

Segmenting and Clustering hottest suburbs in SA eight(8) metropolitans based on their social activities

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A decorative yellow line that starts as a horizontal line on the left and then angles upwards to the right.

Making progress possible. **Together.**

Background

The property values and social activities within different suburbs in SA needs to be represented spatially

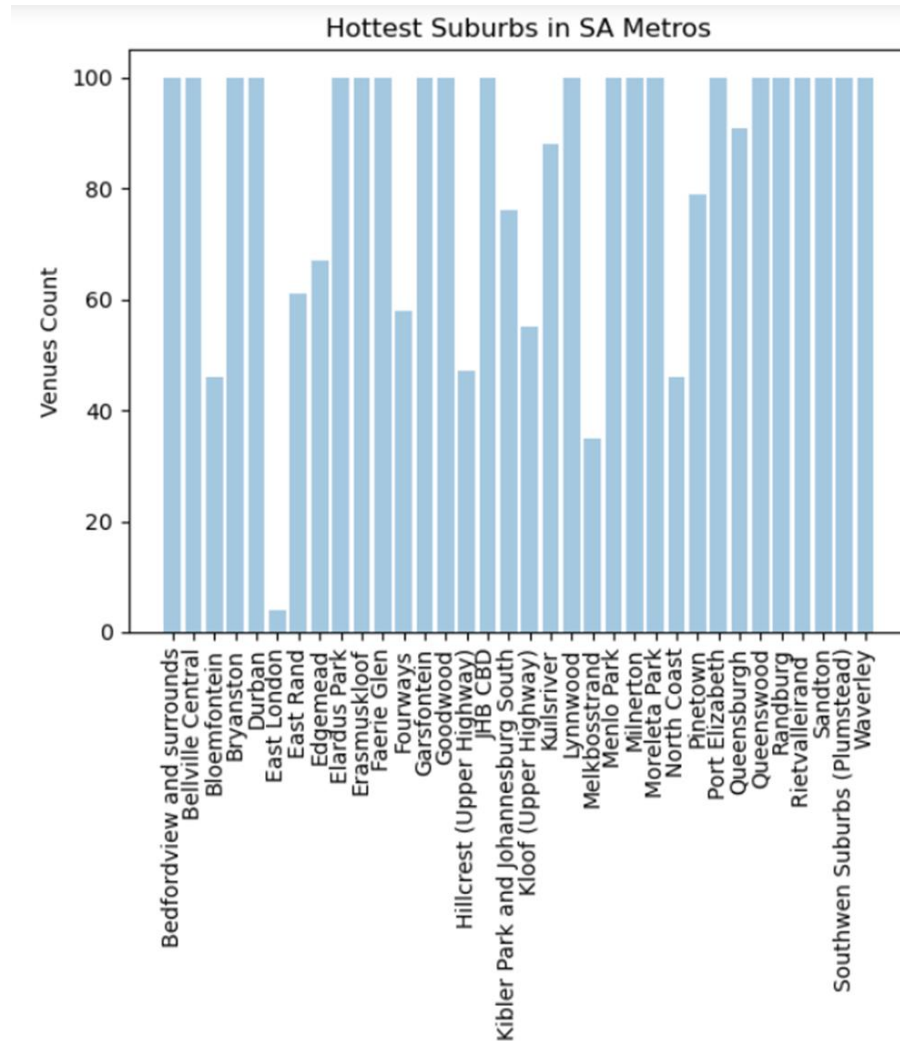
- SA has 278 municipalities, comprising of 8 metropolitans 44 district and 226 local municipalities.
- These 8 metros are focussed on growing local economies and providing infrastructure and service,
- They host major cities in SA
- People flock to these cities/suburbs to uncover new treasure.
- People invest in property in these metro's suburbs across the country
- However, the property values and social activities comparison is not always readily available for investor
- Map showing how the hottest suburbs in SA's metropolitans compares in terms of social activities/venues and property values is vital for property investors and people moving into those suburbs.

Data Acquisition

To consider the problem, we can list the data used and its sources as follow:

- The eight (8) metropolitans data from National Government website
- In total, 34 suburbs were retrieved
- The average property prices data in the hottest suburbs from Property24 and Privateproperty
- Google Map's search engine for suburbs central geographical coordinates
- Foursquare API for common venues within suburbs
- In total 2853 venues and 170 unique venue categories were found.

Foursquare API common venues search count within the hottest suburbs

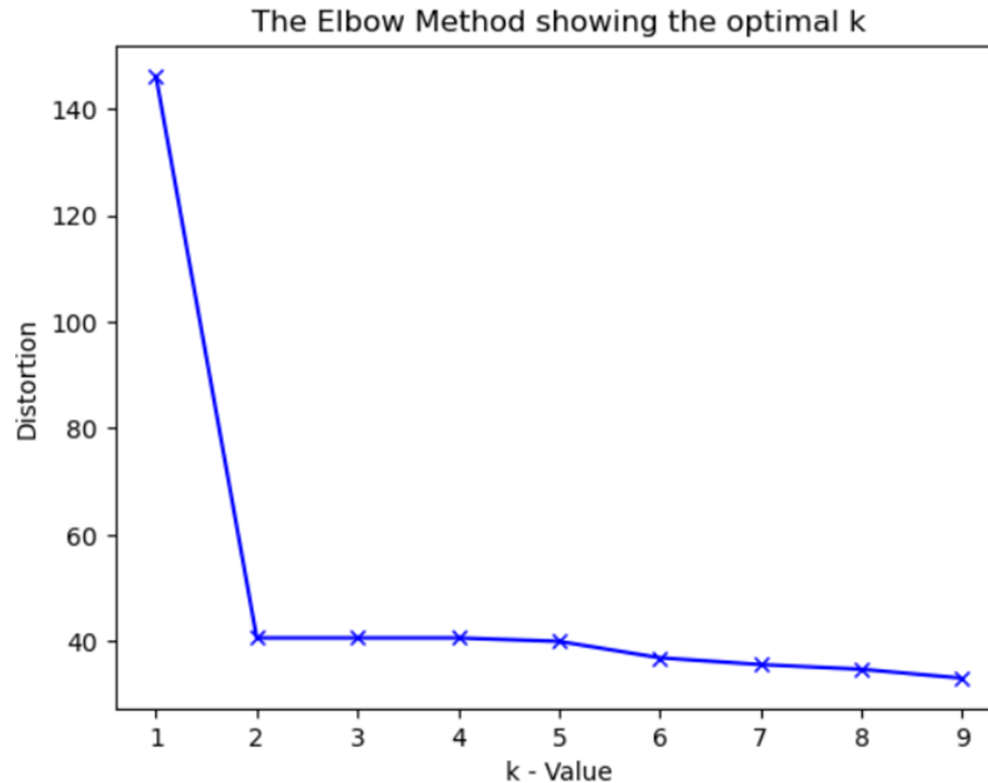


Top 10 venues category frequency of occurrence within each suburb

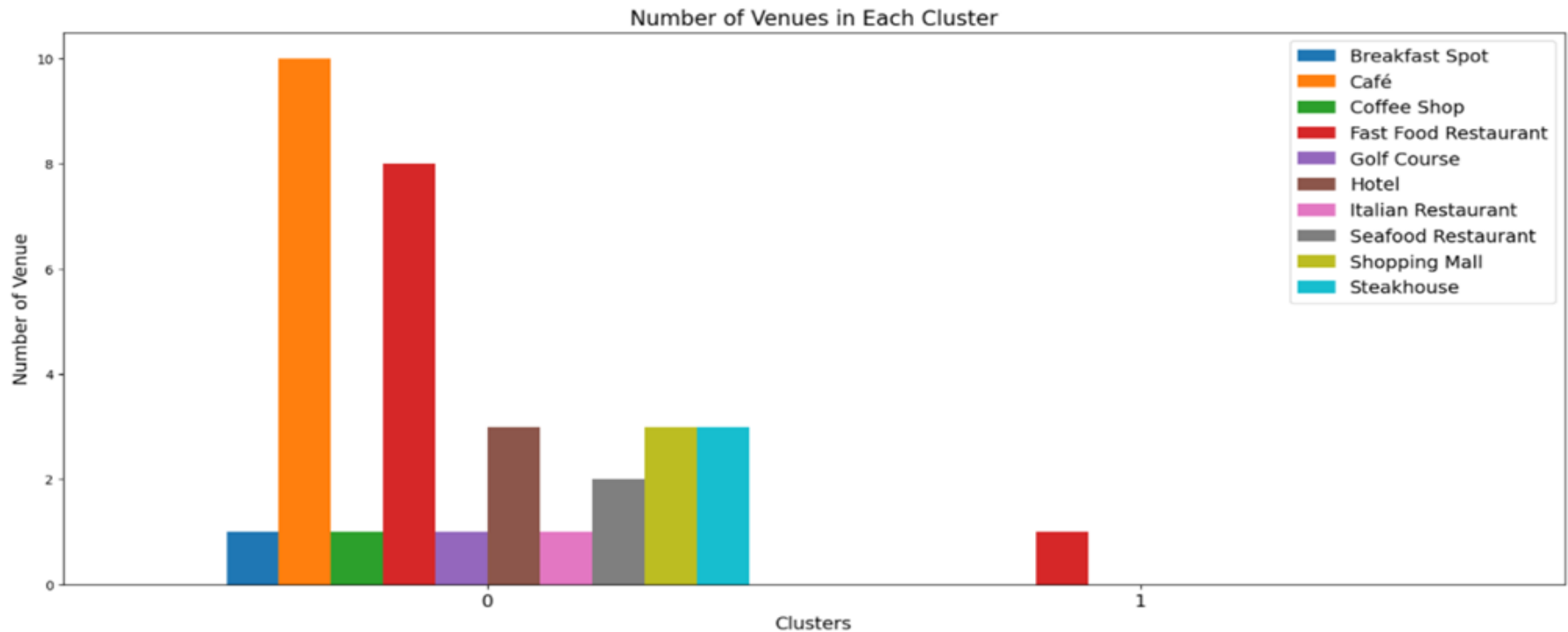
Suburbs	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Bedfordview and surrounds	Café	Shopping Mall	Coffee Shop	Bakery	Steakhouse	Portuguese Restaurant	Restaurant	Supermarket	Pizza Place	Greek Restaurant
Bellville Central	Fast Food Restaurant	Seafood Restaurant	Steakhouse	Breakfast Spot	Shopping Mall	Coffee Shop	Portuguese Restaurant	Grocery Store	Chinese Restaurant	Café
Bloemfontein	Breakfast Spot	Fast Food Restaurant	Shopping Mall	Burger Joint	Portuguese Restaurant	Steakhouse	Seafood Restaurant	Restaurant	Coffee Shop	Italian Restaurant
Bryanston	Hotel	Coffee Shop	Italian Restaurant	Golf Course	Steakhouse	Pizza Place	Café	Shopping Mall	Seafood Restaurant	Indian Restaurant
Durban	Café	Italian Restaurant	Restaurant	Coffee Shop	Indian Restaurant	Portuguese Restaurant	Stadium	Steakhouse	Gastropub	Fast Food Restaurant

Suburbs clustering using K-Means

- Elbow method to find the optimal k value was used and a value of 2 was found



Cluster vs Number of venues



Cluster's names:

- Cluster 0 = Multiple Social Venue
- Cluster 1 = Fast Food Restaurant Venues

Housing prices analyses

- Housing prices categorized into three classes:

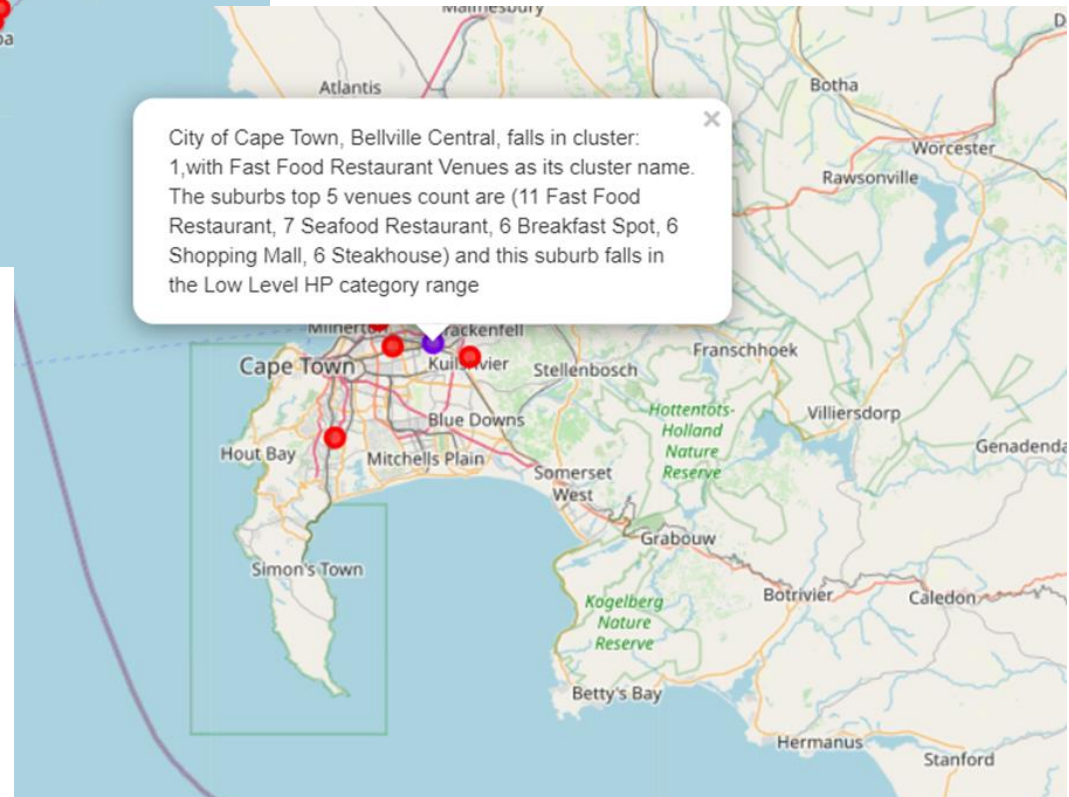
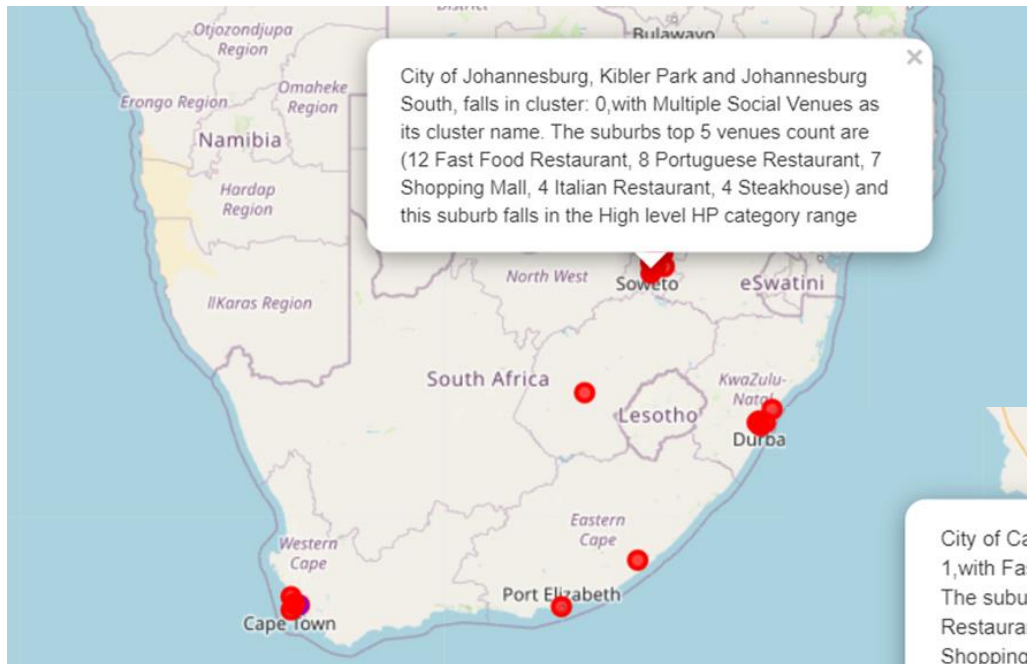
1. Low-level HP
2. Mid-level HP
3. High-level HP

Metros	Suburbs	Average_Property_Value (Rand)	Cluster Labels	HP_Level
Mangaung Municipality	Bloemfontein	504794	0	Mid Level HP
Nelson Mandela Bay	Port Elizabeth	571635	0	Mid Level HP
Buffalo City	East London	635983	0	Low Level HP
City of eThekweni	Pinetown	750000	0	Low Level HP
Ekurhuleni	East Rand	789908	0	Low Level HP
City of eThekweni	Durban	920485	0	Low Level HP
City of Johannesburg	JHB CBD	1068215	0	Mid Level HP
City of eThekweni	Queensburgh	1300000	0	Low Level HP
City of eThekweni	Hillcrest (Upper Highway)	1300000	0	Low Level HP
City of eThekweni	Kloof (Upper Highway)	1300000	0	Low Level HP
City of Cape Town	Kuilsriver	1350000	0	Low Level HP
City of eThekweni	North Coast	1350000	0	Low Level HP
City of Tshwane	Queenswood	1350000	0	Mid Level HP
City of Cape Town	Bellville Central	1425000	1	Low Level HP
City of Tshwane	Elardus Park	1490000	0	Mid Level HP

Final suburb's segmentation and clustering information

Metros	Suburbs	Average_Property_Value (Rand)	Cluster Labels	HP_Level	Top_Venues_Count	Latitude	Longitude	Clusters_Name
Mangaung Municipality	Bloemfontein	504794	0	Low Level HP	6 Breakfast Spot, 6 Fast Food Restaurant, 3 Bu...	-29.111751	26.220795	Multiple Social Venues
Nelson Mandela Bay	Port Elizabeth	571635	0	Low Level HP	12 Fast Food Restaurant, 8 Restaurant, 7 Hotel...	-33.941416	25.601705	Multiple Social Venues
Buffalo City	East London	635983	0	Low Level HP	2 Shopping Mall, 1 Convenience Store, 1 Fried ...	-32.924593	27.644027	Multiple Social Venues
City of eThekweni	Pinetown	750000	0	Low Level HP	10 Fast Food Restaurant, 8 Café, 8 Portuguese ...	-29.829241	30.839090	Multiple Social Venues
Ekurhuleni	East Rand	789908	0	Low Level HP	8 Shopping Mall, 7 Fast Food Restaurant, 5 Por...	-26.152173	28.343029	Multiple Social Venues
City of eThekweni	Durban	920485	0	Low Level HP	10 Café, 7 Italian Restaurant, 6 Coffee Shop, ...	-29.818580	31.020891	Multiple Social Venues

Visualization of suburbs information



Conclusion

- Built useful model to segment and cluster suburbs based on their social venues.
- Model has room for improvement by including more information to assist with segmentation
- Include information like, service delivery, infrastructure quality, outdoors venues, nature venues and etc.