

Introduction - Copenhagen Vegetarian / Vegan restaurant scene

During last couple of years more and more people have started to decrease meat consumption for various reasons (e.g. environmental, ethical or other), which has increased the demand for vegetarian and vegan food options across cities. Copenhagen is the largest city of Denmark with estimated population of around 800 thousand (based on Denmark Statistics latest information). Additionally, Copenhagen is attracting large amount of tourists every year.

In a light of the newest trends, this report will investigate the current scene of restaurants with Vegetarian/Vegan friendly options in Copenhagen in order to establish a good overview of available options and understanding of the gaps in the market by segmenting and clustering the different districts in Copenhagen. For these reasons, the research is valuable as the first starting point of further market research in case someone would like to open a vegetarian/vegan restaurant.

Question addressed in this research is: **Where are the most vegan/vegetarian friendly restaurants in Copenhagen and are there any other similar neighborhoods for potential new restaurant?**

Data

Data used for such analysis will include GeoJson file with districts of Copenhagen Area. Together 12 districts have been used for this purpose. Firstly, data on Postal code level was used, however due to huge amount of postal codes and small area size, it was decided to rather utilize district level detail to get more sensible overview. Data was gathered from <https://giedriusk.carto.com/>. In addition to geometry data, information regards venues were gathered from Foursquare API, where venue category, venue name, latitude, longitude was gathered on the nearby distance. GeoJson data will be used to both get the geospatial information to visualize it on folium maps, as well as derive centroids of the different districts of Copenhagen. These lon and lat data points will further be used to gather data from Foursquare API on nearby Vegan/Vegetarian restaurants as well as other venues for segmentation and clustering purposes.

Methodology

In order to utilize the data location information from GeoJson file, additional transformations to geometry object was made to estimate the centroid of all Copenhagen districts. This was done as latitude and longitude of the districts later on were used for gathering data from Foursquare API.

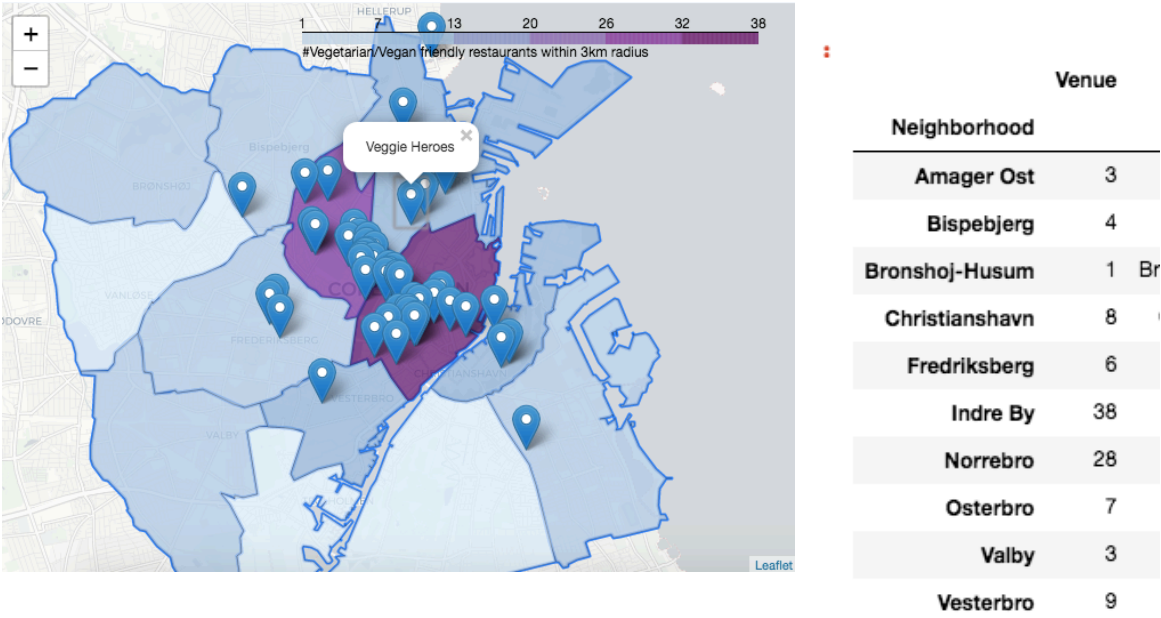
Geocoder API (Foursquare) was then called upon to gather the information on different venues within the radius of 3km of each district. 3km were chosen as basis for the access of vegan/vegetarian restaurants. It could be argued that shorter distance should have been chosen. However, in order to capture the closed venues within reasonably reachable area with bike was chosen. Additionally, another call was done in order to get the information on all vegan/vegetarian restaurants within Copenhagen area to get a full overview in case some venues have not been reached within 3km radius. Descriptive analysis then were done on the results.

For machine learning algorithm of K-means and clustering and segmentation of the different districts - another call from Foursquare was made to get information on all types of venues within districts. By performing clustering based on machine learning algorithm K-means, it was possible then to cluster similar districts.

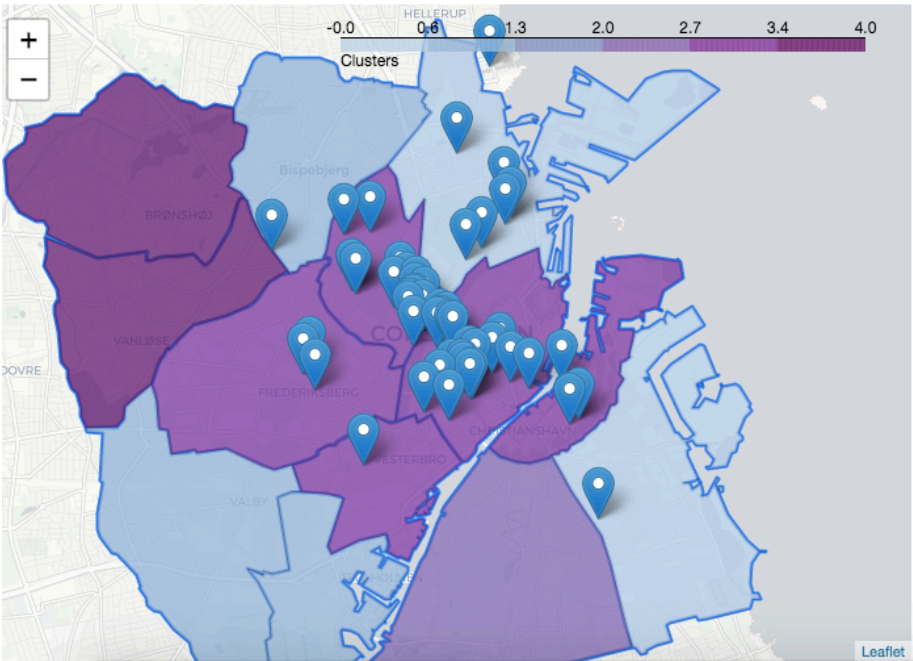
Additionally, folium was used to visualize the results to better interpret the data.

Results

Based on information gathered from Foursquare there are 55 distinct vegetarian/vegan friendly venues within radius of 25km from Copenhagen. Not all of these fall into districts analysed. However, as mentioned above 3km radius was chosen as a starting point to indicate how easily accesable vegan/vegetarian friendly restaurants are there from each distric.



Not surprisingly, the largest amount of Vegan/Vegetarian friendly restaurants are accesible from central Copenhagen area - Indre By. Norrebro area, which is know as a new trendy area in Copenhagen has the second largest amount restaurants within 3km radius from its centroid. Other area, such as Osterbro, which is known more as a high end residential area has only 7 venues within 3km radisu. In order to understand better, which area could potentially be similar to Indre By and Norrebro area, the k-mean clustering has showed that based on top categories of the venues - Frederiksberg, Christianshavn and Valby all are similar within each other. In the figure below the clusters of Copenhagen have been demonstrated.



Discussion

What the analysis of this research has showed that currently Vegan/Vegetarian scene in Copenhagen is very much centered around the most central part of Copenhagen. Norrebro similarly as Indre By has been quite popular hang out area for a lot of people, which most probably also has resulted in more options for vegans and vegetarians. However, what this analysis also showed, is that there is a potential of other districts based on the similarities of other venues those have. For example, Christianshavn is largely famous area for people to go for walks, hang out, and even with some more quality data added in top of this analysis would be considered as quite similar to both. Hence, having only 8 venues within the reach of this area could show a gap in the current market. Obviously, the results need to be further investigated as the amount of venues in the area is not the only contextual factor that should be taken into consideration when choosing where to open a restaurant as other factors such as population, demand, demographics, income etc. could potentially play a role. For that purpose, this research has showed the density of the current Vegan/Vegetarian friendly restaurants in Copenhagen with potential of showcasing that there might be a gap in the market in similar areas with high density.

Conclusion

In conclusion, currently there are around 55 Vegan/Vegetarian friendly restaurants in Copenhagen, with most being within 3km radius of Indre By (Central Copenhagen). Norrebro, which has become a trendy area similarly has large amount of options, however other similar areas to both of these have significantly smaller amounts of options available. Christianshavn is known as well known area in Copenhagen where a lot of people are going out, while Frederiksberg and Valby is considered more as residential areas. All these 3 areas are to have similarities with Norrebro and Indre By, which could potentially be a good place to open a vegan/vegetarian restaurant due to the current market gap.