

RETAIL DEVELOPMENT IN PERTH, WESTERN AUSTRALIA

COURSERA CAPSTONE PROJECT 30 DEC 2019

BACKGROUND

- Most remote city in the world
- Rapid population expansion
- Protected demand and protected market
- Opportunity for further investment



DATA SOURCES

- Greater Perth Suburbs List
- https://en.wikipedia.org/wiki/List_of_Perth_suburbs
- Western Australia Government Population Census 2016
- https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC51218
- Western Australia Postcodes with Lat/Long
- <http://www.corra.com.au/australian-postcode-location-data/>.
- Western Australia Postcodes with Lat/Long Json format
- <https://github.com/tonywr71/GeoJson-Data/blob/master/suburb-10-wa.geojson>

DATA EXPLORATION & ANALYSIS

PREPARATION

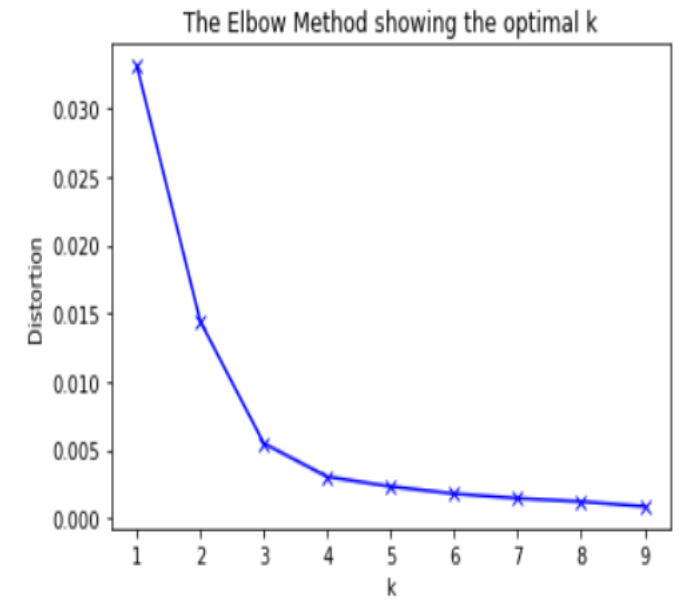
- Lack of single complete data source
- Population data census 2016 out of date
- Suburbs do not always align with Postal Codes
- Suburb names and boundaries change over time
- Data stored in different data types and formats

DATA EXPLORATION & ANALYSIS

ANALYSIS

- 355 suburbs but only 244 with complete data
- 73 suburbs have Shopping Malls
- 2 suburbs have Shopping Plazas
- 247 other Venue Categories
- Elbow method indicated 4-cluster model

```
# Plot the elbow  
plt.plot(K, distortions, 'bx-')  
plt.xlabel('k')  
plt.ylabel('Distortion')  
plt.title('The Elbow Method showing the optimal k')  
plt.show()
```



DATA EXPLORATION & ANALYSIS

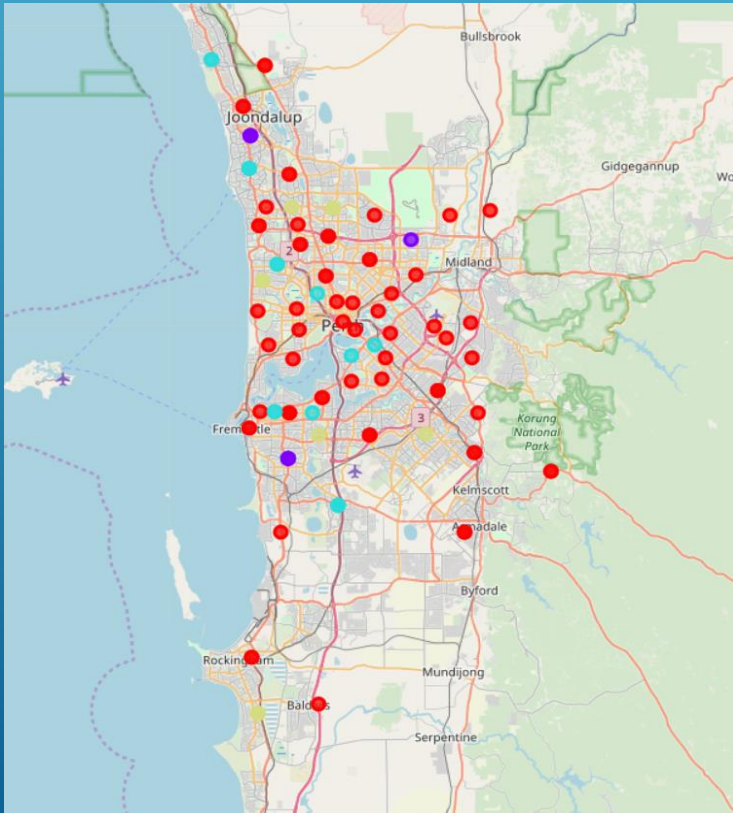
OBSERVATIONS ARISING

- How significant is the missing data?
- How does size of Shopping Malls affect their distribution?
- How does existence of other retail outlets e.g. Supermarkets affect the viability of a Mall?
- How does population density affect the location of Malls?

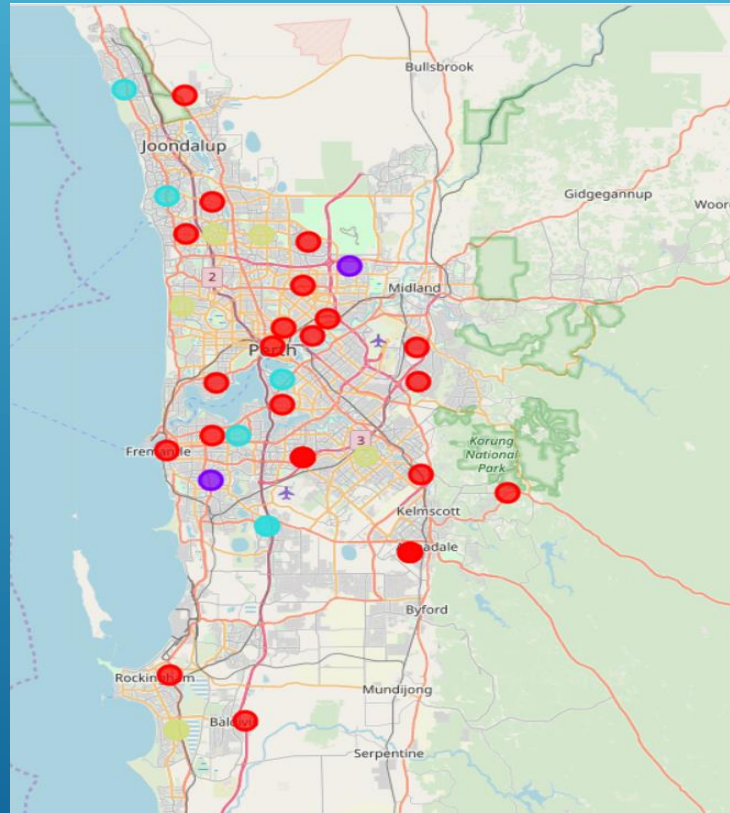
Data Visualization

Analysis of the distribution of Malls

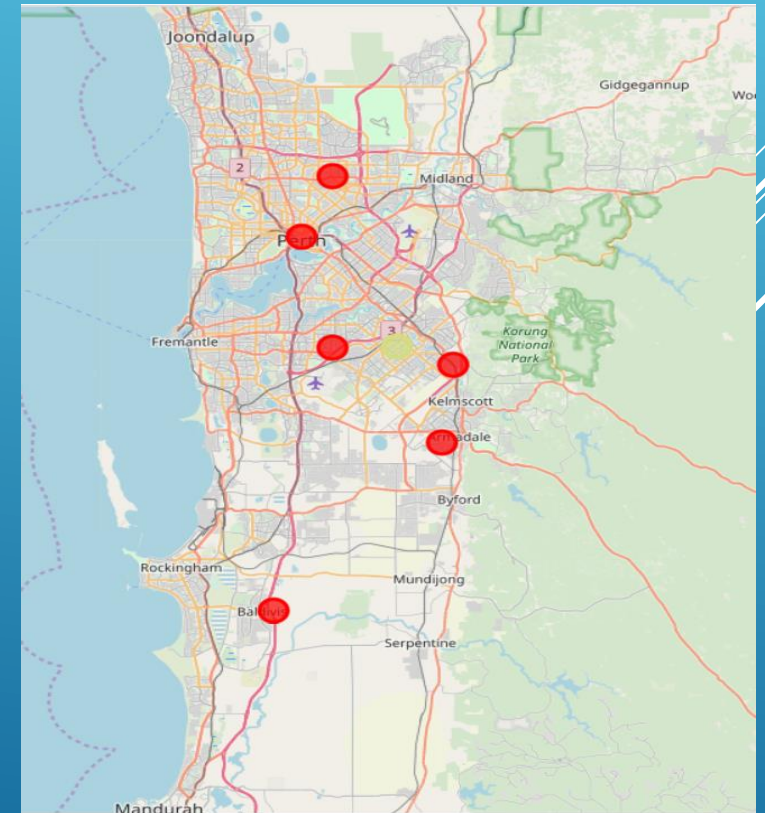
Malls in Suburbs Pop > 5000



Malls in Suburbs Pop > 10000



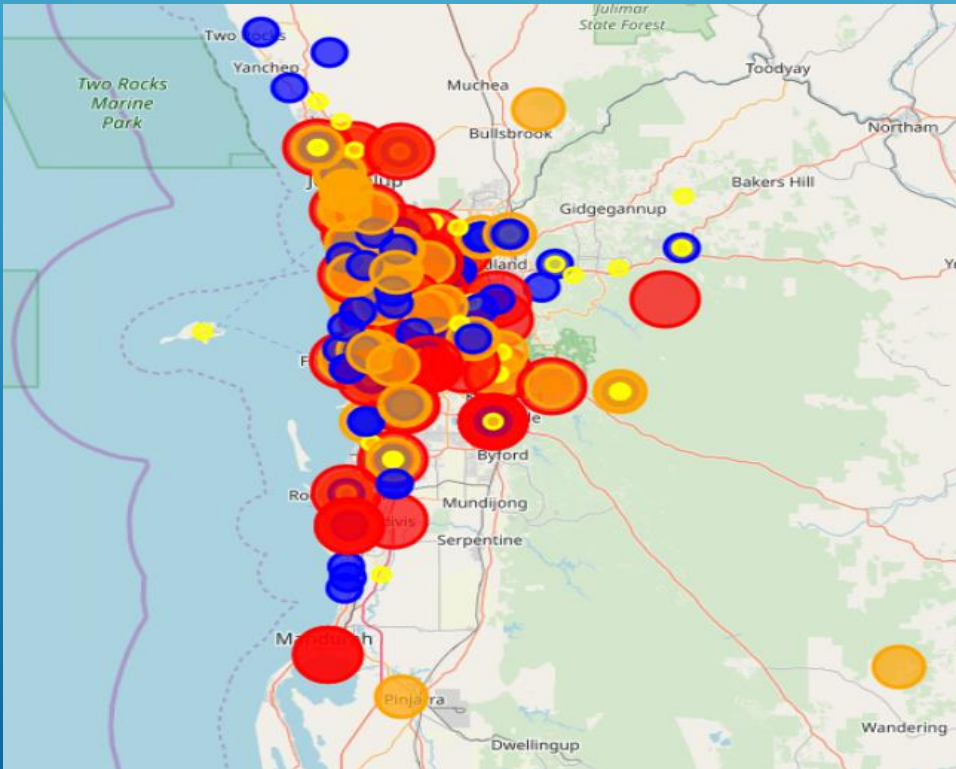
Malls in Suburbs Pop > 20000



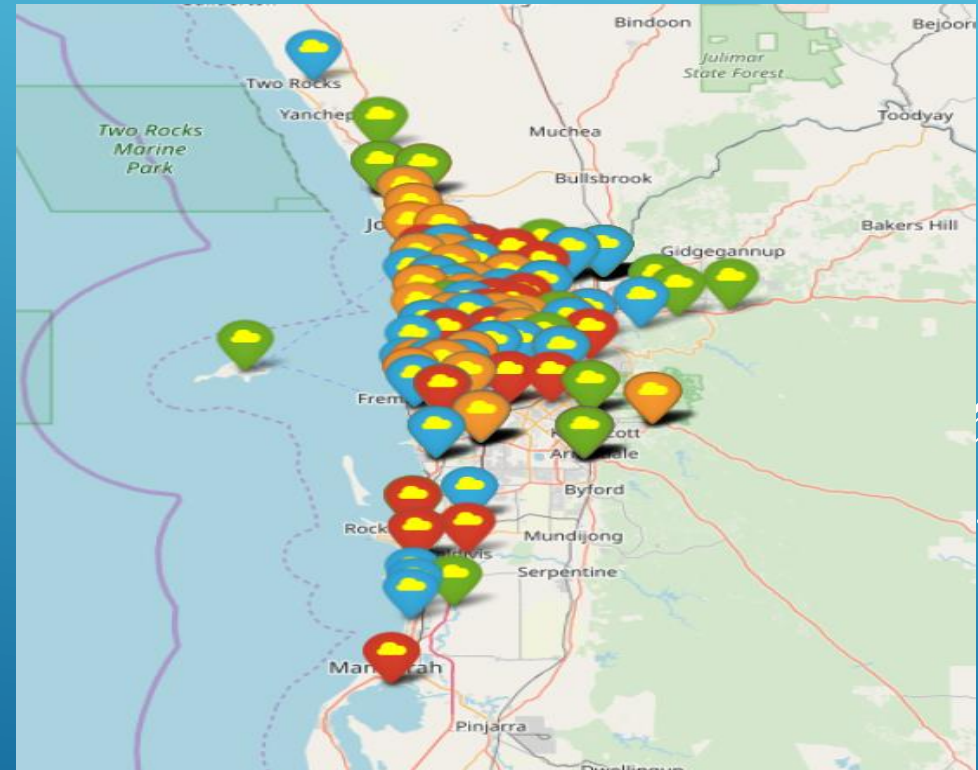
Data Visualization

Analysis of the relationship between Population Density and Mall location

Suburbs Pop > 5000 – Marker Circles



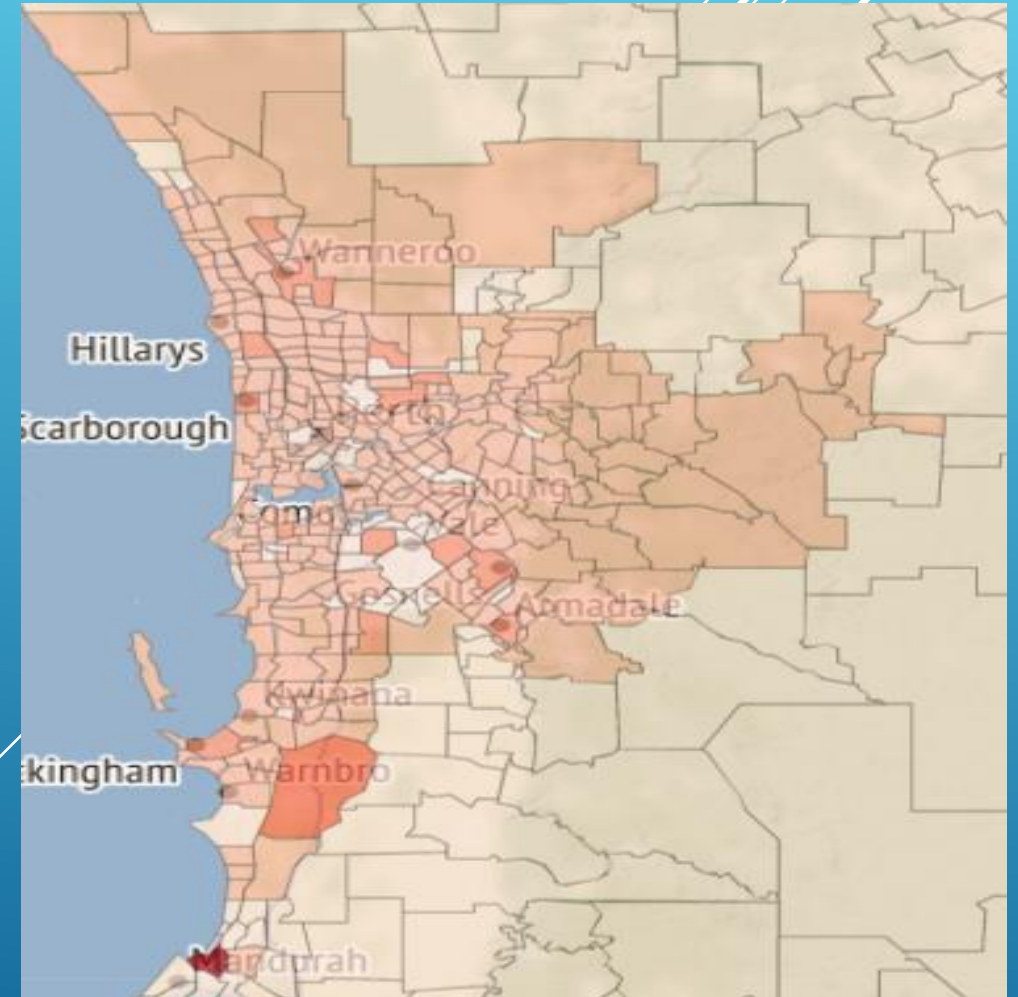
Suburbs Pop > 5000 – Markers



Conclusion: These maps do not provide the right information – A heatmap is required

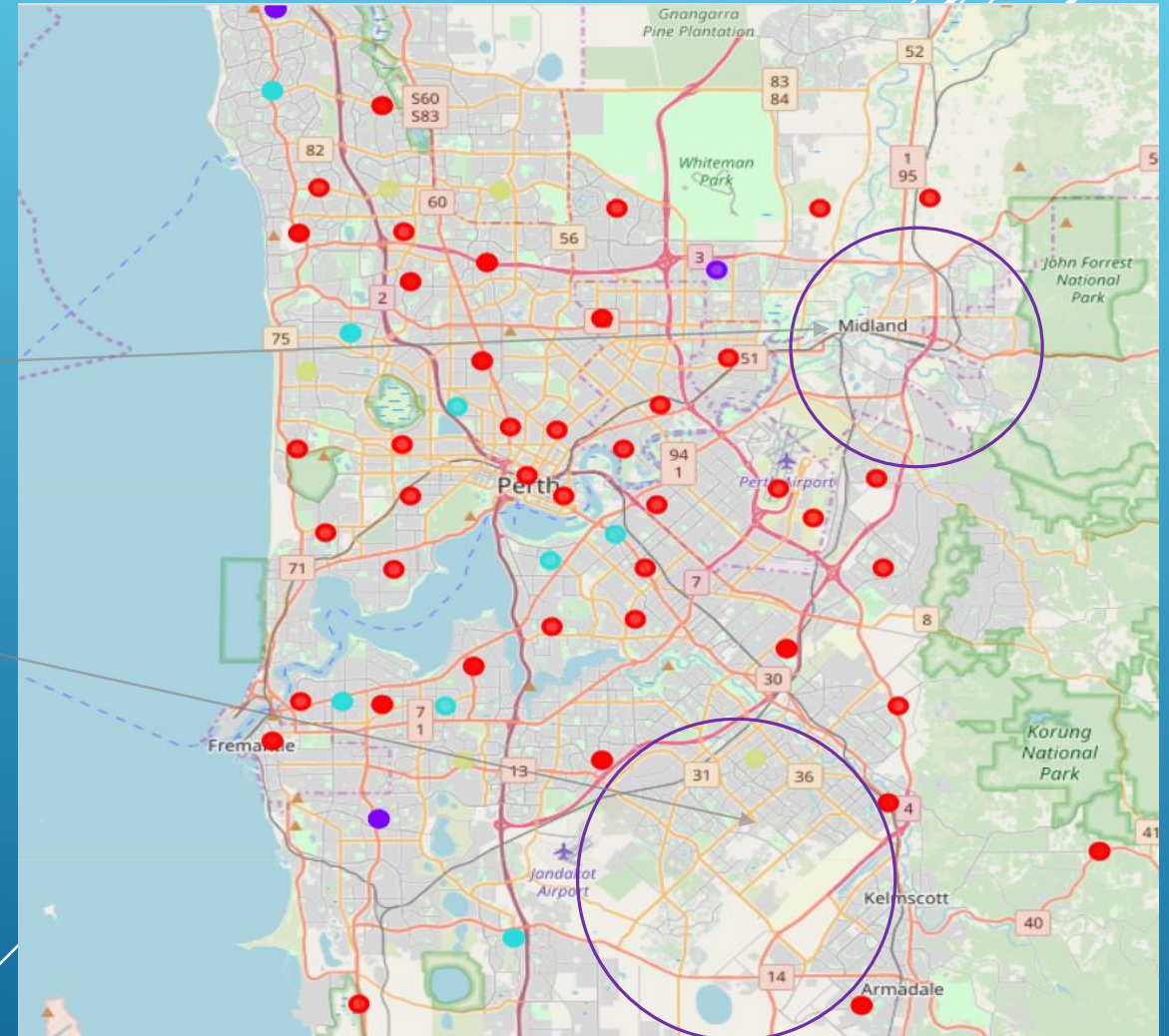
DATA VISUALIZATION

- Heat Map of Western Australia
- Shows possible weakness of data
- Lack of 'hi-density' suburbs in known population areas
- Suburb areas may be 'too small'
- A more specific map of the target area may add clarity



RESULTS

- 2 areas of Perth appear under-represented with shopping malls
 - Eastern Suburbs (centred on Midland)
 - South Western Suburbs (east of Jandakot Airport)
- But results need further verification



RECOMMENDATIONS

- Conduct further data analysis to confirm findings in respect of potential Shopping Mall locations in East and South-West Perth
- Verification of results required:
 - Identify more accurate and complete data source(s) (geography, mapping, population etc)
 - Analyse 111 Suburbs omitted due to incomplete data
 - Confirm relevance of suburbs/postal codes to location of malls
 - Consider the size and coverage of existing malls
 - Consider the presence of other retail venue types on the location of malls.
 - Consider the implications of future Perth Local Authority development plans