Introduction / Problem description

In this project, we will try to find an optimal location for a new bar. Specifically, this report will be targeted to stakeholders interested in opening a bar in Moscow city center, Russia.

Since there are many bars in the city center, which are placed around a crowded location, the project will focus on the least occupied areas.

However, the preference for avoiding no-crowded presents.

In simple term, it should be far enough from other bars but still in a crowded area.

Bars and other spots location data obtained from Foursquare API

Methodology

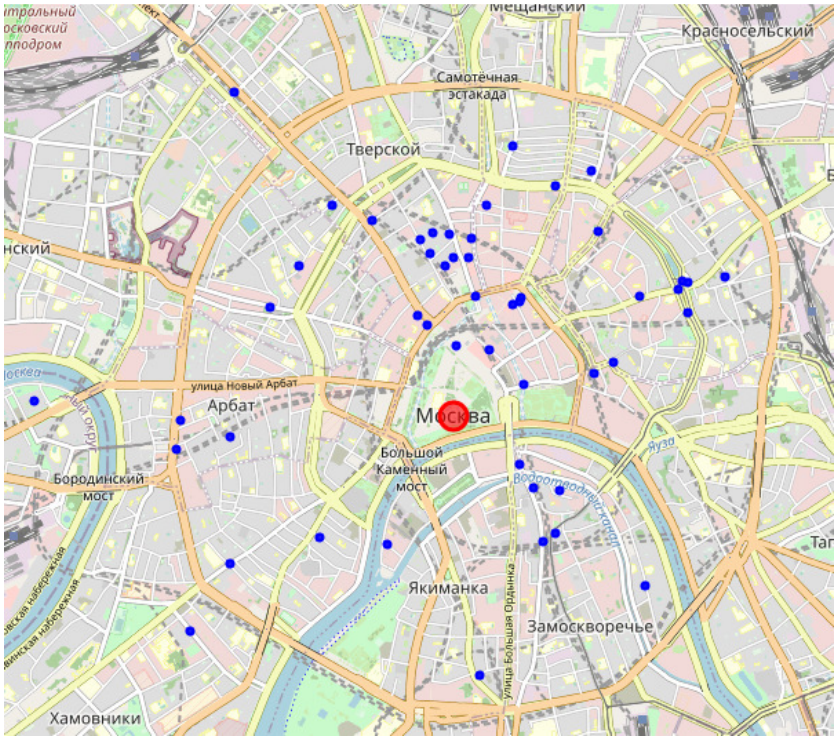
The methodology considers the following steps :

- Getting locations of bars in the city center
- Cluster the locations to get *crowded areas * (here the idea is that existing bars already locates around profitable areas)
- Find the least dense cluster (area/number of bars)
- For the selected cluster find the spot which further away from other bars
- Check if any offices around proposed locations (i.e. proposed bar location should be close to some offices as spot of people attraction)

Project solution steps

Foursquare API shows following bars location map in Moscow city center.

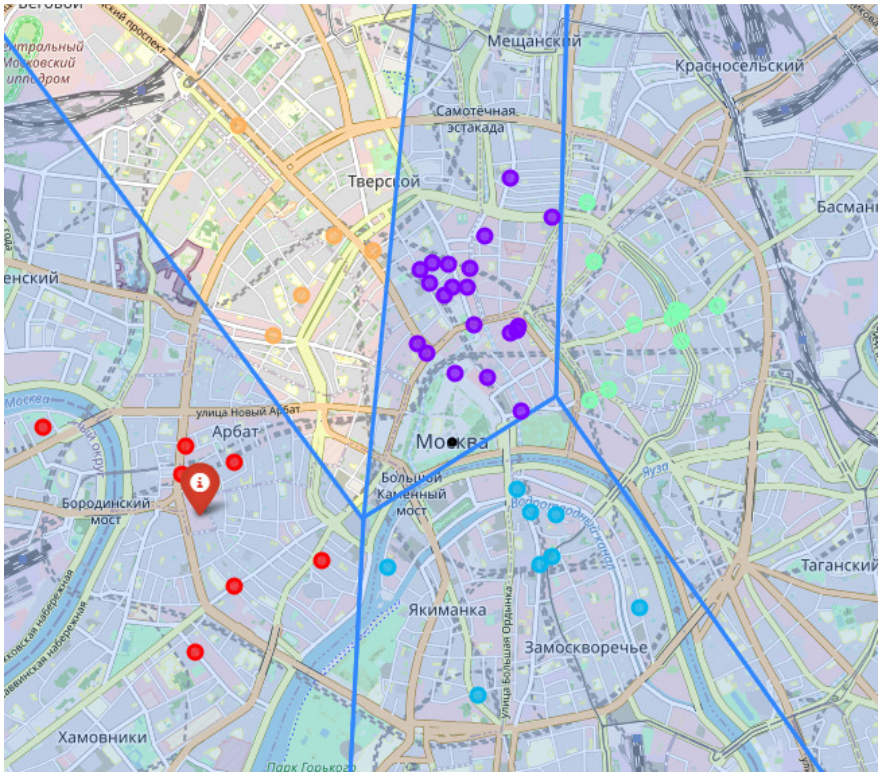
Most likely there are more bars in Moscow but let's use these data set as starting point to demonstrate solution process.



Due city pattern (Moscow river, location of government in the center) the bars are clustered in different areas and starting from the least occupied space would not be logical.

By clustering the dataset , several bar areas can be identified. (here k-means with 5 clusters is used). By using ConveyHux function , boundary points of the cluster can be established and area that every cluster occupies.

Below graph is showing cluster analysis and areas (here boundary of clusters are plotted by using of Voronoi function with using center of clusters)



The table below summaries information about every cluster including number of points(bars) and bars density. With this the cluster 0 seems to be the most promising for further investigation. The center of this cluster marked with Red Icon on the map

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the least occupied cluser is  0.0
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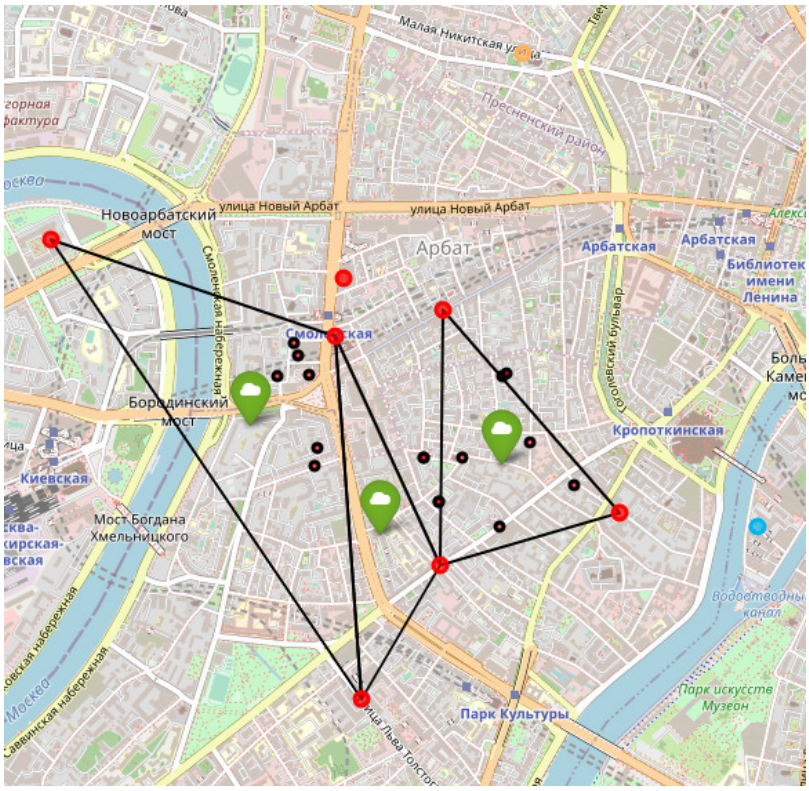
	Cluster	N_point	Area	Density
0	0.0	7.0	0.000271	0.000039
1	1.0	20.0	0.000182	0.000009
2	2.0	8.0	0.000250	0.000031
3	3.0	10.0	0.000122	0.000012
4	4.0	5.0	0.000109	0.000022

By construction triangle areas where a triangular node is a bar location (Delaunay

Function), we can find out the biggest bar empty area (i.e. the biggest triangular area). The center of such a triangular would be a proposed location for a new bar.

Next , the assumption is used that the future bar should be placed next to some attraction spot (an office is used as example). By searching via Foursquare API a number of offices in walking distance (300m) around proposed location can be found. The resulting map with “bar empty areas” , proposed locations and offices around these locations is below



Results and Discussion

The analysis shows that there are several areas\clusters in the city center where people can find a bar. The area around Arbat seems having the lowest density bars and has potential for new place to open. Amount the least occupied areas , "Perichenskiy pereulok" seems to have the highest potential due to 8 offices location in walking distance

Conclusions

the purpose of the project was to recommend a new bar located in the Moscow city, such that the place has a balance of far distance from existing bars and within people busy area. The logic of selection was to find the most suitable location as an infill in existing bars network. To achieve the goal the clustering analysis was used to define "bars busy" areas and the least dense area/cluster was further investigated to define the most "bars empty" region More advanced analysis of the people walking traffic and attraction spots (offices, clubs, shops) could further improve the recommendations