

# **Research of Minsk bakeries**

### ***Target audience of this research:***

It's definitely people who interested in opening bakery and looking for district to open place. In my mind this person should consider how many bakeries Minsk has now and how peoples rated it.

Opening hours in my opinion also important because I and my colleagues and friends really likes to buy fresh croissant and morning coffee when we're going to work.

### ***Data description of research:***

- Open source data about Minsk districts from yandex map.
- API foursquare to find all bakeries of Minsk.

### ***Used libraries:***

pandas, numpy, requests, json, geodesic, translit etc.

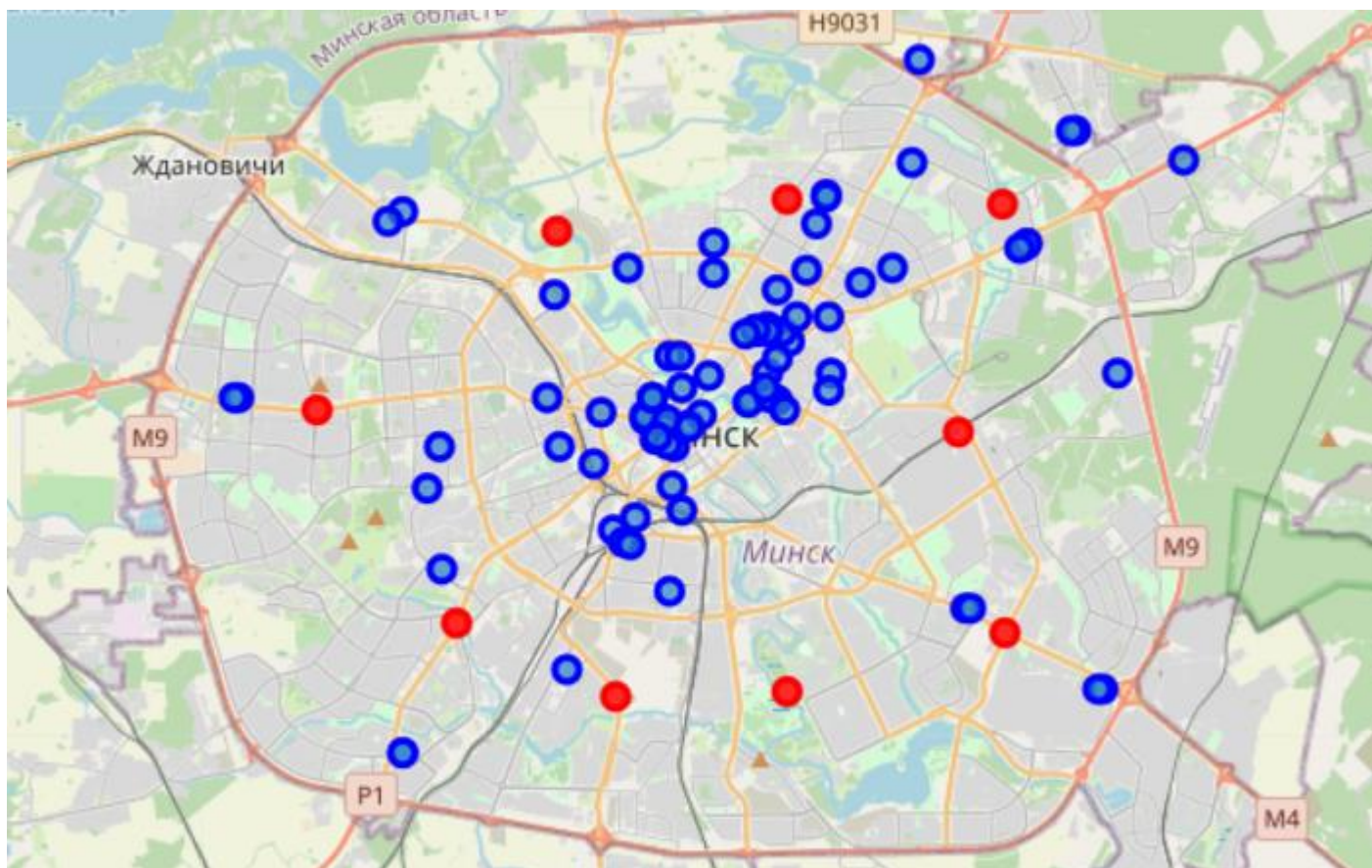
### ***Machine learning techniques:***

K-means for clustering data.

**Red dots: center of districts**

**Blue dots: bakeries**

	district	summary	id	name	lat	lng	categories
0	Центральный район	This spot is popular	5473097b498e2d4d05afda1b	Пан Круассан	53.929749	27.541323	Bakery
1	Центральный район	This spot is popular	59ee1ae8d0a1496688e63150	Brioche Bistro	53.939274	27.478426	Bakery
2	Центральный район	This spot is popular	58ba97964bc2f1632a353e04	Stories	53.900877	27.552514	Bakery
3	Центральный район	This spot is popular	522dc5b311d2920f2460d44c	Cakes.by	53.900149	27.522044	Bakery
4	Центральный район	This spot is popular	4f7afb6ae4b02579039ddc3f	Зерно	53.912388	27.580818	Bakery

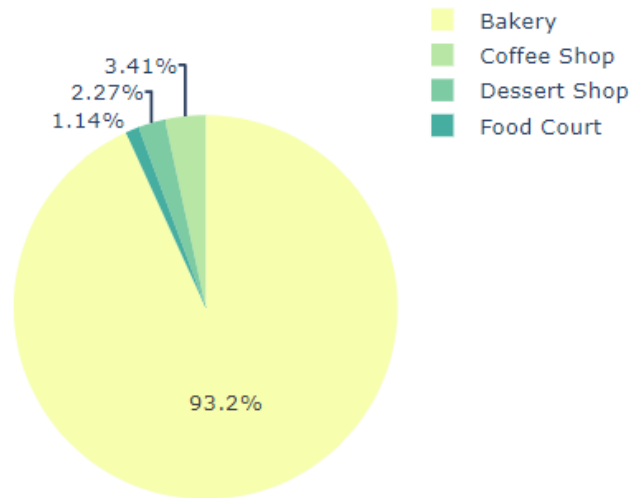


## Table districts with mean values:

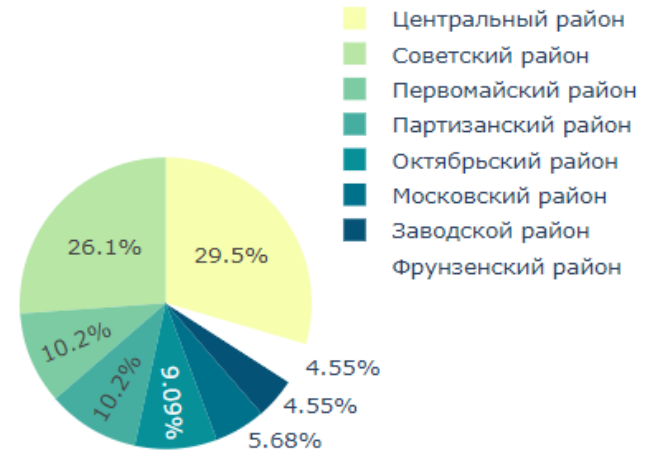
	likes	dislike	rating	price	ok	ratingSignals	specials	tips	listed
district									
Фрунзенский район	7.000000	False	3.525000	0.000000	False	11.500000	0.0	2.000000	1.500000
Октябрьский район	64.250000	False	3.612500	0.250000	False	96.625000	0.0	22.000000	14.000000
Центральный район	77.576923	False	4.092308	0.192308	False	133.461538	0.0	36.461538	16.384615
Заводской район	8.000000	False	4.325000	0.000000	False	14.250000	0.0	3.500000	0.000000
Советский район	59.347826	False	4.404348	0.173913	False	94.391304	0.0	24.130435	12.347826
Первомайский район	10.222222	False	4.433333	0.000000	False	18.222222	0.0	4.444444	0.666667
Московский район	80.200000	False	5.940000	0.400000	False	117.000000	0.0	33.200000	17.600000
Партизанский район	85.222222	False	5.955556	0.222222	False	147.666667	0.0	34.222222	16.333333

# Plots of data frame trough by district and category

Count of places by categories

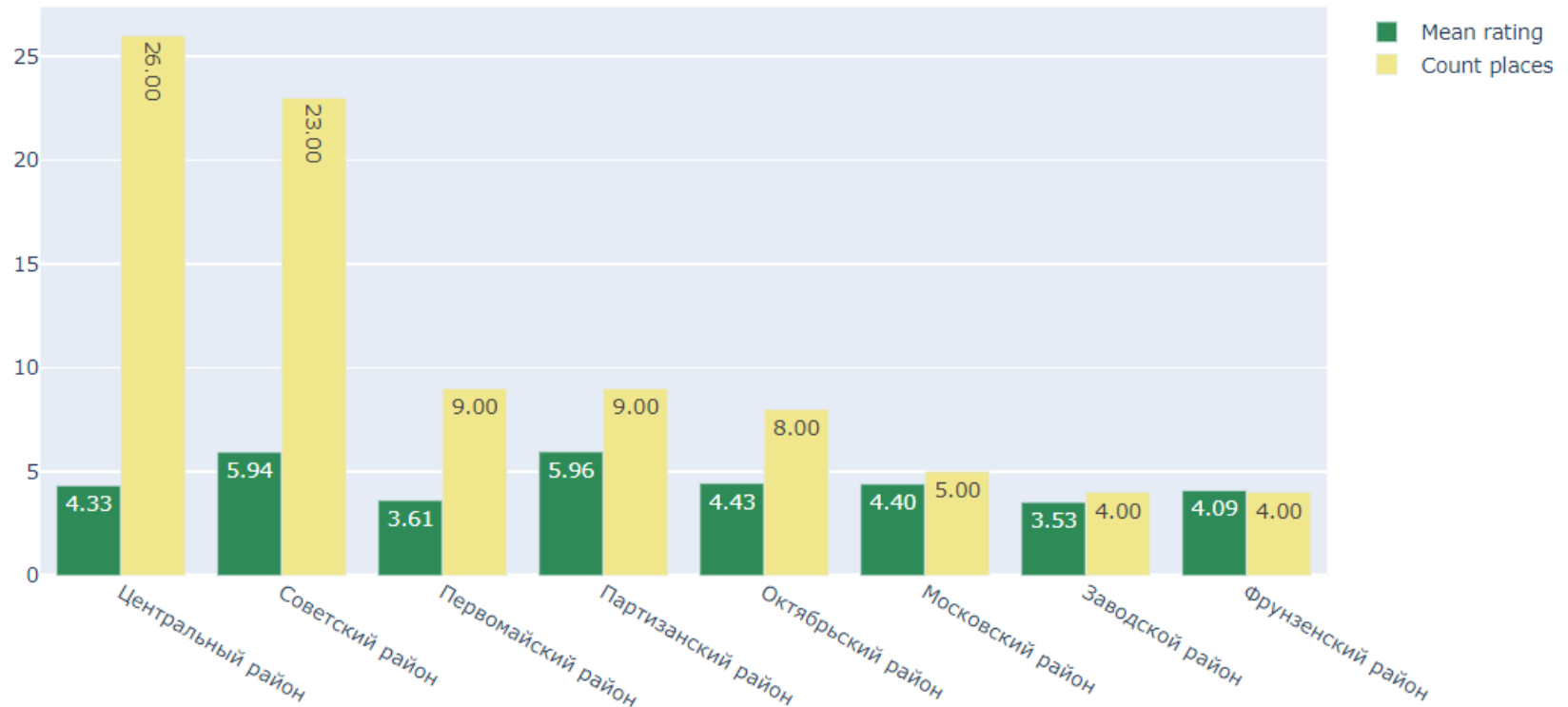


Count of places by district



# Mean rating and count likes of places by district

Mean rating and count likes of places by district



*As we've seen the plot higher:*

1. 'Центральный район' has most of bakeries in Minsk.
2. 'Партизанский район' has highest rating bakeries in Minsk.

Using K-Means algorithm fit our model to cluster data frame to 5 categories

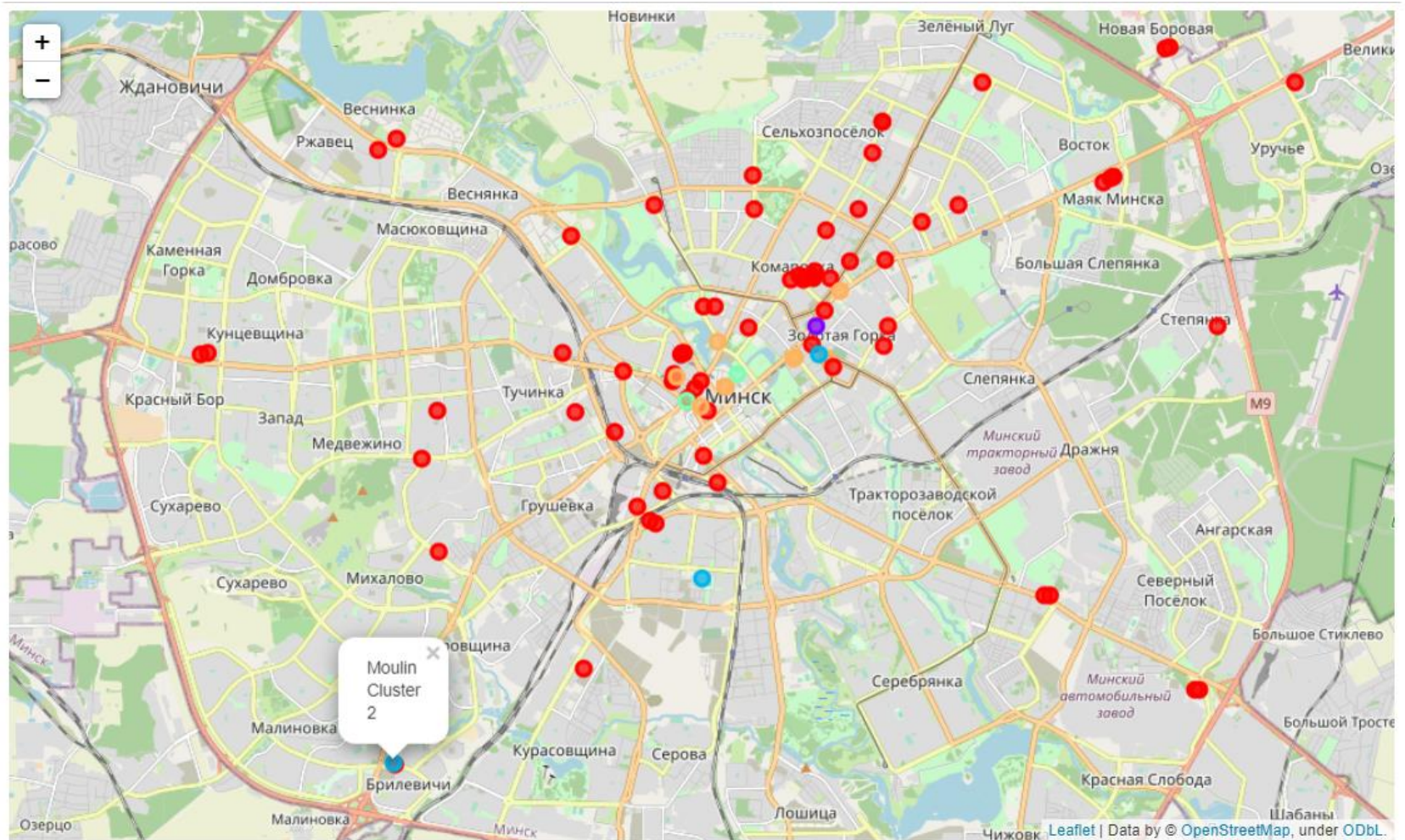
Looking the mean value of each cluster below:

	likes	dislike	rating	price	ok	ratingSignals	specials	tips	listed	lat	lng
cluster											
0	12.054795	False	3.946575	0.000000	False	19.342466	0.0	5.205479	3.410959	53.912398	27.571215
1	1011.000000	False	7.900000	2.000000	False	1541.000000	0.0	357.000000	229.000000	53.912388	27.580818
2	355.000000	False	7.666667	2.000000	False	551.333333	0.0	125.333333	70.000000	53.878120	27.537466
3	436.000000	False	6.300000	1.000000	False	809.500000	0.0	235.000000	29.000000	53.903553	27.555421
4	154.222222	False	6.622222	0.555556	False	263.222222	0.0	70.222222	35.888889	53.907192	27.566023

- As we seen the best mean value of rating, prices and likes has **1** and **2** clusters. This bakeries definitely should visit.



# Adding places on map using color scheme for different clusters:





# The best bakeries in Minsk according to model:

	id	likes	dislike	rating	url	price	ok	ratingSignals	specials	tips	...	summary	name
8	4f7afb6ae4b02579039ddc3f	1011	False	7.9	http://cafezerno.by	2	False	1541	0	357	...	This spot is popular	Зерно

	id	likes	dislike	rating	url	price	ok	ratingSignals	specials	tips	...	summary	name
33	54fee005498e8e467263436b	340	False	7.0	http://www.cafezerno.by	2	False	588	0	103	...	This spot is popular	Зерно
0	4bfcf7b58992a593595fabb0	399	False	7.3	http://cafe-bakery.relax.by	2	False	601	0	142	...	This spot is popular	Бейкери Дю Солей
19	50f17208e4b08ef910e45079	326	False	8.7	http://moulin.relax.by	2	False	465	0	131	...	This spot is popular	Moulin

# Answering to the question:

## 'Which Minsk district really need more bakeries?'

I should notice that most count of bakeries belong to the center of city and central district.

And it's okay because most of cultural and evening life are using there, all European cities has the same statistic.

But according to my question - bakery for me, it's firstly the morning coffee and croissant and **I defiantly recommend to open bakeries not in the center of city, but in the new districts far from the center.**

Really great example we can see at 'Moulin' bakery which is according to the high 2 cluster. From all 88 Minsk's bakeries just 3 from it has 2 cluster and it place is situated to new district.