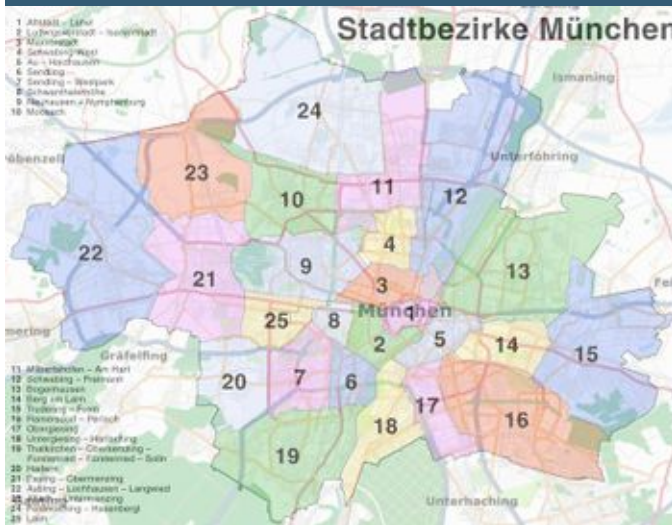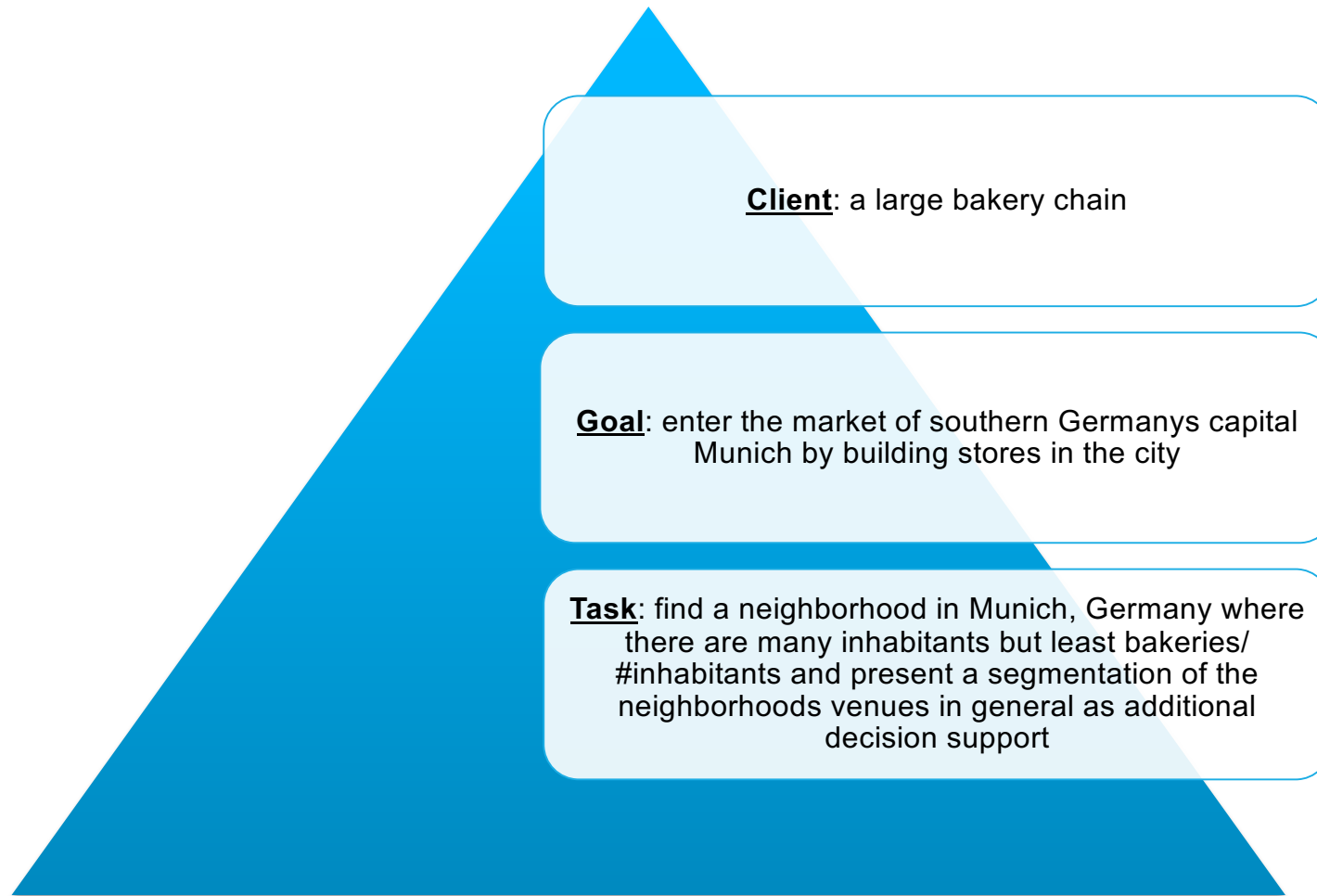# *Munich Bakery Placement*
Insights to Munich's neighborhoods inhabitants, location and venues with a special focus on bakeries and consideration of best strategic investment for bakery stores.
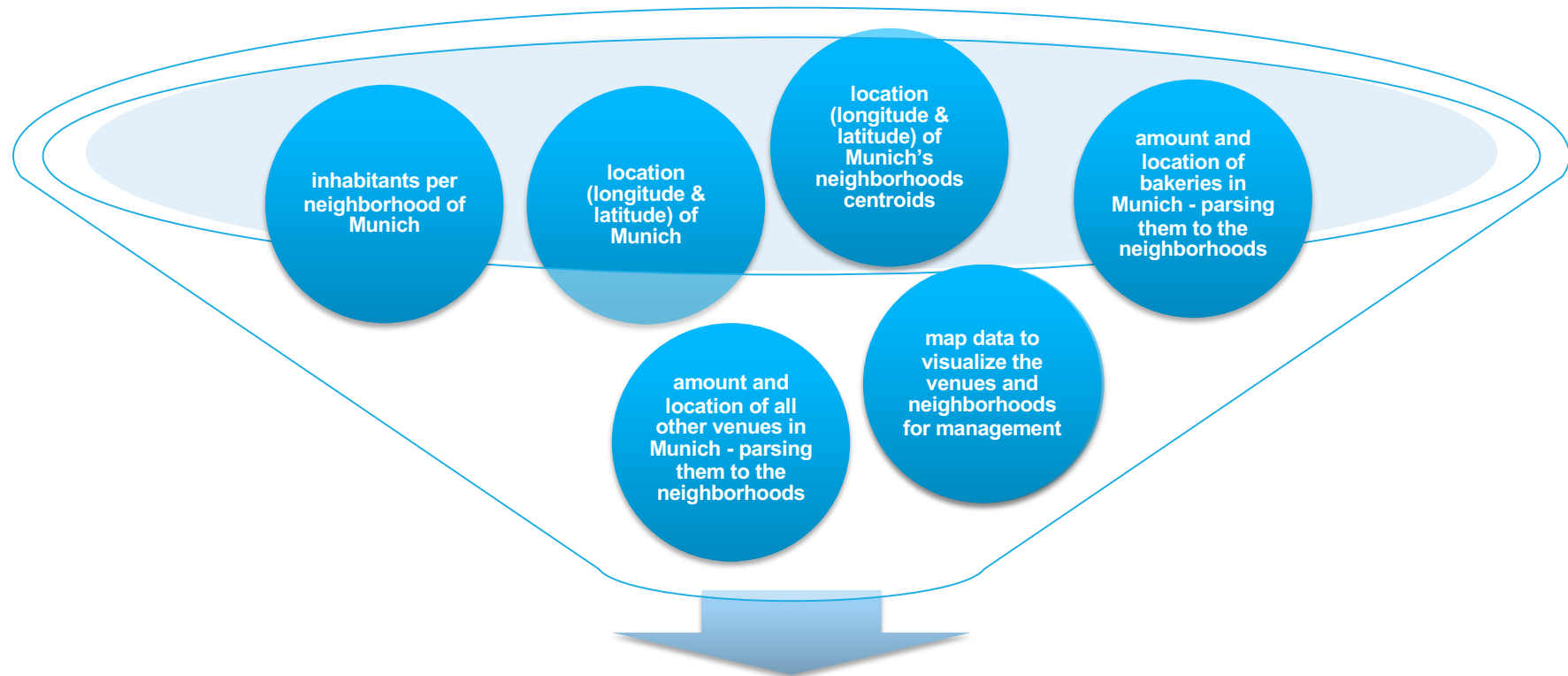
Agenda

- Introduction

- Data used

- Methodology utilized

- Results

- Discussion

- Conclusion

Introduction

Client: a large bakery chain

Goal: enter the market of southern Germanys capital Munich by building stores in the city

Task: find a neighborhood in Munich, Germany where there are many inhabitants but least bakeries/#inhabitants and present a segmentation of the neighborhoods venues in general as additional decision support

Data used

Data needed to examine the best neighborhood to build a bakery store in Munich:

inhabitants per neighborhood of Munich

location (longitude & latitude) of Munich

location (longitude & latitude) of Munich's neighborhoods centroids

amount and location of bakeries in Munich - parsing them to the neighborhoods

amount and location of all other venues in Munich - parsing them to the neighborhoods

map data to visualize the venues and neighborhoods for management

All this data is available open source and without any cost for the client

Methodology utilized

Retrieving and Transforming the data

- location data
- inhabitant data
- venue data

Statistical Analysis

the need for bakeries in each neighborhood was calculated by:

$$\frac{inhabitants/neighborhood}{bakeries/neighborhood}$$

Machine Learning Analysis

The neighborhoods were clustered based on their venue categories using the *k*-means algorithm with k = 5 clusters.

Results

Insights from the bakery information
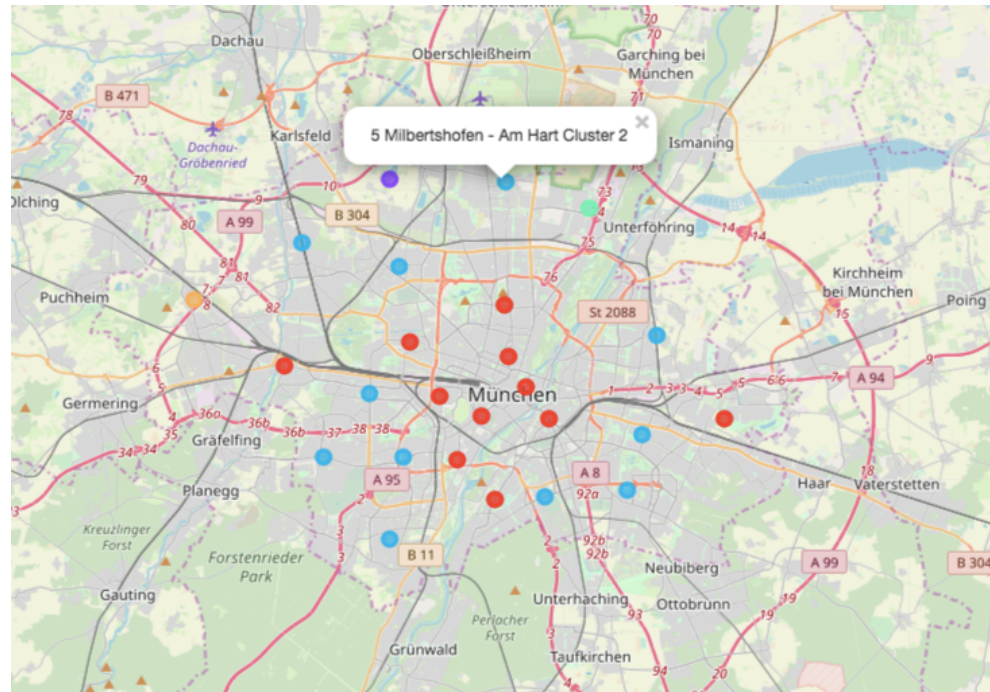
Inhabitant per bakery for each neighborhood were calculated.

The neighborhoods

"Thalkirchen - Obersendling - Forstenried - F.",

"Bogenhausen" and

"Milbertshofen - Am Hart"

all have over 70000 inhabitants per bakery.

	Neighborhood	NumberBakeries	Inhabitants	inh_per_bakery
18	3 Thalkirchen - Obersendling - Forstenried - F...	NaN	90.790	90.790000
12	4 Bogenhausen	1.0	82.138	82.138000
15	5 Milbertshofen - Am Hart	1.0	73.617	73.617000
19	7 Schwabing - Freimann	NaN	69.676	69.676000
20	9 Schwabing West	NaN	65.892	65.892000
21	11 Feldmoching - Hasenbergl	NaN	59.391	59.391000
16	12 Sendling - Westpark	1.0	55.405	55.405000
11	1 Ramersdorf - Perlach	2.0	108.244	54.122000
17	14 Untergiesing - Harlaching	1.0	51.937	51.937000
22	17 Obergiesing - Fasanengarten	NaN	51.499	51.499000
14	19 Hadern	1.0	48.945	48.945000
5	2 Neuhausen - Nymphenburg	2.0	95.906	47.953000
23	21 Aubing - Lochhausen - Langwied	NaN	42.305	42.305000
10	6 Pasing - Obermenzing	2.0	70.783	35.391500
9	8 Trudering - Riem	2.0	67.009	33.504500
13	23 Allach - Untermenzing	1.0	30.737	30.737000
6	15 Maxvorstadt	2.0	51.642	25.821000
8	18 Ludwigsvorstadt - Isarvorstadt	2.0	50.620	25.310000
7	20 Berg am Laim	2.0	43.068	21.534000
24	25 Altstadt - Lehel	NaN	20.422	20.422000
3	10 Au - Haidhausen	3.0	59.752	19.917333
2	13 Laim	3.0	54.030	18.010000
1	16 Moosach	4.0	51.537	12.884250
4	24 Schwanthalerhöhe	3.0	29.663	9.887667
0	22 Sendling	5.0	39.953	7.990600

Results
Insights from the venue cluster information

- **the most central neighborhoods/best locations are within one cluster (red)**
- **the "second best" neighborhoods form a circle like cluster around the red (blue)**
- **3 outer most neighborhoods each form their own cluster**

Results
Insights from the most common venues

Cluster Labels	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
2	1 Ramersdorf - Perlach	Supermarket	German Restaurant	Bakery	Hotel	Bus Stop	Italian Restaurant	Ice Cream Shop	Plaza	Bus Line	Market
0	10 Au - Haidhausen	Italian Restaurant	Café	German Restaurant	Plaza	French Restaurant	Bakery	Ice Cream Shop	Beach	Bar	Gourmet Shop
1	11 Feldmoching - Hasenbergl	Lake	Zoo Exhibit	Event Service	Food & Drink Shop	Food	Flower Shop	Fish Market	Field	Fast Food Restaurant	Farmers Market
2	12 Sendling - Westpark	Bus Stop	Supermarket	Greek Restaurant	Tunnel	Ice Cream Shop	Brewery	Metro Station	Liquor Store	German Restaurant	Coffee Shop
2	13 Laim	Supermarket	Bakery	Bus Stop	Gastropub	Restaurant	Greek Restaurant	Tram Station	Bank	Plaza	Hotel
0	14 Untergiesing - Harlaching	Zoo Exhibit	Soccer Field	Tram Station	Sports Club	Supermarket	German Restaurant	Bus Stop	Café	Lawyer	Beer Garden
0	15 Maxvorstadt	Café	Bar	Italian Restaurant	Vietnamese Restaurant	Art Museum	Burger Joint	Mediterranean Restaurant	Plaza	Pizza Place	French Restaurant
2	16 Moosach	Supermarket	Bakery	Plaza	Tram Station	Drugstore	Hotel	Metro Station	Light Rail Station	Lawyer	Gastropub
2	17 Obergiesing - Fasanengarten	Hotel	Supermarket	Toy / Game Store	Office	Museum	Bus Stop	German Restaurant	Pie Shop	Gym	Ethiopian Restaurant
0	18 Ludwigsvorstadt - Isarvorstadt	Café	Italian Restaurant	German Restaurant	Burger Joint	Vietnamese Restaurant	Hotel	Ice Cream Shop	Asian Restaurant	Bar	Greek Restaurant
2	19 Hadern	Bus Stop	Hotel	Asian Restaurant	Sandwich Place	Garden	Supermarket	Sushi Restaurant	German Restaurant	Bank	Bakery
0	2 Neuhausen - Nymphenburg	Italian Restaurant	Supermarket	Park	Bakery	Restaurant	Shipping Store	Tram Station	Light Rail Station	Department Store	Flower Shop
2	20 Berg am Laim	Tram Station	Bakery	Metro Station	Hotel	Bus Stop	Pool	Drugstore	Café	Supermarket	Fast Food Restaurant
4	21 Aubing - Lochhausen - Langwied	Soccer Field	Dog Run	Bus Stop	Fast Food Restaurant	Event Space	Food & Drink Shop	Food	Flower Shop	Fish Market	Field

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Discussion

Foresquare database incompleteness:

lacking venue information and thus distort the calculations

Circular Neighborhood Area:

instead of true neighborhood boarders only centroids could be retrieved

Random k for Clustering:

the number k of Clusters is randomly chosen and thus probably not be the best segmentation of the neighborhoods

Conclusion

Build stores in these neighborhoods:

"Thalkirchen - Obersendling - Forstenried - F."

"Bogenhausen"

"Milbertshofen - Am Hart"

which all have over 70000 inhabitants per bakery.

Start alliances with the existing supermarkets and/or hotels in the areas.