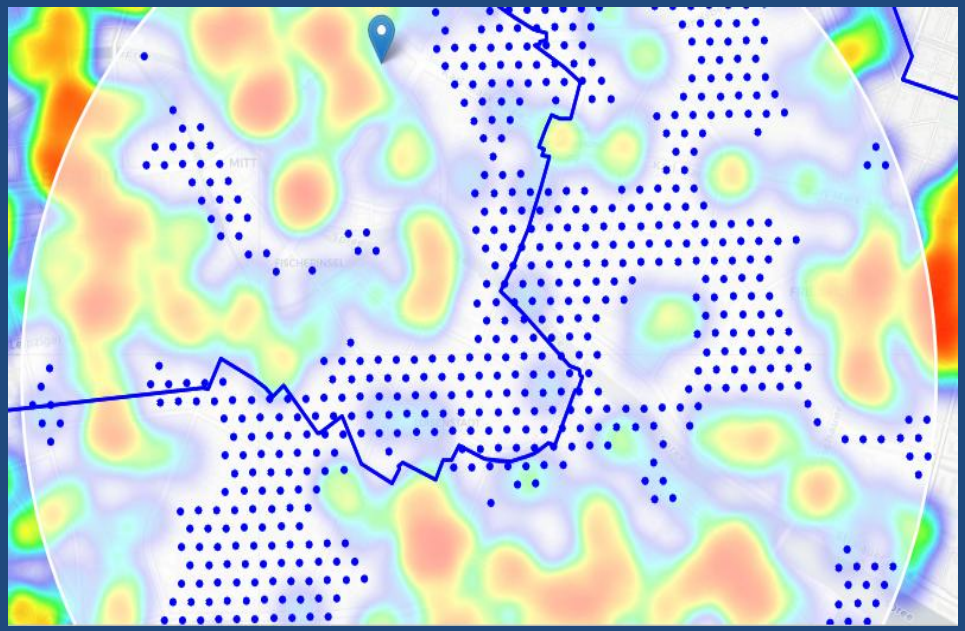
Kreuzberg and Friedrichshain as beautiful, interesting, rich with culture, 'hip' and 'cool' Berlin neighborhoods popular with tourists and loved by Berliners.

Preferred Location for Indian Restaurant

Location filtered as per the following conditions

For Restaurant –
Radius = 250 m, max Restaurant = 2

For Indian Restaurant –
Radius 400, Restaurant = 0



Good Locations for Indian Restaurant

Location filtered as per the following conditions

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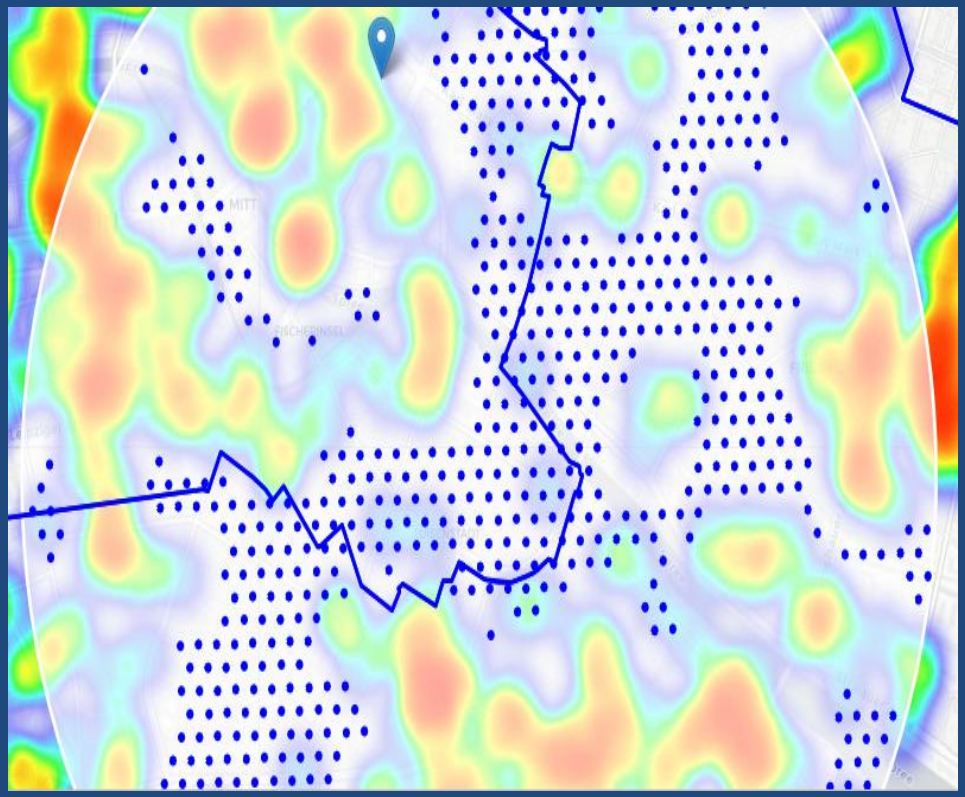

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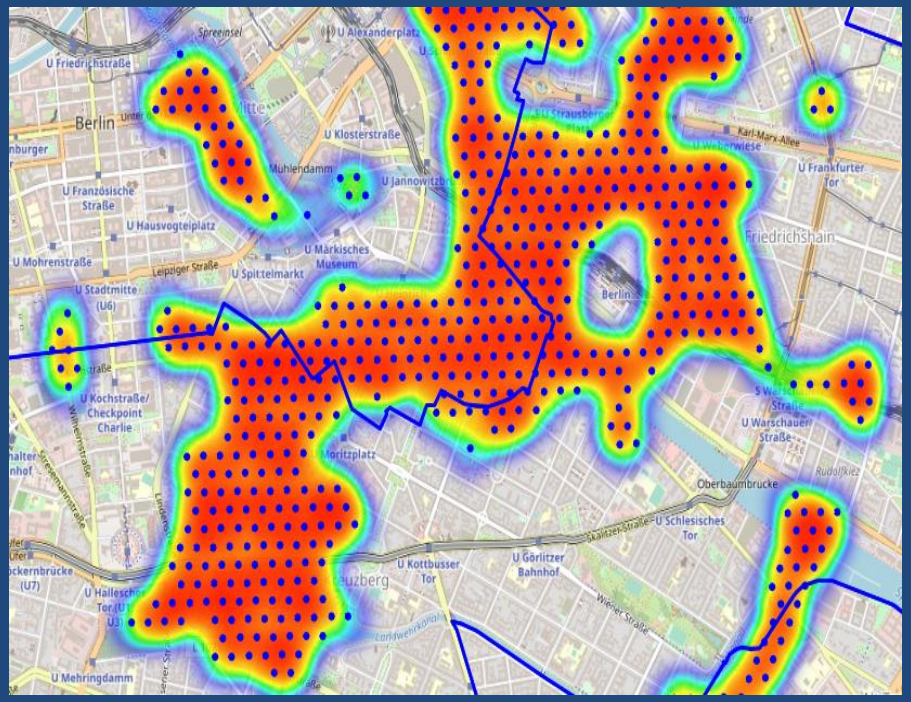
Heatmap



Clustering of Good Locations

K-Means Clustering

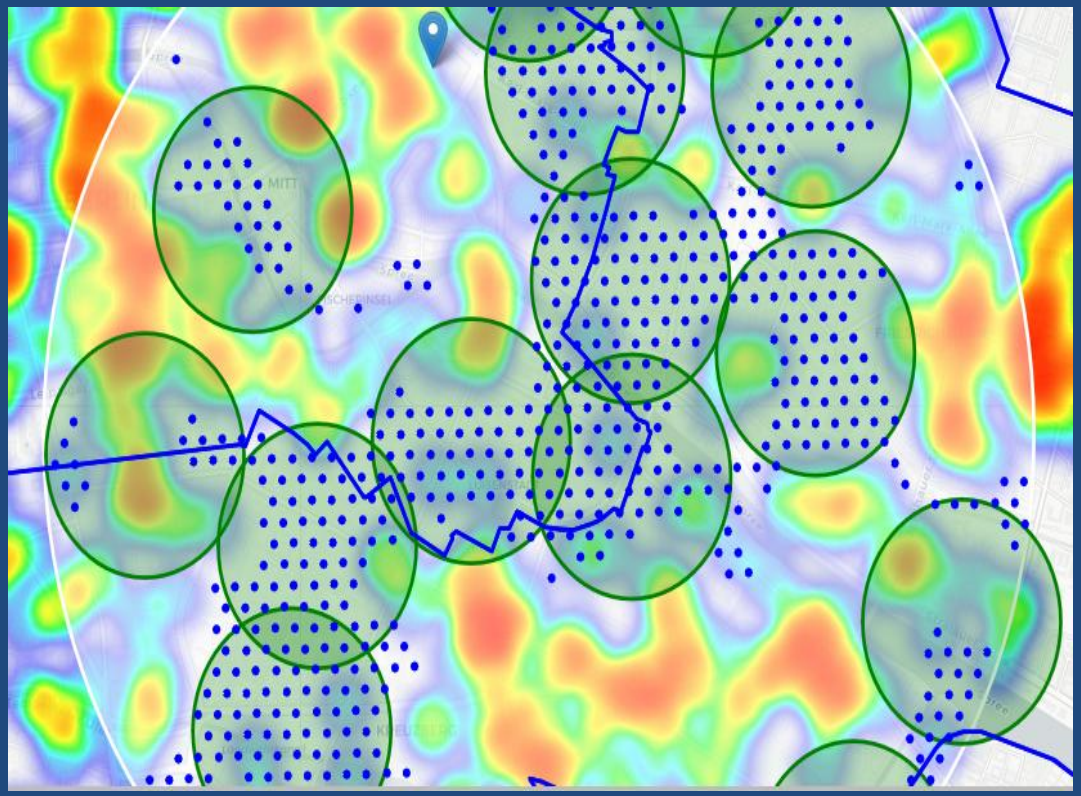
15 Clusters of Good Locations

802 Locations with no more than two restaurants

1581 Locations with no Indian restaurants within 400m

707 Locations with both conditions met

Heatmap



Cluster of Good Locations

K-Means Clustering

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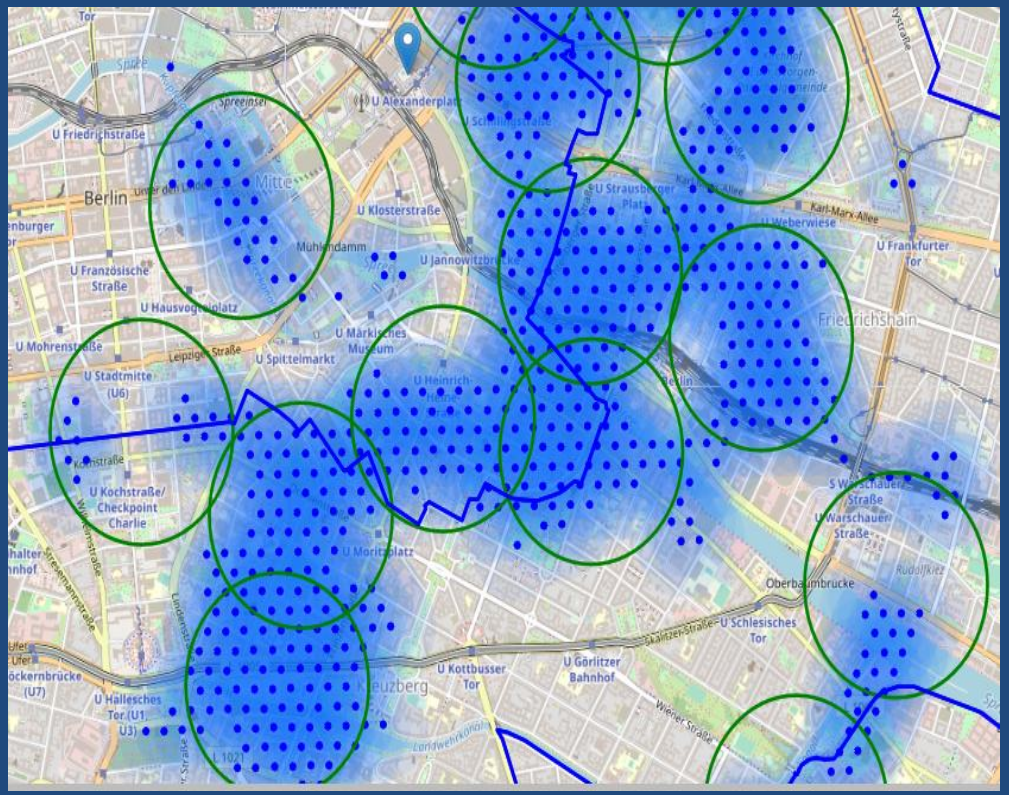
Without Heatmap



Clusters of Good Locations near **Kreuzberg**

Kreuzberg Coordinates
[52.498972, 13.409591)]

Most promising location near **Kreuzberg** are visualized.

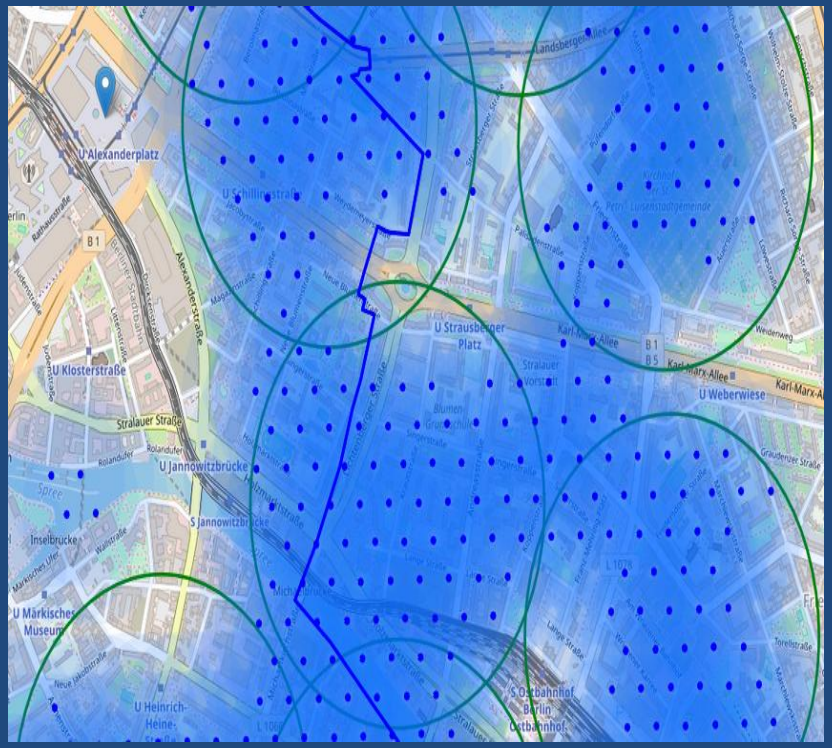
Final decision on location of restaurant will be made by stakeholders based on specific characteristics of neighborhoods and locations in every recommended zone.

Cluster of Good Locations near **Friedrichshain**

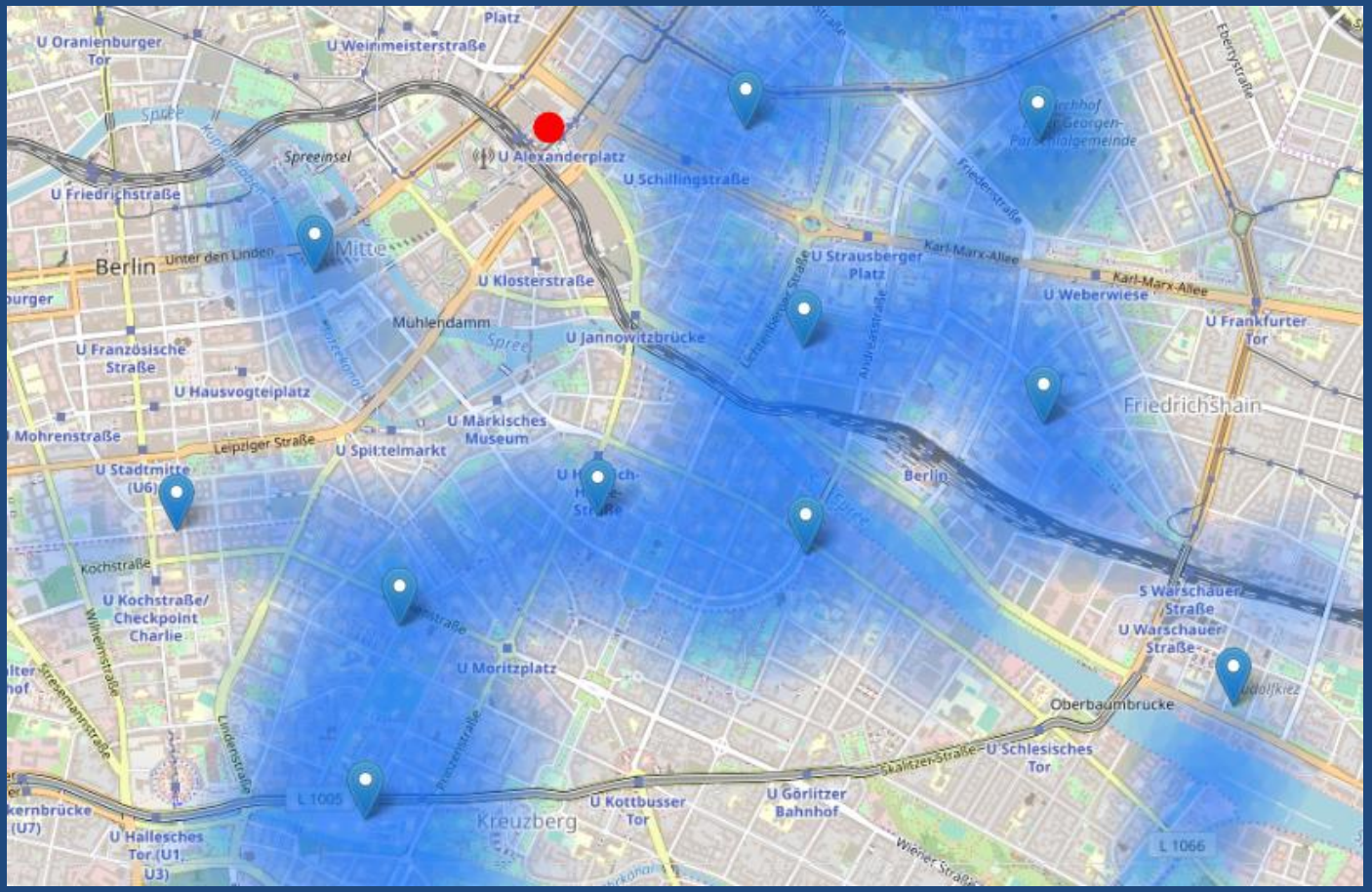
Friedrichshain Coordinates
[52.516347, 13.428403]

Most promising location near **Friedrichshain** are visualized.

Final decision on location of restaurant will be made by stakeholders based on specific characteristics of neighborhoods and locations in every recommended zone.



Area centers recommended for further analysis



Conclusion

- Our objective was to assist stakeholders in identifying areas close to center of Berlin with low number of restaurants for opening a new Indian restaurant.

- 1. Using Foursquare data we calculated density of restaurants to identify boroughs that is justified for the purpose.

- 2. Clustering of those locations was then performed in order to create major zones of interest (containing greatest number of potential locations) and addresses of those zone centers were created to be used as starting points for final exploration by stakeholders.

Conclusion cont....

- 3. The further analysis of two major tourist locations (Kreuzberg and Friedrichshain), and then generated extensive collection of locations which satisfy some basic requirements regarding existing nearby restaurants.

- 4 . Final decision on location of restaurant will be made by stakeholders based on specific characteristics of neighborhoods and locations in every recommended zone.

- 5. Additional factors: Stakeholder can consider additional factors like
  - Attractiveness of each location (proximity to park or water)
  - Levels of noise / proximity to major roads
  - Real estate availability
  - Real estate Prices
  - Social and economic dynamics of every neighborhood etc.

Thanks

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IBM Coursera