

The Battle of the Neighborhoods – Report

/ choosing the best place to open a fitness center in the Central administrative borough of Moscow /

1. Introduction & Business problem

Moscow is the capital of the Russian Federation, the most populous city in Russia. In a given variety of business opportunities with a favorable business environment. Data attracts many investors to the financial market. In fact, the city of Moscow is a global center of business and trade. He is also major in banking and finance, retail, world trade, transport, tourism, sports, media, advertising, legal services, accounting, insurance, culture, fashion and art in the Russian Federation. This also means that the market is highly competitive. The city of Moscow is actually a megalopolis; the cost of business in it is one of the highest. Thus, any new business venture or expansion needs to be analyzed. The conclusions drawn from the analysis will provide a good understanding of the business environment, which will help in strategic market orientation. This will help reduce risk and the return on investment will be successful.

Business problem

Many people live and work in the city of Moscow. Most people work in an office environment (financial institutions, government agencies, educational institutions, and so on). It is this part of the people that the project is aimed at. People who work in offices simply need to maintain their health with physical education. Office work is associated with a sedentary way of working. And such people need to visit fitness centers for sports. Fitness centers have become popular in the cities of Russia, which seems to be on every corner, not only in large, but also in small cities. Opening a fitness center can be a great business opportunity, but we need to understand how our fitness center should be different from others in order to enjoy long-term success.

If you are planning to open a successful and expensive fitness center, then you need to focus on areas that already attract sophisticated clients. If you are planning a cheap fitness center, you may need to pay attention to places with high traffic, for example, near large shopping centers or in large sleeping areas. Therefore, it is obvious that for the success of a project in such a competitive market it is very important to start planning. Various factors must be examined in order to decide on the location of a fitness center.

My client wants to open his business in the Central administrative boroughs of Moscow, so I focus my attention during my analysis only on this area. The Central administrative boroughs of the city of Moscow is one of the twelve districts of the capital. It was formed in 1991 to administer the territory. The Central administrative boroughs includes 10 neighborhoods: Arbat, Basmanny, Zamoskvorechye, Krasnoselsky, Meshchansky, Presnensky, Tagansky, Tverskoy, Khamovniki and Yakimanka.

The goal is to find and recommend to management which area of Moscow would be the best choice for opening a fitness center. The client's management also expects to understand the rationale behind the recommendation to open a new fitness center in the downtown area. Therefore, this analysis necessary to ensure that we have enough customers and that we are not so close to other fitness center places.

2. Data.

Data 1. To find the best location for a fitness center, we need to research each district in the administrative district of Moscow we have chosen for analysis. For the implementation of the project, it is important to obtain a list of the names of 12 boroughs and 125 neighborhoods of the city of Moscow with their reference to geographic coordinates. This is necessary for the segmentation and study of city districts, that is, we need a dataset containing boroughs and neighborhoods, as well as the latitude and longitude coordinates of each neighborhoods. Fortunately, this dataset is available free on the Internet. We will use information from the open data portal of the Moscow Government (<https://data.mos.ru>). According to the portal, more than 1000 thematic data sets and reference books have been published on it, which disclose information on more than 1,900,000 urban infrastructure facilities. The most widely presented data on the portal are education, sports, health care, key cultural and leisure places. For residents and guests of Moscow, data is presented in tabular and cartographic form, and for developers - in specialized machine-readable formats. I will use a JSON dataset. The portal allows you to work with data directly through the REST API, but we will simplify the task by loading the 'data-4275-2021-06-01.json' file locally - which contains all the information we need to implement the project.

Here is a link to this file <https://op.mos.ru/EHDWSREST/catalog/export/get?id=1106105>.

This dataset needs to be transformed and cleaned up. To do this, you need to translate the names from Cyrillic to Latin, calculate the geographical coordinates for each district and discard duplicates. As a result, we will get the following dataset:

	Borough	Neighborhood	Latitude	Longitude
0	Northeast	Jaroslavskij	55.864151	37.697785
1	Central	Taganskij	55.741998	37.662322
2	Northeast	Lianozovo	55.900109	37.568415
3	Central	Arbat	55.750998	37.592153
4	Southeast	Lefortovo	55.752483	37.707171


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df.shape
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(146, 4)

Data 2. The geographic coordinates of the city of Moscow will be used as input for the Foursquare API. We will use the data is a web search-and-discovery resource, provides personalized recommendations of places to go near a user's current location based on users' previous browsing history and check-in by Foursquare Labs Inc. (<https://foursquare.com>). The below is image of the Foursquare API data. To get the Foursquare API data, use the fitness center category ID [4bf58dd8d48988d175941735](#).

3. Methodology.

For this project, I will use the methodology described in Week 3 lab "Neighborhood Segmentation and Clustering" of the IBM Applied Data Science Capstone course, which can help a new investor choose the best area to open a fitness center in Central borough of Moscow.

	Borough	Neighborhood	Latitude	Longitude
0	Central	Taganskij	55.741998	37.662322
1	Central	Arbat	55.750998	37.592153
2	Central	Meschanskij	55.771993	37.627735
3	Central	Basman'nyj	55.763280	37.656543
4	Central	Zamoskvorech'e	55.735110	37.632451
5	Central	Presnenskij	55.758716	37.567657
6	Central	Tverskoj	55.769039	37.606422
7	Central	Hamovniki	55.732433	37.580824
8	Central	Krasnosel'skij	55.773847	37.650063
9	Central	Jakimanka	55.732413	37.613099

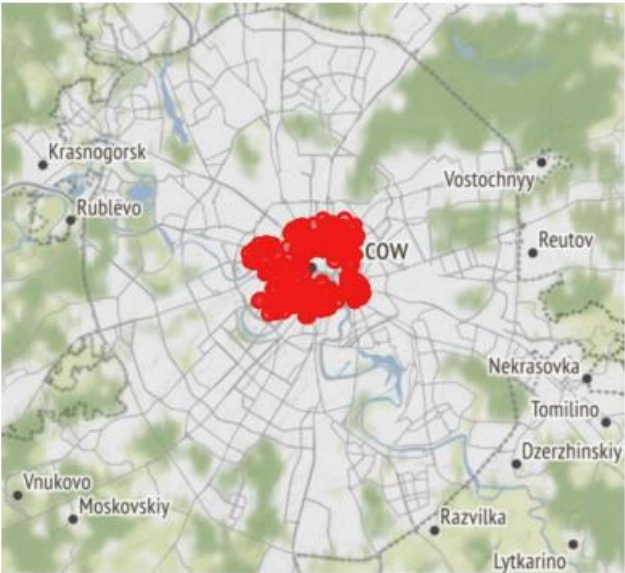
To do this, I used geolocation-linked city district data, combined with folium maps to visually display clusters within the county, and Foursquare data to display the current fitness centers in Central administrative borough.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Taganskij	55.741998	37.662322	Top Stretching	55.741188	37.658452	Gymnastics Gym
1	Taganskij	55.741998	37.662322	FOK v Parke «Taganskij»	55.738409	37.666063	Gym / Fitness Center
2	Taganskij	55.741998	37.662322	La Salute	55.743409	37.656018	Gym / Fitness Center
3	Taganskij	55.741998	37.662322	Heavy Duty	55.736286	37.672850	Gym / Fitness Center
4	Taganskij	55.741998	37.662322	Stadion «Taganskij»	55.737565	37.666959	Soccer Field

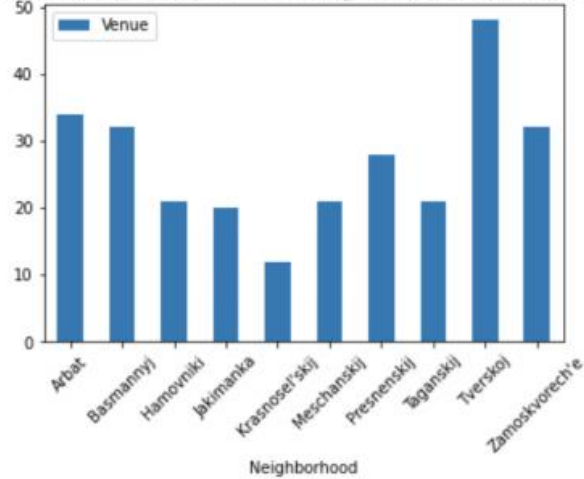

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msk_venues.shape
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(287, 7)

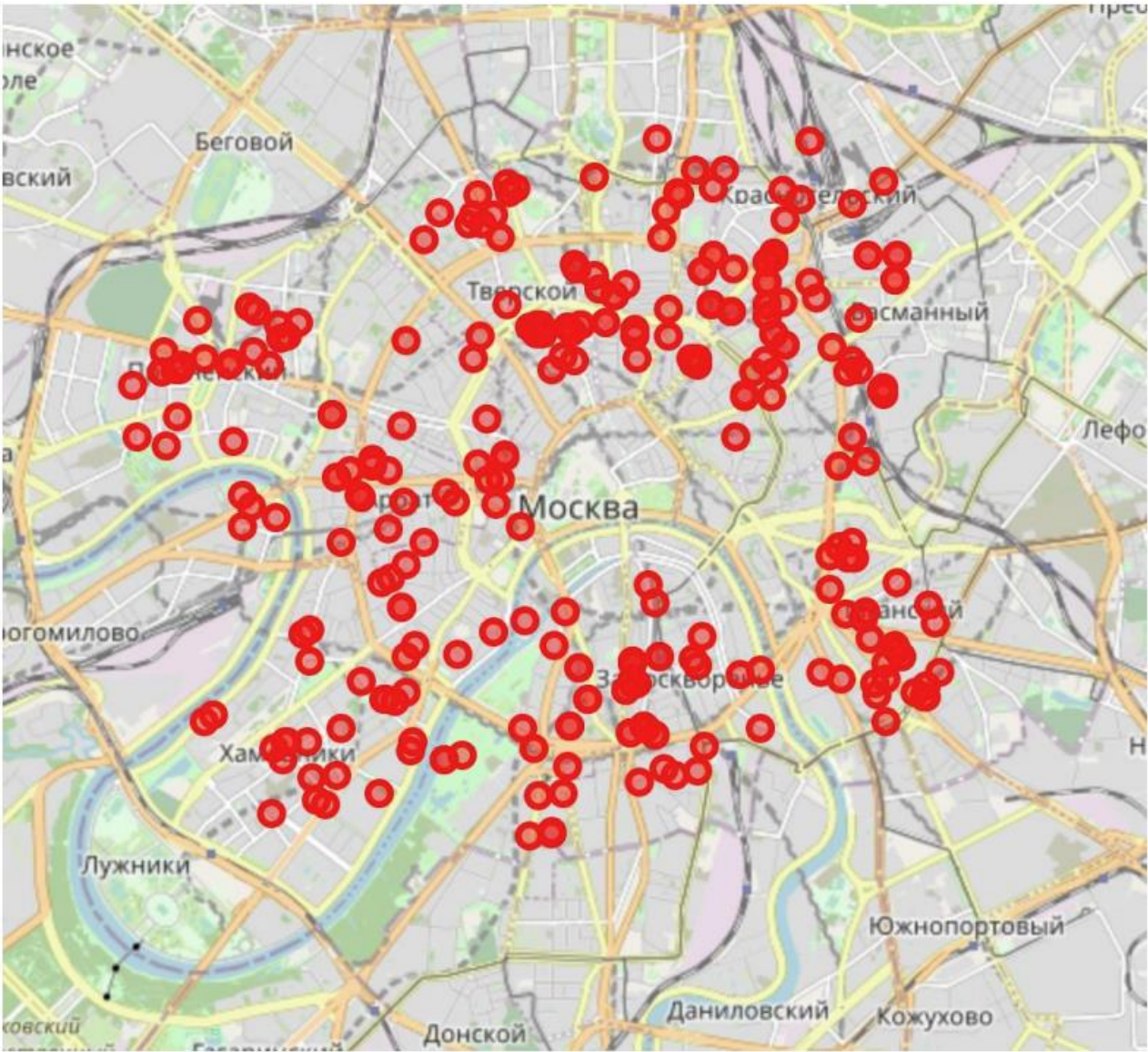
Fitness centers in the Central borough of Moscow:



The number of fitness centers in each Neighborhood of the central borough



Visualization with magnification, on the OpenStreetMap tile of Folium library, all fitness centers of Central borough:



Fitness centers in Central borough

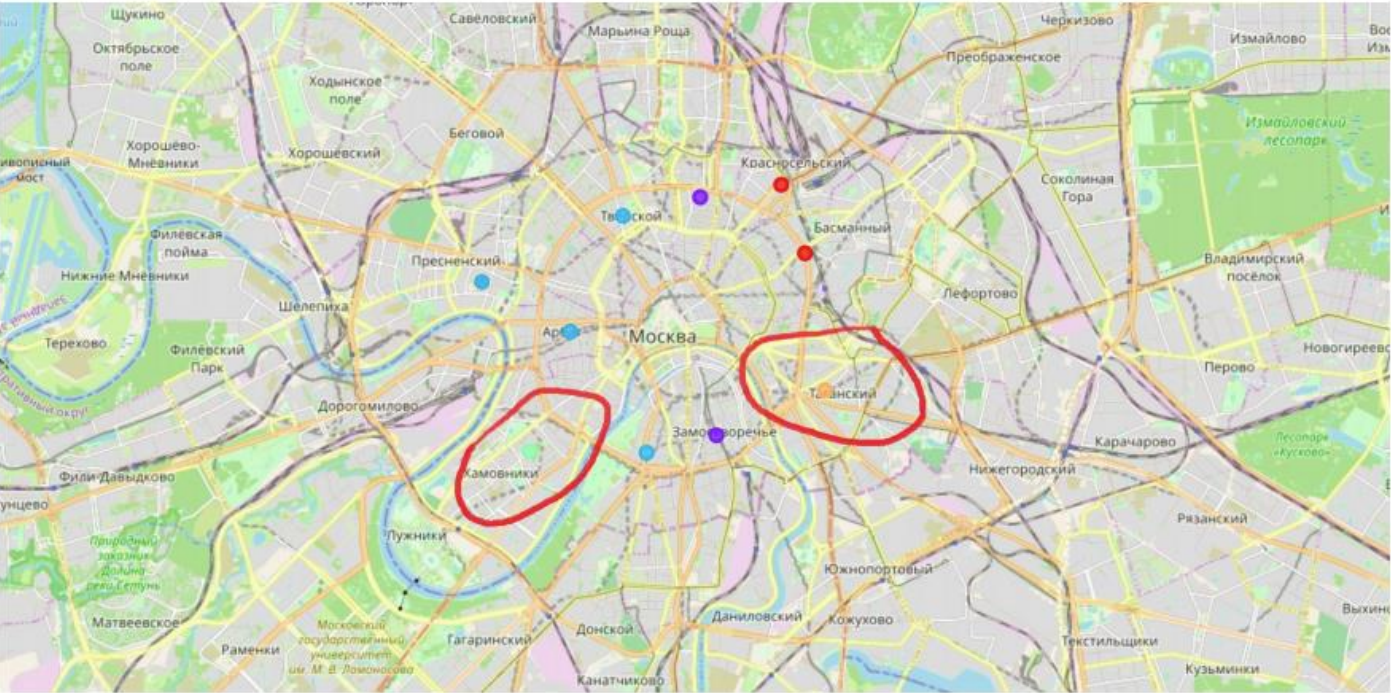
	Neighborhood	Latitude	Neighborhood	Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
	Arbat	28		28	28	28	28	28
	Basmanyj	29		29	29	29	29	29
	Hamovniki	28		28	28	28	28	28
	Jakimanka	28		28	28	28	28	28
	Krasnosel'skij	29		29	29	29	29	29
	Meschanskij	29		29	29	29	29	29
	Presnenskij	29		29	29	29	29	29
	Taganskij	30		30	30	30	30	30
	Tverskoj	30		30	30	30	30	30
	Zamoskvorech'e	27		27	27	27	27	27

Neighborhood	Arts & Entertainment	Boxing Gym	College Gym	Cycle Studio	Dance Studio	Gym	Gym / Fitness Center	Gym Pool	Gymnastics Gym	Martial Arts School	Massage Studio	Outdoor Gym	Pool	Soccer Field	Social Club	Spa	Spiritual Center	Sports Club	Tennis Court	Track	Yoga Studio
0 Taganskij	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
1 Taganskij	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Taganskij	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Taganskij	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Taganskij	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Then use feature to group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task. And also, the Folium library to visualize the neighborhoods in Central and its emerging clusters.

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
0 Arbat	Gym / Fitness Center	Yoga Studio	Gym	Martial Arts School	Track	Gymnastics Gym	Boxing Gym	Spa	Soccer Field	Tennis Court
1 Basmanyj	Gym / Fitness Center	Yoga Studio	Gym	Martial Arts School	Spiritual Center	Boxing Gym	Soccer Field	Track	Tennis Court	Sports Club
2 Hamovniki	Gym / Fitness Center	Yoga Studio	Gym	Outdoor Gym	Gymnastics Gym	Boxing Gym	Track	Social Club	Pool	Arts & Entertainment
3 Jakimanka	Gym / Fitness Center	Yoga Studio	Gym	Track	Dance Studio	Sports Club	Outdoor Gym	Soccer Field	Tennis Court	Spiritual Center
4 Krasnosel'skij	Gym / Fitness Center	Yoga Studio	Gym	Track	Spiritual Center	Boxing Gym	Pool	Tennis Court	Sports Club	Spa

Visualization of the Central administrative borough and its new five clusters with recomondations for business:



4. Methodology.

K-mean Cluster Using K-mean to clustering data area with less number of fitness centers.

Cluster 0

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
4 Zamoskvorech'e	Gym / Fitness Center	Yoga Studio	Gym	Track	Dance Studio	Sports Club	Gymnastics Gym	Soccer Field	Tennis Court	Spiritual Center
8 Krasnoser'skij	Gym / Fitness Center	Yoga Studio	Gym	Track	Spiritual Center	Boxing Gym	Pool	Tennis Court	Sports Club	Spa
9 Jakimanka	Gym / Fitness Center	Yoga Studio	Gym	Track	Dance Studio	Sports Club	Outdoor Gym	Soccer Field	Tennis Court	Spiritual Center

Cluster 1

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
1 Arbat	Gym / Fitness Center	Yoga Studio	Gym	Martial Arts School	Track	Gymnastics Gym	Boxing Gym	Spa	Soccer Field	Tennis Court
2 Meschanskij	Gym / Fitness Center	Gym	Yoga Studio	Gymnastics Gym	Tennis Court	Outdoor Gym	Boxing Gym	Martial Arts School	Massage Studio	Gym Pool
3 Basman'nyj	Gym / Fitness Center	Yoga Studio	Gym	Martial Arts School	Spiritual Center	Boxing Gym	Soccer Field	Track	Tennis Court	Sports Club

Cluster 2

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
5 Presnenskij	Gym / Fitness Center	Yoga Studio	Gym	Track	Sports Club	Spa	Martial Arts School	Outdoor Gym	Soccer Field	Tennis Court
6 Tverskoj	Gym / Fitness Center	Yoga Studio	Gymnastics Gym	Cycle Studio	Tennis Court	Gym	Martial Arts School	Boxing Gym	Spa	Social Club

Cluster 3

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
0 Taganskij	Gym / Fitness Center	Yoga Studio	Martial Arts School	College Gym	Cycle Studio	Track	Gym	Gym Pool	Gymnastics Gym	Boxing Gym

Cluster 4

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
7 Hamovniki	Gym / Fitness Center	Yoga Studio	Gym	Outdoor Gym	Gymnastics Gym	Boxing Gym	Track	Social Club	Pool	Arts & Entertainment

5. Discussion.

Based on dataframe analysis above Cluster 3 (**Taganskij**) and Cluster 4 (**Hamovniki**) neighborhoods are the best places to open a new fitness centers.

This analysis was performed on limited data. This may or may not be correct. But if you have enough data, you can get better results.

- The best option is to consider the Cluster 4 and Cluster 3 areas. They have almost the same potential for starting a business.
- There is a lot of competition in Cluster 0 and Cluster 1 and Cluster 2, so it is very risky to start a business in these areas.
- For a more detailed analysis, it is necessary to add other factors such as demographics, the proximity of office buildings, etc.

Finally FourSquare proved to be a good source of data. However, remember, the research results are educational material and cannot be used in real business, but the method itself can.

6. Conclusion.

The goal of the project was achieved and, with some work, could support the discovery of a business idea in an unknown location. Of course, there is room for further improvement and development, because we used a limited set of data. According to the type of area and type of business - gym / fitness center, the analysis can be checked. The analysis allows you to determine the place with the least risk and competition.

Thank you!

Dmitry Rabot'ko as assignment of an IBM Applied Data Science Capstone training course created this report.