Capstone Project- Battle of Neighbourhoods

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Table of Contents

1. Introduction

1.1 Background

I currently live in Melbourne and I have been offered a great opportunity to work for a leading Finance firm in Canberra. I am very excited, and I want to use this opportunity to practice my learnings in Coursera to answer my key question, finding out an affordable and enjoyable place like mine now in Melbourne.

Melbourne is the coastal capital of the south-eastern Australian state of Victoria. At the city's centre is the modern Federation Square development, with plazas, bars, and restaurants by the Yarra River. Being in Melbourne I enjoy many amenities and venues in the area, such as various international cuisine restaurants, cafes, food shops and entertainment. On the other hand, Canberra is the capital city of Australia. It is also the location of many social and cultural institutions of national significance such as the Australian War Memorial, the Australian National University, the Royal Australian Mint, the Australian Institute of Sport, the National Gallery, the National Museum and the National Library. It is home to many important institutions of the federal government.

To make a comparison and evaluation of the rental options in Canberra, I must set some basis, therefore the apartment in Canberra must meet the following demands:

1. Apartment Size : 2-3-bedroom unit
2. Location : Close to public commute stations
3. Rent: Not more than 800 per week
4. Others: amenities in the selected neighbourhood shall be like current residence

1.2 Business Problem

The goal is to find an affordable and suitable neighbourhood in Canberra that complies with the demands on location, rent and venues.

2. Data

2.1 Description of the Data

- List of Boroughs and neighbourhoods of Canberra with their geodata (latitude and longitude)
- List of Train stations in Canberra with their address location
- List of apartments for rent in Canberra with their addresses, no.of beds and weekly rent
- Venues for each Canberra neighbourhood
- Venues near my location in Melbourne

The above-mentioned data will be collected using webpage scraping and manual data collection from rental websites. The key dataset of Canberra (Suburbs with latitude & longitude data) is downloaded Australia Post Website.

2.2 How the Data will be used to solve the given business problem

- Use of Foursquare and geopy data to map top 10 venues for all Canberra neighbourhoods and cluster in groups

- Use of foursquare and geopy data to map the location of train stations on top of the above clustered map to explore the venues near each station
- Use Foursquare and geopy data to map the location of rental places
- create a map that provides an overview of the following information
    1. average rental price for a 2-bedroom unit
    2. nearby train stations
    3. venues nearby like my location in Melbourne

The processing of these DATA will give us better understanding of house rents, venues and train stations around each neighbourhood in Canberra. It will allow us to answer our business problem, which is to find an affordable and suitable neighbourhood in Canberra that complies with the demands on location, rent and venues.

3. Methodology Section

This section represents the main component of the report where the data is gathered, prepared for analysis. The tools described are used here and the Notebook cells indicates the execution of steps.

3.1 Exploratory Data Analysis

3.1.1 Current residence Neighbourhood in Melbourne
Using Foursquare API, we were able to request the venues around my current place in Melbourne and used Folium to create a Map with venues as markers on it.
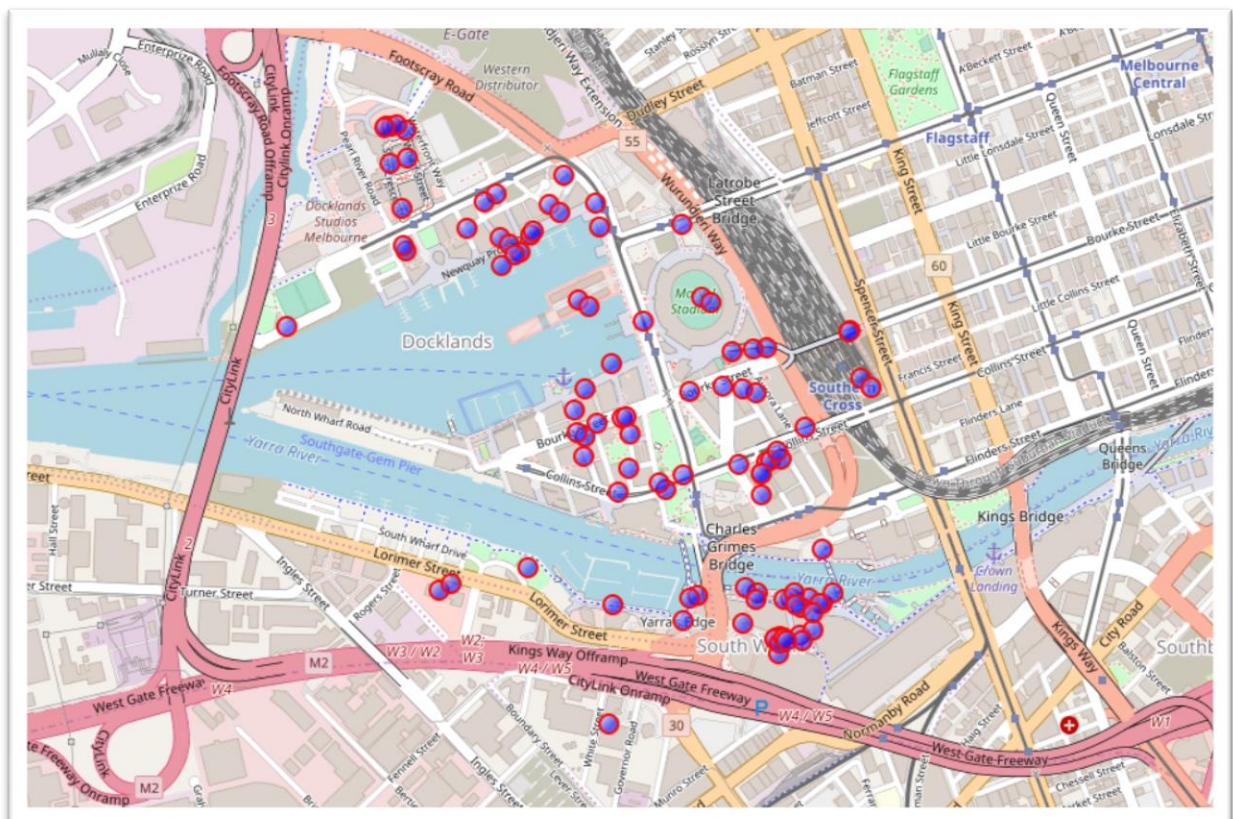
3.1.2 Venues around Neighbourhood in Melbourne


```
docklands_venues.head(10)
```

]:

	name	categories	lat	lng
0	Blended Beard	Coffee Shop	-37.819633	144.944355
1	Cafe Bambino	Café	-37.819922	144.945437
2	Banoi	Vietnamese Restaurant	-37.819507	144.945172
3	Code Black Coffee Roasters	Coffee Shop	-37.820797	144.945380
4	Pok Pok Thai Street Food	Thai Restaurant	-37.819495	144.945275
5	Mama Rumaan	Middle Eastern Restaurant	-37.816491	144.943757
6	Coffee Gauge	Coffee Shop	-37.819977	144.943955
7	Tap 831	Restaurant	-37.819903	144.943683
8	The Mill & Bakery	Bakery	-37.816670	144.944072
9	Hooks at the Yarra	Seafood Restaurant	-37.824059	144.947606

3.1.3 Canberra Neighbourhood Map with Cluster of Venues

Using KNN Algorithm, we were able to cluster the venues in Canberra so that we can compare and Analyse the rental places and bus stations nearby in the next steps.
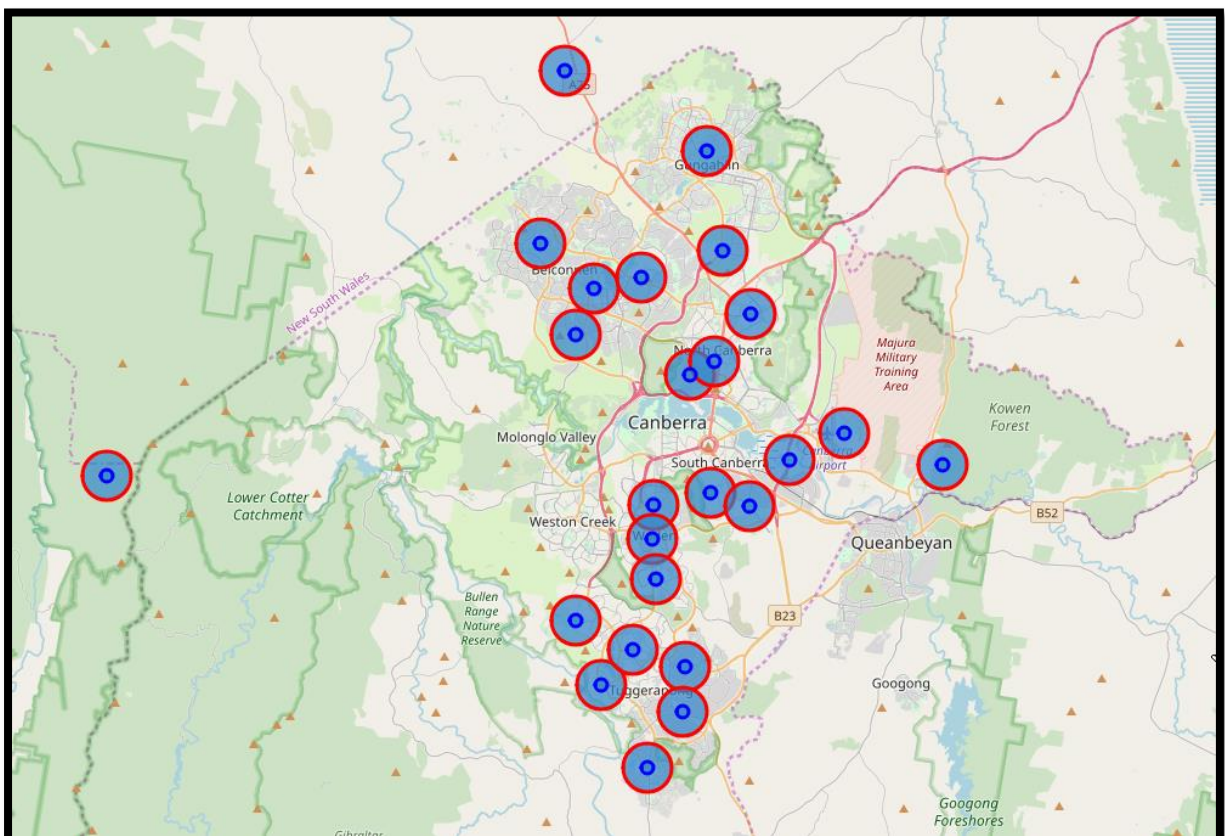
## 3.1.4 Canberra rental places with Geodata Dataset and Statistics Analysis plots

## 1. Canberra rental dataset with Geodata

```
df_can_rent.head()
```

:

	Postcode	Neighborhood	No.of Beds	Rent_Price	latitude	longitude
0	2905	CHISHOLM	5	1000.0	-35.431011	149.110025
1	2903	WANNIASSA	3	750.0	-35.402705	149.081776
2	2905	RICHARDSON	4	530.0	-35.431011	149.110025
3	2904	GOWRIE	2	500.0	-35.410206	149.111402
4	2905	BONYTHON	2	500.0	-35.431011	149.110025

2. Statistics analysis plots

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f78f698dba8>
```


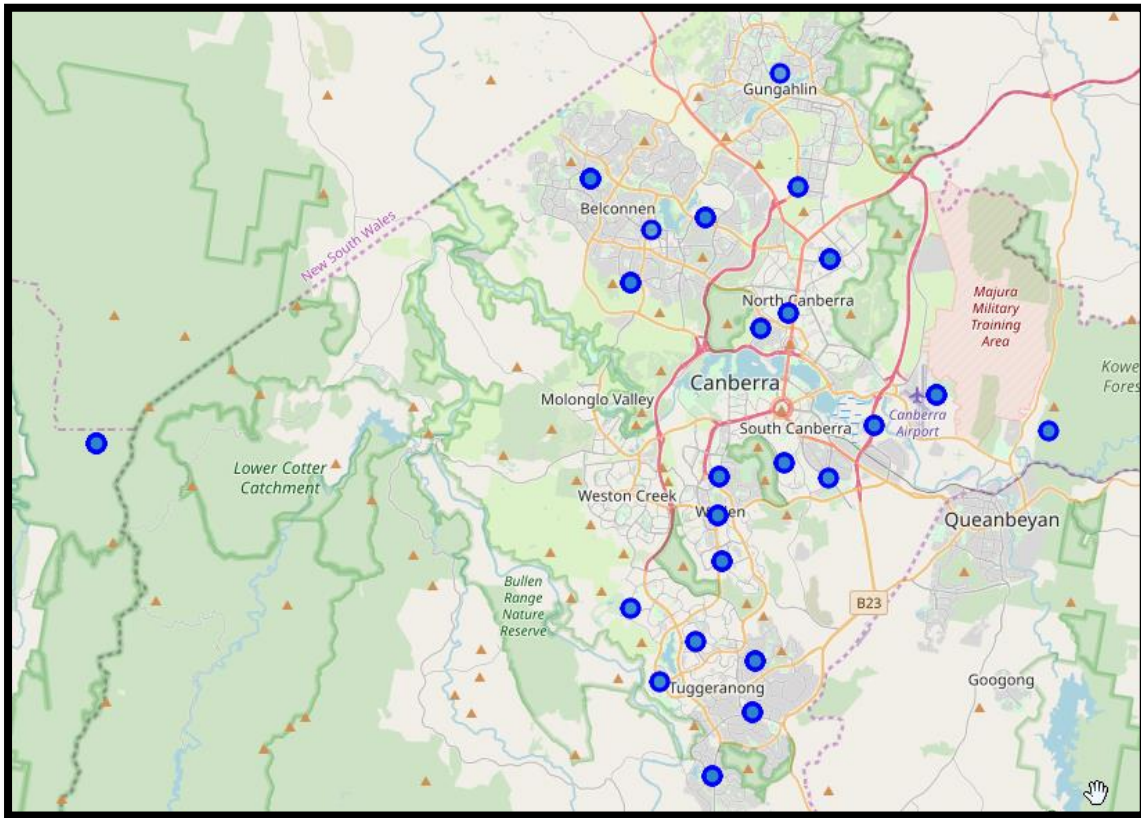
```
<matplotlib.axes._subplots.AxesSubplot at 0x7f78f6927ef0>
```
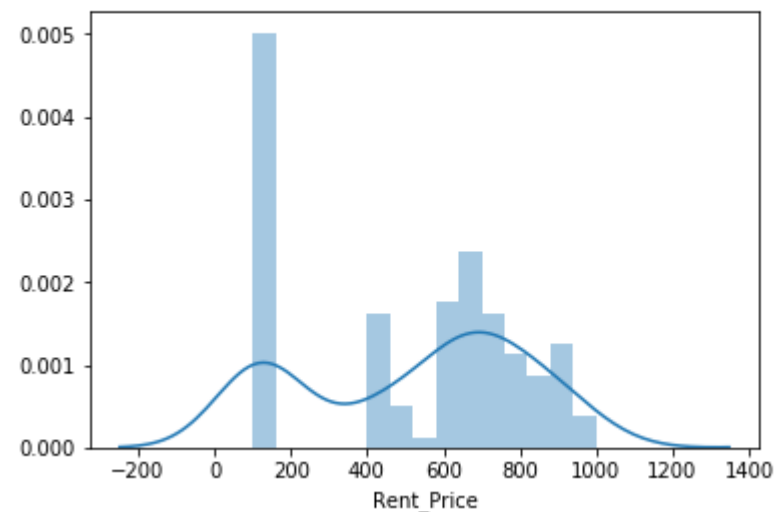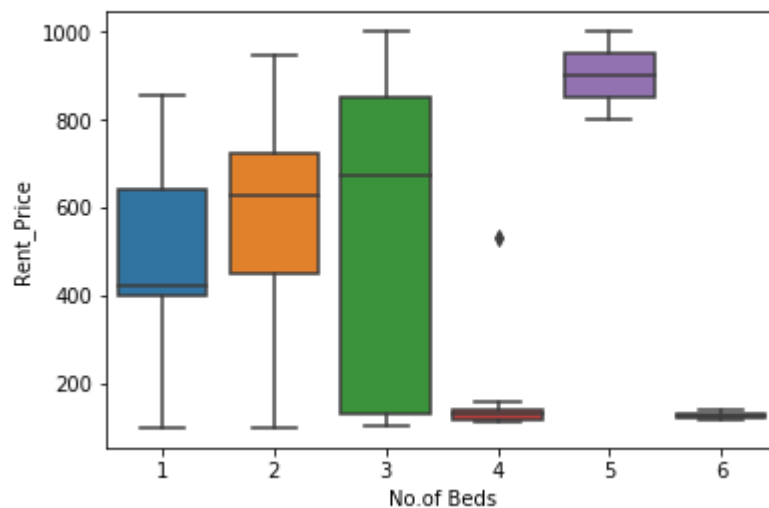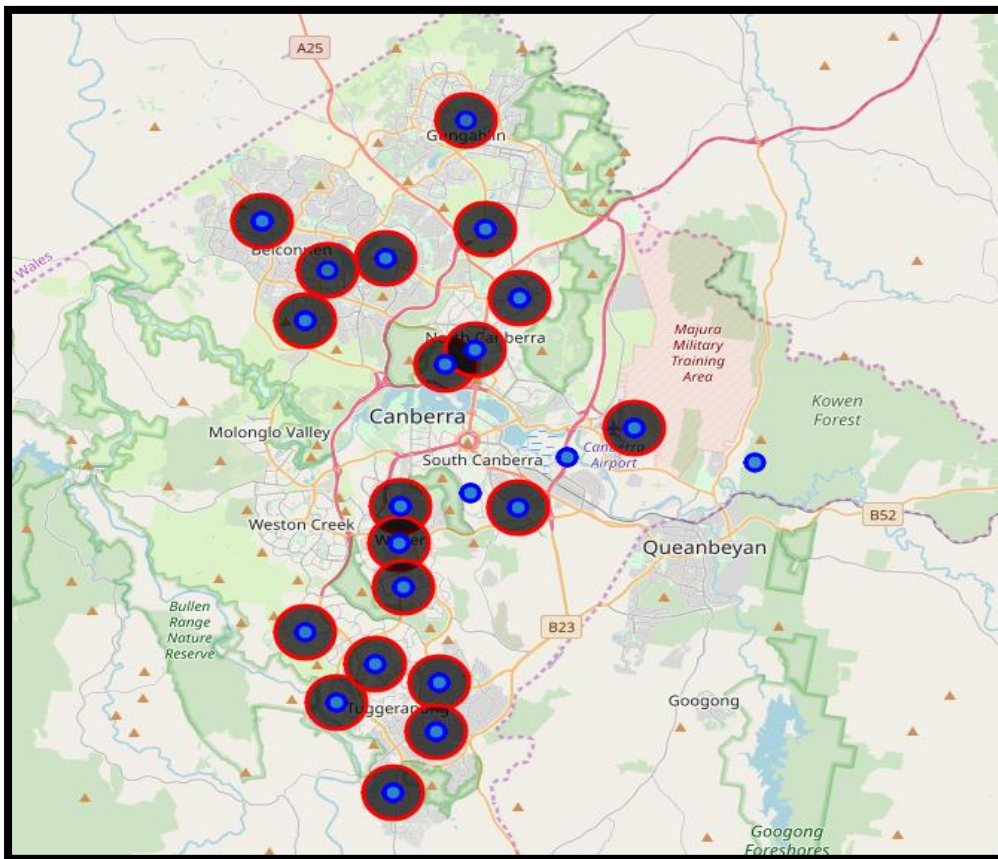
3.1.4 Map of Canberra with rental places

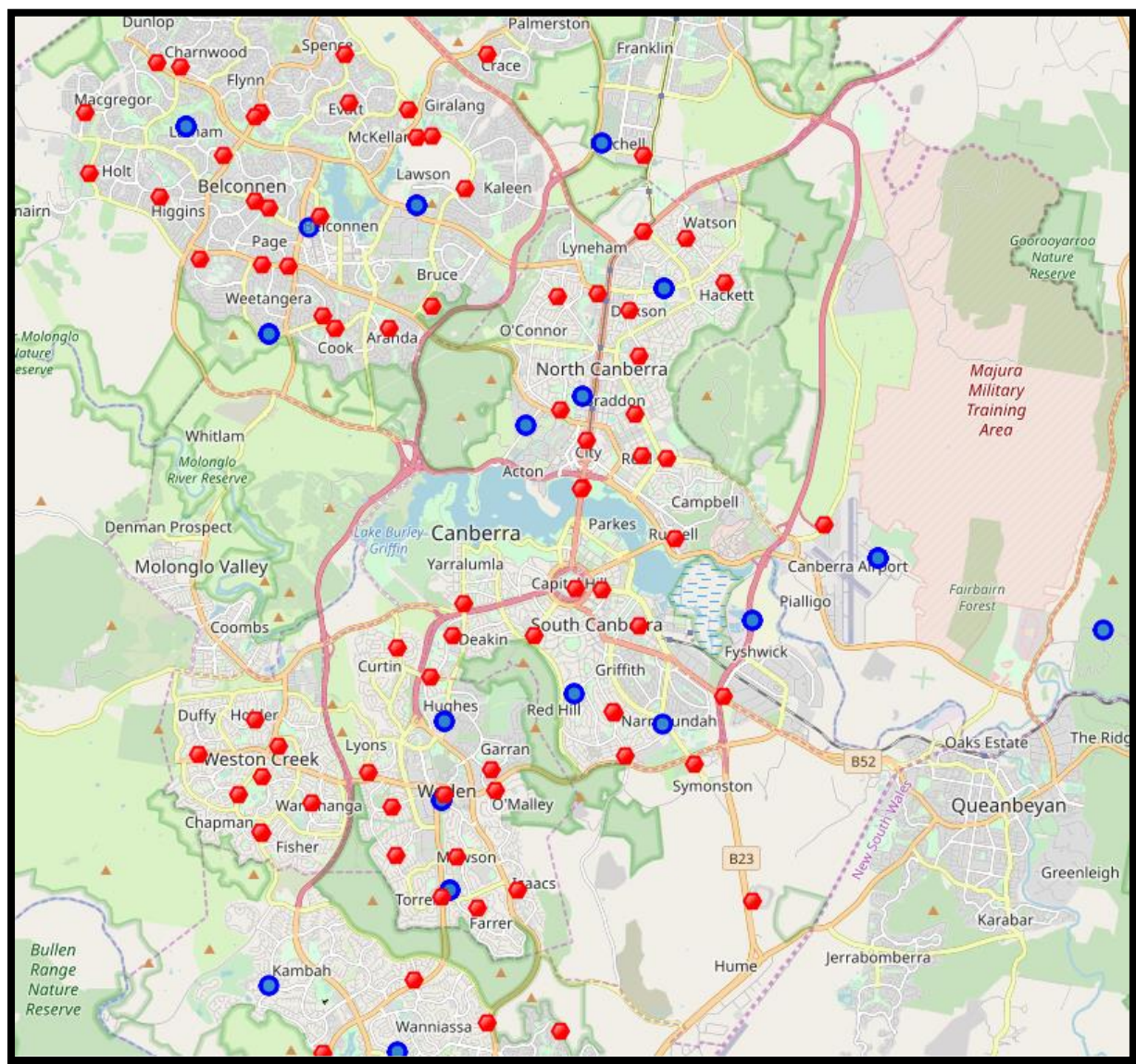### 3.1.5 Map of Canberra with rental places and Venue Clusters

3.1.6 Venues of Cluster 1

```
## kk is the cluster number to explore
kk = 1
dt_merged.loc[dt_merged['Cluster Labels'] == kk, dt_merged.columns[[1] + list(range(5, dt_merged.shape[1]))]]
]:
```

	State	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 Most Common Venue	10th Most Common Venue
3	ACT	1.0	Lake	Hostel	Soccer Field	Yoga Studio	Dessert Shop	Hotel	Gym / Fitness Center	Gym	Grocery Store	German Restaurant
5	ACT	1.0	Hotel	German Restaurant	Food Truck	Yoga Studio	Video Game Store	Ice Cream Shop	Hostel	Gym / Fitness Center	Gym	Grocery Store
6	ACT	1.0	Bakery	Gym / Fitness Center	Fast Food Restaurant	Yoga Studio	Electronics Store	Ice Cream Shop	Hotel	Hostel	Gym	Grocery Store
7	ACT	1.0	Asian Restaurant	Café	Liquor Store	Middle Eastern Restaurant	Electronics Store	Sandwich Place	Indian Restaurant	Thrift / Vintage Store	Botanical Garden	Fish & Chips Shop
8	ACT	1.0	Rugby Pitch	Supermarket	Sports Bar	Fish & Chips Shop	Department Store	Hostel	Gym / Fitness Center	Gym	Grocery Store	German Restaurant
10	ACT	1.0	Hotel	Yoga Studio	Café	Liquor Store	Mediterranean Restaurant	Food Truck	Park	Pub	Rental Car Location	Athletics & Sports
13	ACT	1.0	Ice Cream Shop	Dessert Shop	Paper / Office Supplies Store	Thai Restaurant	Sushi Restaurant	Music Venue	Liquor Store	Café	Burger Joint	Fried Chicken Joint
20	ACT	1.0	Coffee Shop	Department Store	Supermarket	Hotel	Electronics Store	Pub	Café	Bowling Alley	Multiplex	Basketball Court
25	ACT	1.0	Supermarket	Fried Chicken Joint	Fast Food Restaurant	Sandwich Place	Shopping Mall	Liquor Store	Pizza Place	Toy / Game Store	Grocery Store	German Restaurant

3.1.7 Map of Canberra with rental places(red dots) and nearby bus stations(blue dots)
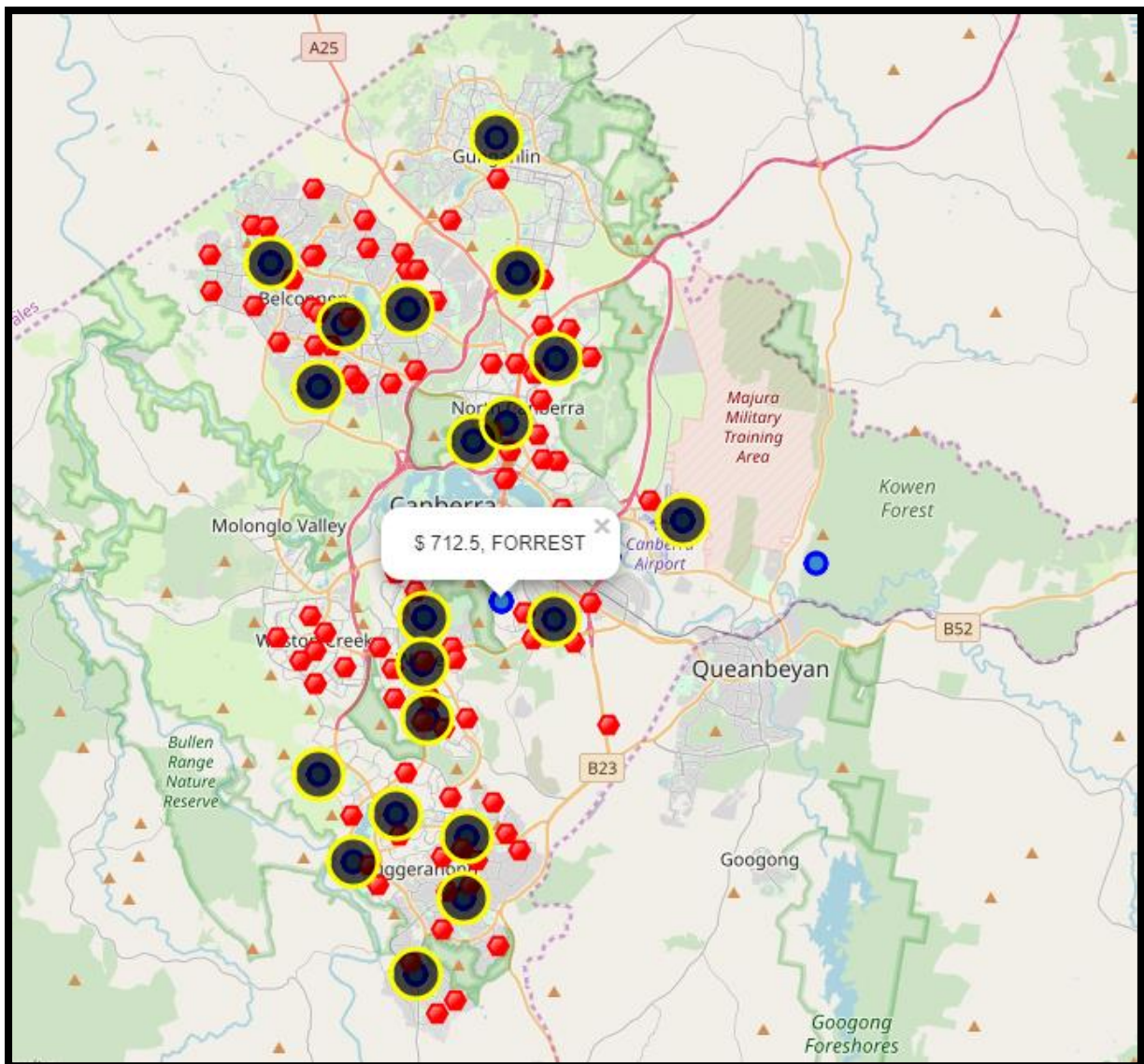
4. Result Section

In this section all the required information to make the apartment selection is consolidated in one map. The Map of Canberra with rental places, but station locations and cluster of venues.

Red dots are bus stations, Blue dots are apartments available for rent, Bubbles are the clusters of venues

4.1 Apartment Selection

The above consolidated map was used to explore options. After examining, I was able to choose one location that meet the desired requirements.

Apartment 1: Forrest Neighbourhood and near 'LA PEROUSE ST AFTER CALEY CR' bus station, Cluster # 1
Monthly rent : 712.5 AUD

4.2 Venues around select apartment in Canberra

```
k = 1
dt_merged.loc[dt_merged['Cluster Labels'] == k, dt_merged.columns[[1] + list(range(5, dt_merged.shape[1]))]]
```

	State	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 Most Common Venue	10th Most Common Venue
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		0	Coffee Shop	Department Store	Supermarket	Hotel	Electronics Store	Pub	Café	Bowling Alley	Multiplex	Basketball Court
25	ACT	1.0	Supermarket	Fried Chicken Joint	Fast Food Restaurant	Sandwich Place	Shopping Mall	Liquor Store	Pizza Place	Toy / Game Store	Grocery Store	German Restaurant

5. Discussion

In this study, I analysed the relationship between Venues, commute stations and House rents. I identified that different type of venues and nearby commute stations play an important role for house/apartment rental prices in that Neighbourhood. I built Maps with markers each for venues, bus stations and rental places to compare and find the right place like my current place. These maps can be very useful in helping anyone to explore and decide a right place to move in into Canberra.

6. Conclusion

This project has shown me a practical application to resolve a real-world scenario using Data Science tools and methodologies. The mapping with Folium is a very powerful technique to consolidate information and make the analysis and decision thoroughly and with confidence.