Best Business Place in Kanpur

Introduction/Business Problem

Kanpur is a large city in the state of Uttar Pradesh, India. It is the 12th most populous city in India and 11th most populous urban agglomeration. It is also the second largest city proper and the largest urban agglomeration in Uttar Pradesh. Located on the west bank of the Ganges River, it is a major trade and commercial centre in North India with the first woollen mill of India, the British India Corporation established here in 1876 by Alexander McRobert. The city is widely regarded as "The Leather City of the World" and is also nicknamed as "Manchester of India".

Having a large population, the demand for food will also be large. Hence any potential investor would want to open a business related to food in Kanpur. However the decision to where open the business plays a key role. We will cluster various neighbourhoods of Kanpur and find the best cluster to open a business

Target audience will be any investor who wants to open a business in Kanpur related to food.

Data Description

	Neighborhood	Latitude	Longitude
0	Nawabganj	26.492607	80.301811
1	Barra	26.427971	80.296242
2	Yashoda Nagar	26.4034	80.3368
3	Arya Nagar	26.4834	80.3217
4	Ashok Nagar	26.4713	80.3172
5	Azad Nagar	26.4543	80.2786
6	Bhauti	26.4476	80.1934
7	Chowk Sarafa	26.4697	80.3496
8	Chunni Ganj	26.4781	80.3359
9	Civil Lines	26.4750	80.3533

1. FourSquare API is used to get common venues in a particular area.

2. Latitude and Longitude taken from Google Search

Data can be extracted is nearby venues (using Foursquare) as shown

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barra	26.427971	80.296242	Axis Bank ATM	26.423720	80.295840	ATM
1	Yashoda Nagar	26.4034	80.3368	Axis Bank ATM	26.401577	80.341095	ATM
2	Arya Nagar	26.4834	80.3217	Upper Crust	26.482225	80.320857	Bakery
3	Arya Nagar	26.4834	80.3217	Mithas	26.485217	80.321400	Indian Restaurant
4	Arya Nagar	26.4834	80.3217	Aromas, Arya Nagar	26.482953	80.318024	Fast Food Restaurant
5	Arya Nagar	26.4834	80.3217	cafe coffee day	26.483661	80.320399	Coffee Shop
6	Arya Nagar	26.4834	80.3217	Makhan Singh (Biryani Spot)	26.481089	80.321161	Fast Food Restaurant
7	Arya Nagar	26.4834	80.3217	KD Palace	26.480891	80.321732	Indian Restaurant
8	Arya Nagar	26.4834	80.3217	Mr Brown Bakery	26.486043	80.323756	Bakery
9	Arya Nagar	26.4834	80.3217	Ganges Club	26.480379	80.323979	Club House

Methodology

Pandas was used to store and retrieve data. Here is an overview of initial data

	Neighborhood	Latitude	Longitude
0	Nawabganj	26.492607	80.301811
1	Barra	26.427971	80.296242
2	Yashoda Nagar	26.4034	80.3368
3	Arya Nagar	26.4834	80.3217
4	Ashok Nagar	26.4713	80.3172
5	Azad Nagar	26.4543	80.2786
6	Bhauti	26.4476	80.1934
7	Chowk Sarafa	26.4697	80.3496
8	Chunni Ganj	26.4781	80.3359
9	Civil Lines	26.4750	80.3533

Then FourSquare API was used to get venues nearby

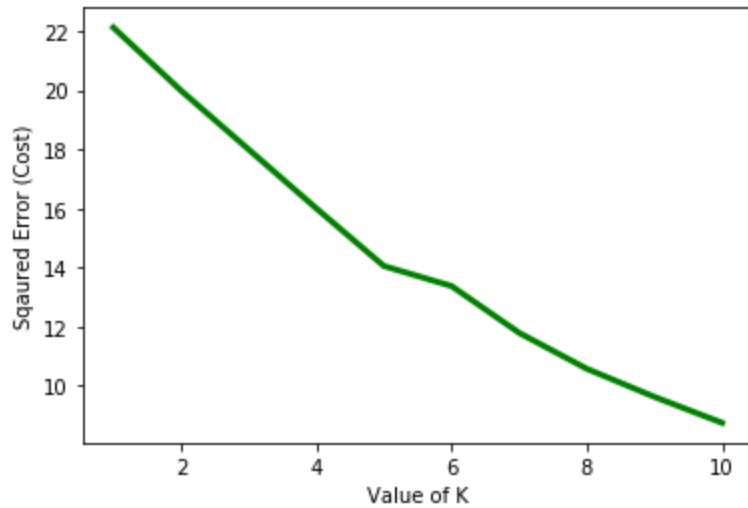|	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barra	26.427971	80.296242	Axis Bank ATM	26.423720	80.295840	ATM
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9	Arya Nagar	26.4834	80.3217	Ganges Club	26.480379	80.323979	Club House

Then one hot encoding was used to make the data ready for clustering

	Neighborhood	ATM	Afghan Restaurant	Asian Restaurant	Awadhi Restaurant	Bakery	Boat or Ferry	Bookstore	Bowling Alley	Breakfast Spot	...	Mexican Restaurant	Multiplex	Park	Pizza Place
0	Arya Nagar	0.0	0.0	0.0	0.000000	0.20	0.0	0.0	0.000000	0.0	...	0.0	0.000000	0.000000	0.000000
1	Ashok Nagar	0.0	0.0	0.0	0.000000	0.00	0.0	0.0	0.000000	0.0	...	0.0	0.000000	0.250000	0.000000
2	Azad Nagar	0.0	0.0	0.0	0.000000	0.00	0.0	0.0	0.000000	0.0	...	0.0	0.000000	0.000000	0.000000
3	Barra	1.0	0.0	0.0	0.000000	0.00	0.0	0.0	0.000000	0.0	...	0.0	0.000000	0.000000	0.000000
4	Chowk Sarafa	0.0	0.0	0.0	0.000000	0.00	0.0	0.0	0.000000	0.0	...	0.0	0.166667	0.000000	0.000000
5	Civil Lines	0.0	0.0	0.0	0.000000	0.00	0.0	0.0	0.000000	0.0	...	0.0	0.100000	0.000000	0.100000
6	Darshan Purwa	0.0	0.0	0.0	0.000000	0.00	0.0	0.0	0.000000	0.0	...	0.0	0.000000	0.000000	0.000000
7	Defence Colony	0.0	0.0	0.0	0.000000	0.20	0.0	0.2	0.000000	0.0	...	0.2	0.000000	0.000000	0.000000
8	Fazalganj	0.0	0.0	0.0	0.000000	0.00	0.0	0.0	0.000000	0.0	...	0.0	0.000000	0.000000	0.000000
9	Ghumni Bazar	0.0	0.0	0.0	0.000000	0.00	0.0	0.0	0.000000	0.0	...	0.0	0.000000	0.000000	0.000000

Then we added top 10 venues for each location

	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	Arya Nagar	Indian Restaurant	Fast Food Restaurant	Bakery	Coffee Shop	Club House	Tea Room	Bus Station	Clothing Store	Camera Store	Café
1	Ashok Nagar	Hotel	Tea Room	Park	Breakfast Spot	Coffee Shop	Club House	Clothing Store	Camera Store	Café	Bus Station
2	Azad Nagar	Diner	Dessert Shop	Convenience Store	Coffee Shop	Club House	Clothing Store	Camera Store	Café	Bus Station	Breakfast Spot
3	Barra	ATM	Dessert Shop	Convenience Store	Coffee Shop	Club House	Clothing Store	Camera Store	Café	Bus Station	Breakfast Spot
4	Chowk Sarafa	Dessert Shop	Shopping Mall	Clothing Store	Multiplex	Cosmetics Shop	Bus Station	Convenience Store	Coffee Shop	Club House	Camera Store

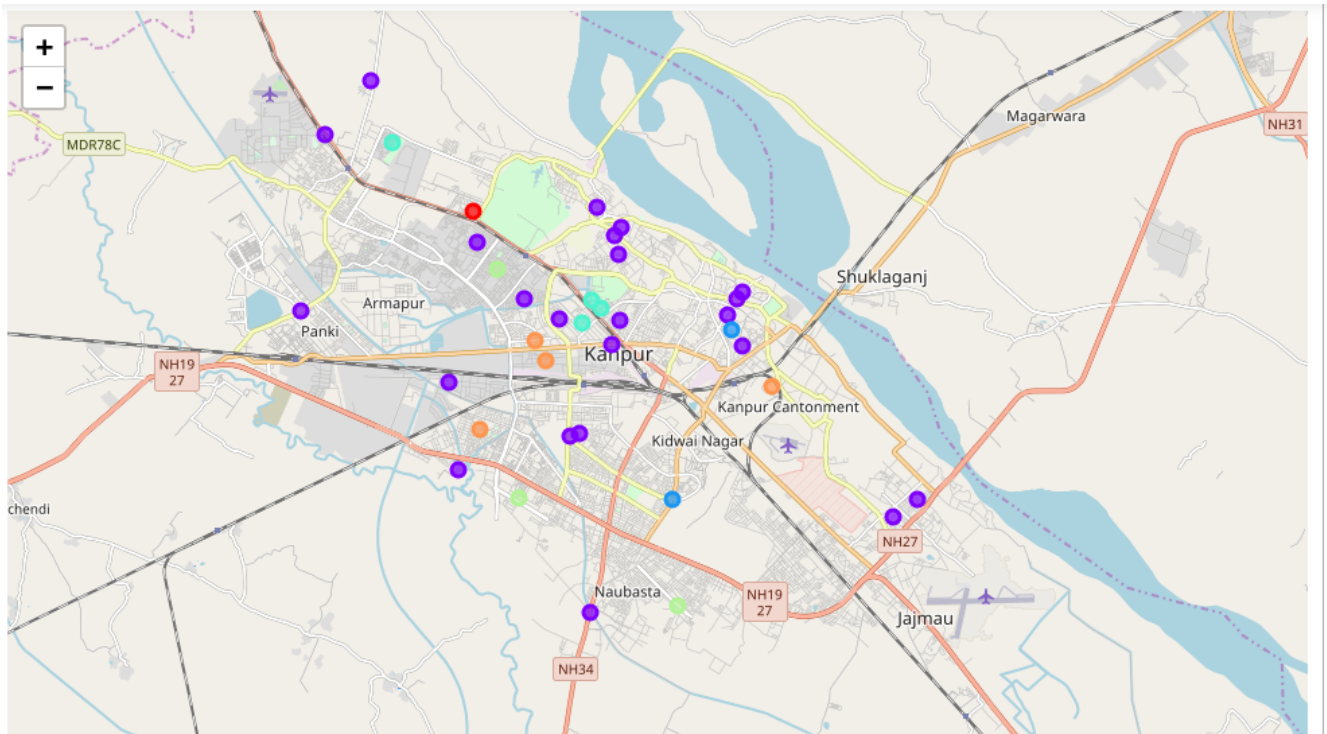Finally we found the elbow point for optimal k in k means clustering

Finally we apply k means clustering to find venues

	Neighborhood	Latitude	Longitude	Cluster Labels	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 Com
1	Barra	26.427971	80.296242	4.0	ATM	Dessert Shop	Convenience Store	Coffee Shop	Club House	Clothing Store	Camera Store	Café	S
2	Yashoda Nagar	26.4034	80.3368	4.0	ATM	Dessert Shop	Convenience Store	Coffee Shop	Club House	Clothing Store	Camera Store	Café	S
3	Arya Nagar	26.4834	80.3217	1.0	Indian Restaurant	Fast Food Restaurant	Bakery	Coffee Shop	Club House	Tea Room	Bus Station	Clothing Store	C
4	Ashok Nagar	26.4713	80.3172	3.0	Hotel	Tea Room	Park	Breakfast Spot	Coffee Shop	Club House	Clothing Store	Camera Store	
5	Azad Nagar	26.4543	80.2786	1.0	Diner	Dessert Shop	Convenience Store	Coffee Shop	Club House	Clothing Store	Camera Store	Café	S
7	Chowk Sarafa	26.4697	80.3496	1.0	Dessert Shop	Shopping Mall	Clothing Store	Multiplex	Cosmetics Shop	Bus Station	Convenience Store	Coffee Shop	
9	Civil Lines	26.4750	80.3533	1.0	Fast Food Restaurant	Diner	Multiplex	Dessert Shop	Clothing Store	Café	Cosmetics Shop	Pizza Place	Sho
10	Darshan Purwa	26.4629	80.3200	1.0	Electronics Store	Tea Room	Bus Station	Convenience Store	Coffee Shop	Club House	Clothing Store	Camera Store	
11	Defence Colony	26.4276	80.3979	1.0	Spa	Restaurant	Bakery	Bookstore	Mexican Restaurant	Tea Room	Bus Station	Coffee Shop	
12	Fazalganj	26.4591	80.3032	5.0	Indian Restaurant	Tea Room	Bus Station	Convenience Store	Coffee Shop	Club House	Clothing Store	Camera Store	

We can see that cluster 1 is ideal for our business

Finally we plot the clusters on map using folium

Results

Below places are most suitable for opening business:

Arya Nagar', 'Azad Nagar', 'Chowk Sarafa', 'Civil Lines', 'Darshan Purwa', 'Defence Colony', 'Govind Nagar', 'Harjinder Nagar', 'Jawahar Nagar', 'Kalyanpur', 'Lajpat Nagar', 'Mall Road', 'Nirala Nagar', 'Naubasta', 'Nayaganj', 'Pandu Nagar', 'Panki', 'Swaroop Nagar', 'Sharda Nagar', 'Singhpur', 'Vishnupuri', 'Tatya Tope Nagar', 'Tilak Nagar

Conclusion

We have clustered various places in Kanpur and found the most suitable places to open a business related to food