

Capstone Project - Kebab Connection

Introduction / Business Problem

You have just graduated college with a degree in theoretical philosophy – the world is your oyster. You're thinking of moving to Europe to live the sophisticated life – London, Paris, maybe Madrid? But then it hits you: Berlin! Art, culture, food, a phenomenal bar and club scene – you can't wait. But what are you going to do? You'll figure it out.

It is now a year later. You still live in the two-bedroom apartment that you share with four French guys. They are very nice, but you and Francois have to take turns sleeping on the couch. You tried, but you haven't really made a name for yourself in Berlin yet. People don't know who you are, and you're desperate to get out of this shit-hole apartment. But what are you going to do? Then it hits you: Everyone in Berlin is seemly either drunk, high or lost – and what do people need when they're one or all of those things? They need **food**! An idea creeps up on you that **no-one** has ever had before: **You're going to open a kebab restaurant in Berlin.**

OK, after some research, it seems that you're not the very first person to have the idea. But after walking around for a few days, you've noticed that there are still like maybe three, but at least two streets in Berlin that you haven't seen a kebab restaurant on. Your feet hurt. If only there was some way of figuring this out without leaving your apartment ...

So it's settled. All you have to do now: **find a neighborhood in Berlin that has lots of bars, is somewhat affordable to live in and has no or barely any kebab restaurants, and do it all without leaving the apartment.** „Piece of cake“, you're thinking to yourself. „How hard can it be to open up a kebab place?“

Data

To figure this out, you are going to be using the following:

Data	Used for	Source
A map of Berlin	Hanging on your wall and putting cool pins in	OpenStreetMap
A list of Berlin neighborhoods	Figuring out what neighborhoods there are in the first place	Wikipedia
Rent prices for Berlin	Where can you live off of 200€ a month? Anywhere? Oh God.	Statista
Location of all bars in Berlin	Where do people get drunk? Can I get it on this?	Foursquare
Location and maybe ratings of all kebab restaurants in Berlin	Is someone already feeding people kebab?	Foursquare

Methodology

Neighborhood data

You quickly find a handy Wikipedia (https://de.wikipedia.org/wiki/Verwaltungsgliederung_Berlins) that lists all Berlin neighborhoods and corresponding boroughs. After scraping it and using the Google geocoder API to get the coordinates for each one, you end up with a list of 96 neighborhoods in 12 boroughs. Putting these over an OpenStreetMap of Berlin, you get this:



Pretty snazzy. Now, it can't be that hard to find out how much living in Berlin costs, right? Turns out it is. The only thing you find is this table on rent prices by borough in 2018: <https://de.statista.com/statistik/daten/studie/259905/umfrage/mietpreise-in-berlin-nach-bezirken/>

Because you're poor and can't afford buying the dataset, you decide to copy the preview data by hand. You end up with a dataset that looks something like this:

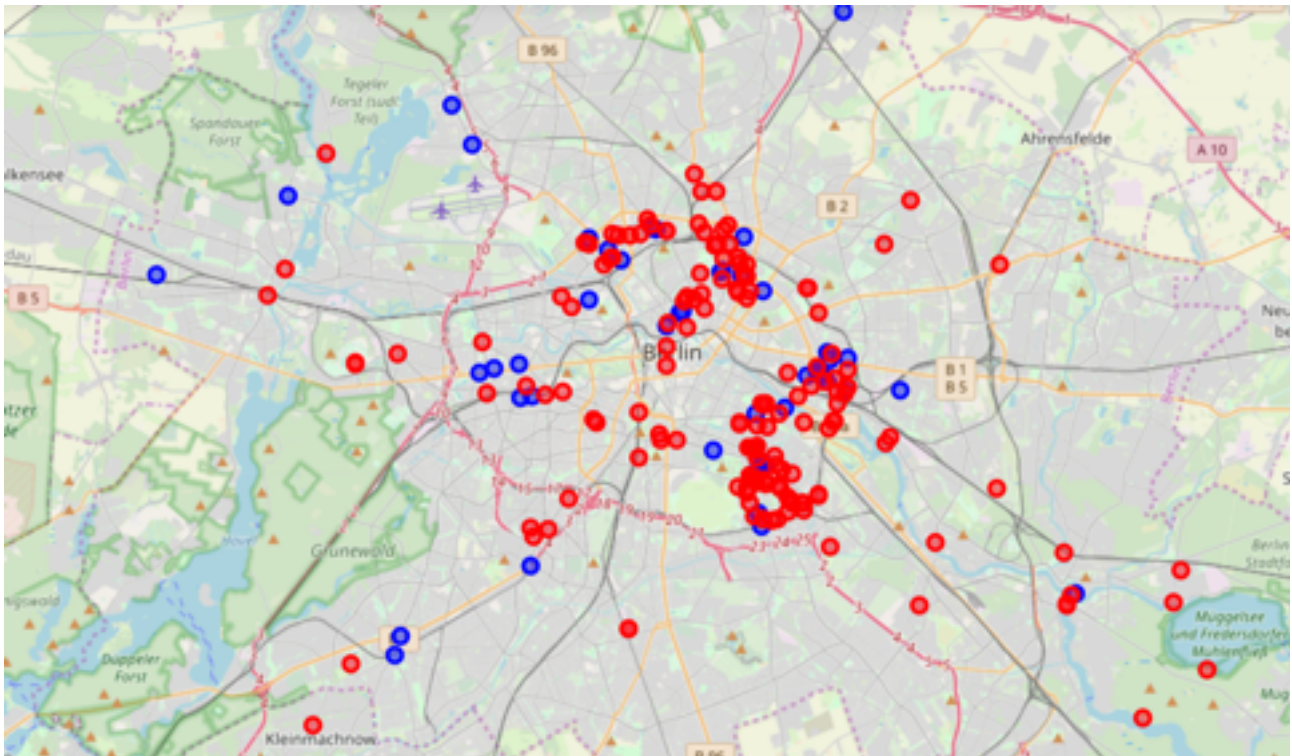
	Neighborhood	Borough	Latitude	Longitude	Rent
0	Mitte	Mitte	52.519444	13.406667	12.50
1	Moabit	Mitte	52.530783	13.347176	12.50
2	Hansaviertel	Mitte	52.521312	13.343322	12.50
3	Tiergarten	Mitte	52.514534	13.350101	12.50
4	Wedding	Mitte	52.550483	13.351984	12.50
5	Gesundbrunnen	Mitte	52.552345	13.381467	12.50
6	Friedrichshain	Friedrichshain-Kreuzberg	52.515824	13.453989	12.99
7	Kreuzberg	Friedrichshain-Kreuzberg	52.498344	13.406579	12.99
8	Prenzlauer Berg	Pankow	52.539179	13.424207	10.97
9	Weißensee	Pankow	52.553880	13.467545	10.97
10	Blankenburg	Pankow	52.594398	13.454750	10.97
11	Heinersdorf	Pankow	52.569684	13.437785	10.97
12	Karow	Pankow	52.611711	13.482460	10.97
13	Stadtrandsiedlung Malchow	Pankow	52.581568	13.471677	10.97
14	Pankow	Pankow	52.566250	13.412403	10.97
15	Blankenfelde	Pankow	52.624746	13.403770	10.97
16	Buch	Pankow	52.641401	13.496539	10.97
17	Französisch Buchholz	Pankow	52.608412	13.429900	10.97

Nightlife and food data

After doing a bit of research using the Foursquare API, you end up with 3254 unique Berlin venues. Is that enough? Is that too much? There's no real way of telling. You filter the results down to two categories:

1. Döner kebab and similar restaurants – 74 results
2. Bars and nightclubs – 200 results

That seems right. There's no way that there could be more than 200 bars and 74 kebab places in all of Berlin. I mean, after all, Foursquare is an exhaustive compendium, right? After plotting where they are located (restaurants in blue, bars in red), you go to bed happy.



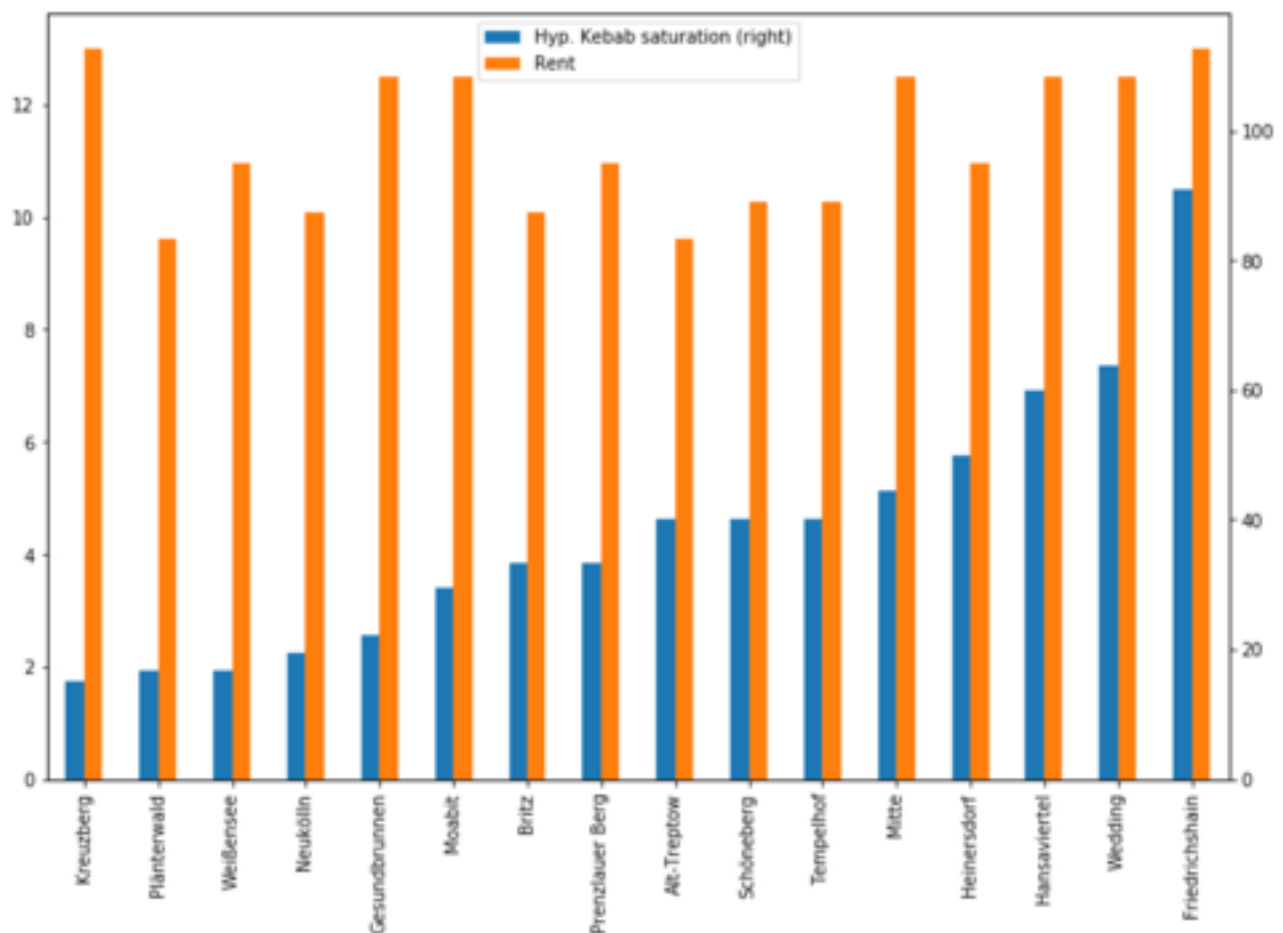
Results

Getting up the next day, you're excited. This should now be pretty easy to figure out! You start by grouping the bars and kebab restaurants by neighborhood to calculate a brilliant KPI you've come up with: The **Kebab saturation** given by $\frac{\text{\# of kebab restaurants}}{\text{\# of bars}}$ in a neighborhood. Given that you want to open up another restaurant, you also calculate the **Hypothetical kebab saturation** given by $\frac{(\text{\# of kebab restaurants} + 1)}{\text{\# of bars}}$.

Interesting. You take a look at the Top 10 neighborhoods by hypothetical kebab saturation and their respective rent prices.

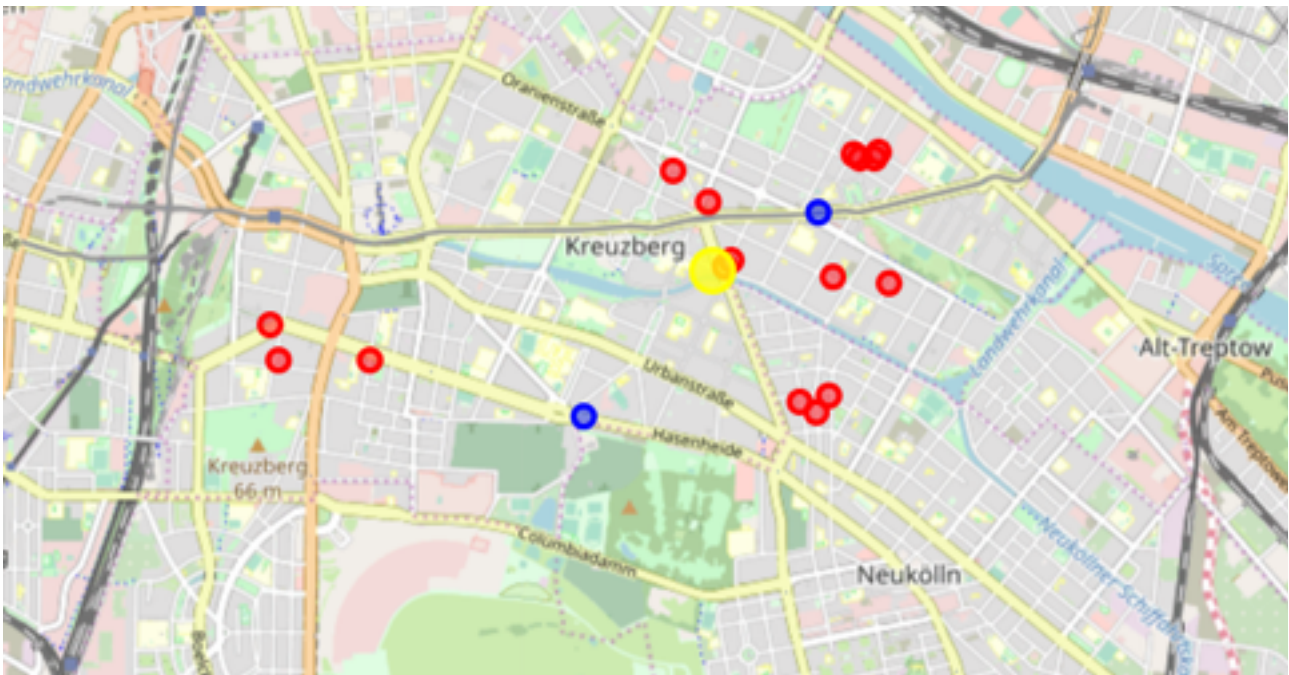
	Neighborhood	Bars	Hyp. Kebab places	Hyp. Kebab saturation	Rent
2	Kreuzberg	20	3	15.000000	12.99
0	Plänterwald	6	1	16.666667	9.61
1	Weißensee	6	1	16.666667	10.97
4	Neukölln	31	6	19.354839	10.09
3	Gesundbrunnen	9	2	22.222222	12.50
8	Moabit	17	5	29.411765	12.50
9	Britz	12	4	33.333333	10.09
10	Prenzlauer Berg	12	4	33.333333	10.97
5	Alt-Treptow	5	2	40.000000	9.61
6	Schöneberg	5	2	40.000000	10.26

This seems like a lot of information, so you visualize it in a bar chart.



So it turns out that you should set up camp in Kreuzberg – although it is the most expensive of all neighborhoods, it has the second-highest number of bars and the lowest hypothetical kebab saturation. (And to be honest, you always wanted to ride around on a fixed-gear bike and do your taxes sitting in an overpriced café with your MacBook. You’re just going to make your kebab fancy-expensive and it will all work out.)

So the only question left now is: Where exactly should you open your restaurant? You figure that right in the middle of all the bars should be best.



Your results indicate that you should open up your kebab restaurant in Kreuzberg, right on the edge to Neukölln on the Kotbusser Brücke. Time to find a landlord!

Discussion

You go to look at your new location. As soon as you get out of the subway, you're in shock – there's like 10 kebab restaurants on the way to the bridge alone. A quick search on Google Maps reveals that there are 4 kebab restaurants within a radius of 100 meters of where you wanted to set up. It starts to dawn on you that your Foursquare research may have been flawed – indeed, using Google Maps, within a minute you find over 250 kebab restaurants in Berlin (almost four times as many as on Foursquare) and God knows how many bars.

At first, this comes as a surprise to you. It seems like you did everything right? Then you stop to think. Might there have been problems with your analysis? You come up with the following:

- Not every venue will be on Foursquare, especially in Berlin. It's much too hip for that.
- Additionally, the Foursquare API only gives you 50 results per call, and as Berlin neighborhoods vary in size wildly, there were probably a lot of results lost.
- The „center“ coordinates and the radius in which you should look for venues in can be very inaccurate because of the shape of neighborhoods.
- The rent price data was only available on a borough level.

„There are probably a lot more problems“, you think to yourself. „But I did my best. Who could have known that sometimes, you can't solve a problem from your bedroom?“

You get drunk and have a doner kebab.

Conclusion

You review your findings again. You've set out to find a neighborhood in Berlin that has lots of bars, is somewhat affordable to live in and has no or barely any kebab restaurants, and do it all without leaving the apartment. Your report seems somewhat elegant, but you have to admit: You've reached a completely wrong conclusion because you had too much trust in the power of the internet (and you were too lazy to walk). Lesson learned.

tl;dr: If you want to open a kebab restaurant in Berlin, don't. Wherever you go, there's already hundreds of them.