

The Battle of the Neighborhoods

Report Presentation

Background

- ▶ South Africa is divided into 9 Provinces; these provinces each have one or more cities. Gauteng Province hosts the economic hub of Africa, by implication cities within this province have most of the economic activities than any other cities in the country. The province is also mainly urbanized than the other 8 provinces.
- ▶ The South African citizen's perception is therefore that if you need to shop the best of the best you need to do it in one of the cities in Gauteng. Of all the cities in the Gauteng Province, Johannesburg is held to the highest regard than the others, but the rest of the cities in Gauteng also remain attractive to prospective business from international and locally.



Problem Statement

- ▶ Construction Company XYZ Investments is interested in building a massive shopping mall that will be housing mostly international and a number of local businesses, the mall will also have mostly high end restaurants. The mall should be located in one of the Gauteng cities but shouldn't be too close to an area where other malls are popular as this will increase competition especially on prices.
- ▶ As a Data Scientists, the team is required to identify a conducive city or cluster of neighborhoods where the mall can be built with a potential for good business.

Gauteng Province Map



Data Description and Sources

Data

- ▶ The data that was used is the geographical codes and coordination of South African cities and provinces, this data will be vital in identifying the cities/neighborhoods across the provinces.
- ▶ The second dataset will come from the Foursquare site; this data will be utilized to identify business types across the cities/neighborhoods. The data will also assist in clustering cities/neighborhoods according to the types of businesses.

Data Sources

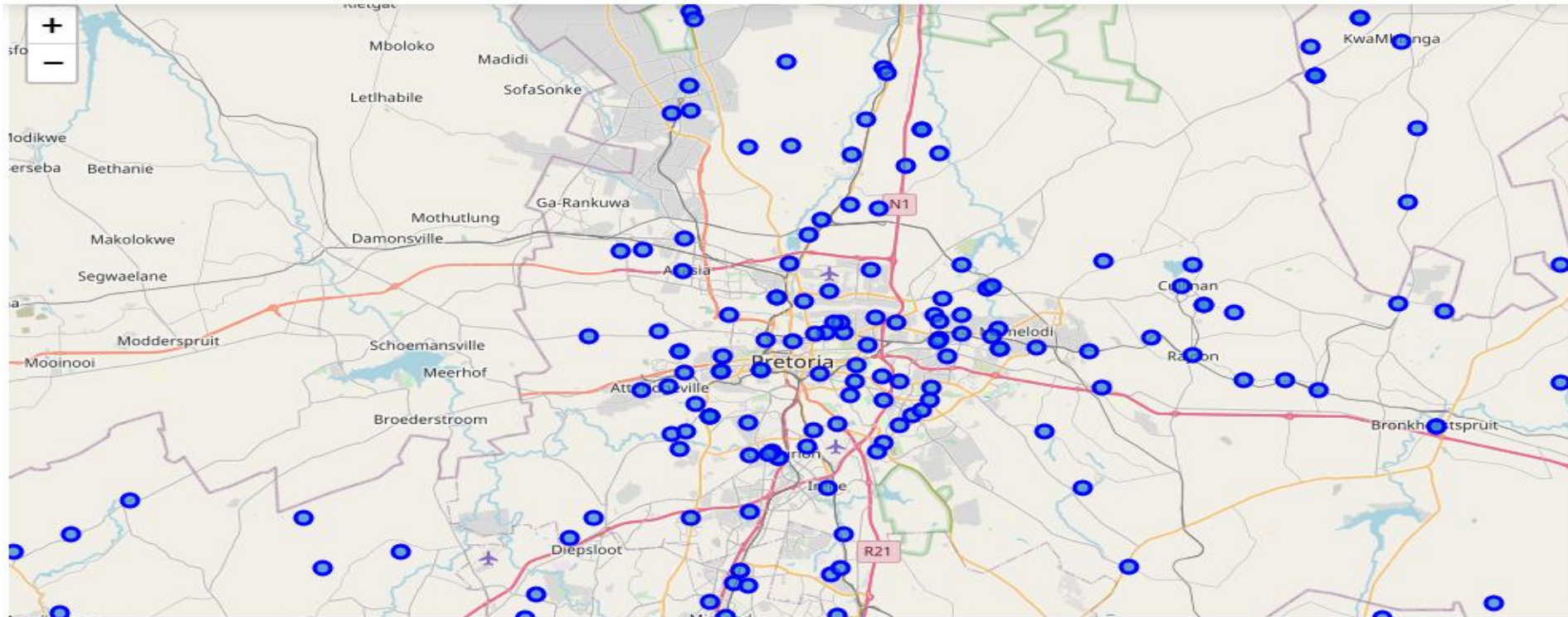
- ▶ <https://dirkstrauss.com/south-african-cities/>
- ▶ <https://foursquare.com/>

	City	Province Name	Latitude	Longitude
0	Gqaka	Eastern Cape	-31.553917	28.210587
1	Gqaqala	Eastern Cape	-31.275246	28.422504
2	Gqiba	Eastern Cape	-32.293342	28.686302
3	Gqobonco	Eastern Cape	-31.623649	28.255605
4	Gqogqora	Eastern Cape	-31.466667	28.533333

Methodology/Approach

Data Loading

- ▶ Load data from South African Cities dataset and transform into a pandas dataframe
- ▶ Explore the South African provinces and cities/neighborhoods
- ▶ Geopy and Folium libraries used to create a Gauteng provinces and cities/neighborhoods map



Methodology/Approach (cont.)

Explore 1st Gauteng city/neighborhood

- ▶ Load Foursquare client for access to venues dataset
- ▶ Explore the first Gauteng city/neighborhood (Hatfield) to test the coordinates
- ▶ Get the top 100 venues within the Hatfield neighborhood
- ▶ Explore the venues returned by Foursquare for Hatfield

	name	categories	lat	lng
0	Bravo Pizzeria	Pizza Place	-25.753017	28.240889
1	Moloko, Pretoria	Nightclub	-25.752554	28.240059
2	Deli On Duncan	Deli / Bodega	-25.751315	28.240496
3	Papa's Real Food & Function House	Restaurant	-25.751364	28.240683
4	+27 Café	Café	-25.752788	28.239961

Methodology/Approach (cont.)

Explore Gauteng Neighborhoods

- ▶ Create a function for exploring the Gauteng Province cities/neighborhood venues
- ▶ Explore unique categories of Gauteng venues returned by Foursquare
- ▶ Create a table for the Gauteng venues categories

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Halfway House	-25.997137	28.129919	BP	-25.995249	28.128440	Gas Station
1	Halfway House	-25.997137	28.129919	Chicken Licken	-25.996536	28.126773	Fried Chicken Joint
2	Halfway House	-25.997137	28.129919	Nando's	-25.996764	28.127478	Portuguese Restaurant
3	Halfway House	-25.997137	28.129919	KFC	-25.997886	28.126834	Fast Food Restaurant
4	Halfway House	-25.997137	28.129919	Virgin Active	-25.996378	28.126123	Gym / Fitness Center

Methodology/Approach (cont.)

Explore Gauteng Neighborhoods

- Create a table of the top 10 venues for each Gauteng city/neighborhood

	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	Akasia	Construction & Landscaping	Yoga Studio	Farm	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
1	Alberton	German Restaurant	Yoga Studio	Farmers Market	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
2	Albertynsville	Gas Station	Yoga Studio	Farmers Market	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
3	Alexandra	Afghan Restaurant	Butcher	Farmers Market	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
4	Annlin	Hotel	French Restaurant	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market

Methodology/Approach (cont.)

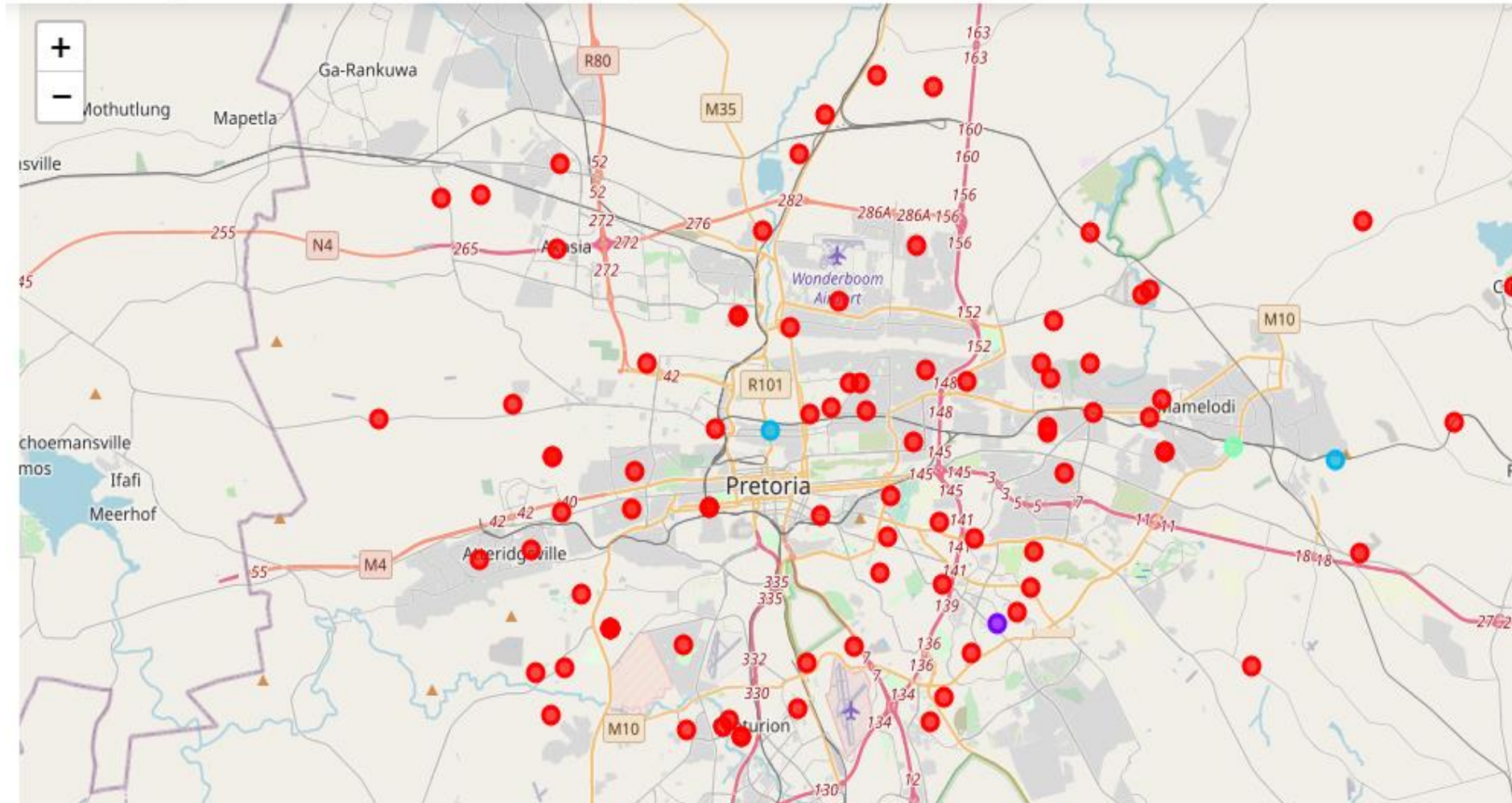
Cluster Gauteng Neighborhoods

- ▶ Apply k-means clustering to create 5 clusters of the Gauteng cities/neighborhoods
- ▶ Create a dataframe that includes the clusters as well as the top 10 venues identified via Foursquare earlier

	City	ProvinceName	Latitude	Longitude	Cluster Labels	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	Graley	Gauteng	-25.766667	28.850000	0.0	Akasia	Construction & Landscaping	Yoga Studio	Farm	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
1	Grasmere	Gauteng	-26.427497	27.860230	0.0	Alberton	German Restaurant	Yoga Studio	Farmers Market	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
2	Greenview	Gauteng	-25.731389	28.397778	4.0	Albertynsville	Gas Station	Yoga Studio	Farmers Market	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
3	Groenpunt	Gauteng	-26.826341	28.038443	0.0	Alexandra	Afghan Restaurant	Butcher	Farmers Market	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
4	Groot-Elandslei	Gauteng	-26.139916	27.670300	0.0	Annlin	Hotel	French Restaurant	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market

Methodology/Approach (cont.)

Visualize the Clusters



Result

- ▶ Cluster 1: The most common venues in these neighborhoods are a mixture of businesses but mainly in the food and hospitality industries.

	Province Name	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	Gauteng	Alberton	German Restaurant	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
3	Gauteng	Alexandra	Afghan Restaurant	Butcher	Dance Studio	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market
4	Gauteng	Annlin	Hotel	Hostel	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
5	Gauteng	Arcon Park	Hotel	Hostel	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
6	Gauteng	Aston Woods	Lake	Food Court	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm

Result (cont.)

- Cluster 2: The most common venues in these neighborhoods comprises of a mix of small and big businesses such as farms, food including pizza places, Flea markets and farms.

	ProvinceName	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	Gauteng	Atteridgeville	Pizza Place	Dance Studio	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
36	Gauteng	Culemborgpark	Pizza Place	Dance Studio	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
166	Gauteng	Oberholzer	Pizza Place	Dance Studio	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
191	Gauteng	Randfontein	Pizza Place	Dance Studio	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm

Result (cont.)

- Cluster 3: The most common venues in these neighborhoods in this cluster consist of diverse businesses which includes food, Yoga Studios, Flea Markets, Farms and probably small to medium enterprises such as Construction & Landscaping.

	ProvinceName	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	Gauteng	Akasia	Construction & Landscaping	Yoga Studio	Farm	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market
16	Gauteng	Boipatong	Home Service	Yoga Studio	Factory	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
42	Gauteng	De Deur Estates	Construction & Landscaping	Yoga Studio	Farm	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market
65	Gauteng	Erasmia	Convenience Store	Construction & Landscaping	Yoga Studio	Factory	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market
72	Gauteng	Fietas	Home Service	Construction & Landscaping	Business Service	Yoga Studio	Farm	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
88	Gauteng	Hekpoort	Campground	Construction & Landscaping	Factory	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm

Result (cont.)

- Cluster 4: The most common venues in these neighborhoods are mainly basic necessities such as Gas Stations, Yoga Studios, Fast food restaurants and Flower shops.

	ProvinceName	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
2	Gauteng	Albertynsville	Gas Station	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
52	Gauteng	Duncanville	Gas Station	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
67	Gauteng	Evaton	Gas Station	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
82	Gauteng	Glenharvie	Gas Station	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
102	Gauteng	Katlehong	Gas Station	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
144	Gauteng	Mid-Ennerdale	Convenience Store	Gas Station	Yoga Studio	Farm	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market
145	Gauteng	Middenerdale	Convenience Store	Gas Station	Yoga Studio	Farm	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market
149	Gauteng	Mohlakeng	Pub	Gas Station	Yoga Studio	Factory	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market
194	Gauteng	Rietfontein	Gas Station	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm

Result (cont.)

- Cluster 5: The most common venues in this neighborhoods are small businesses such as flea markets, these includes flower shops, fish and chips and Yoga Studios.

	ProvinceName	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
17	Gauteng	Booyens	Fried Chicken Joint	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
104	Gauteng	Kenilworth	Fried Chicken Joint	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm
120	Gauteng	Lenasia	Fried Chicken Joint	Bakery	Yoga Studio	Farmers Market	Food	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant
185	Gauteng	Primrose	Fried Chicken Joint	Burger Joint	Yoga Studio	Food & Drink Shop	Flower Shop	Flea Market	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market

Observation/Recommendations

- ▶ Out of the five clusters neighborhoods we examined in the Gauteng Province, Cluster 3's neighborhoods comprise of a good mix of businesses. This is a sign of neighborhoods with a fair amount of economic activity that is worth exploring further.
- ▶ The mix of the types of restaurants in the neighborhoods in this cluster can be clustered in a shopping mall set up, by implication bring these types of venues together in a mall will be a viable business option as there is a need for them is already established.
- ▶ Whilst across the five clusters there is no explicit mention of clothing shops, this is becomes a market that is worth tapping in a shopping mall set up. Cluster 3 therefore will make more business sense.

Conclusion

- ▶ With the analysis performed on the all the clusters, it is worth noting that with the top 10 venues identified from the data set for all the clusters conclusion can be made that the results are a true reflection of the cities/neighborhoods overall data set.
- ▶ XYZ Investment can therefore consider building a shopping mall in the neighborhoods within the Cluster 3 where there are diverse business types.