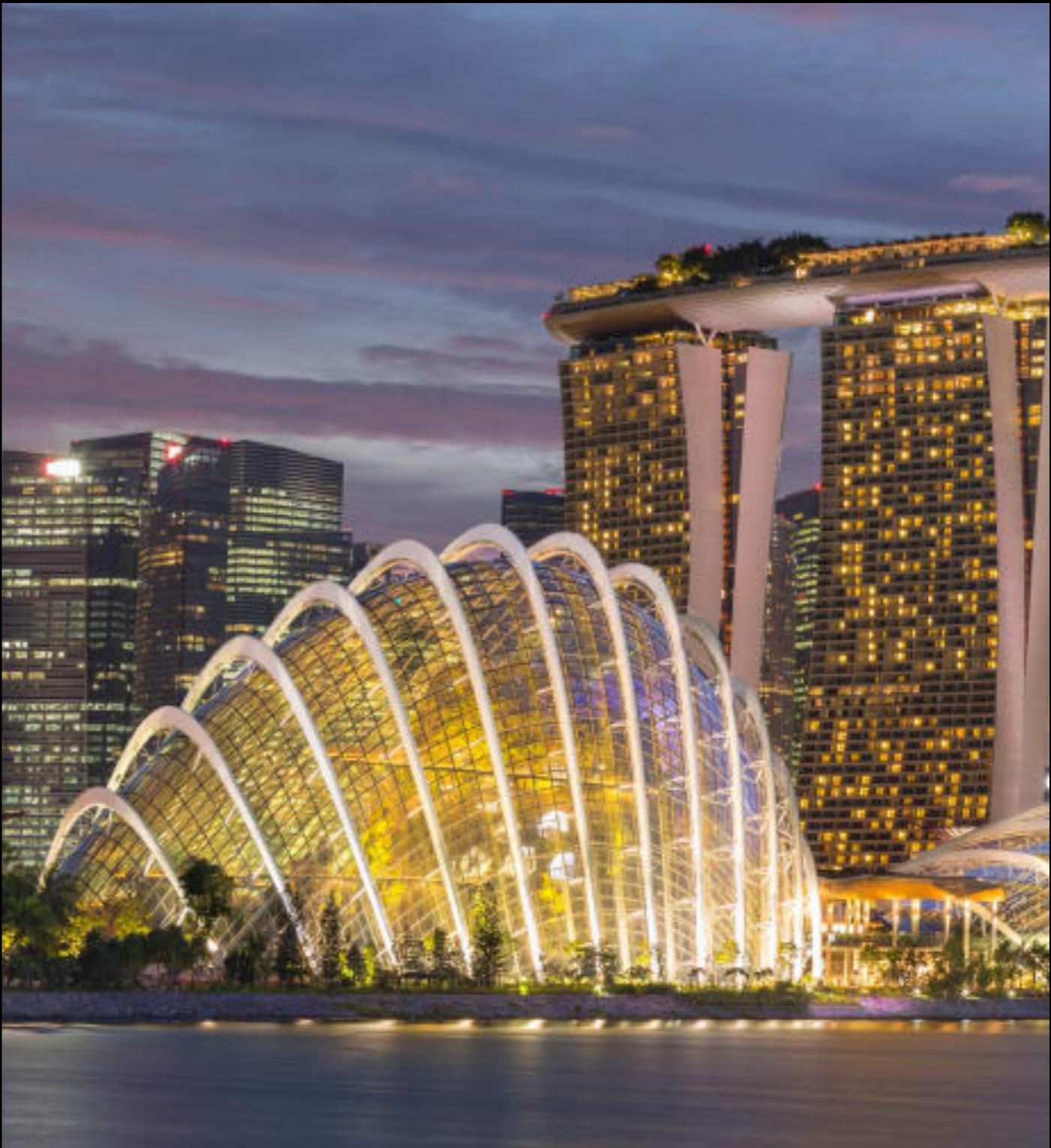


IBM DATA SCIENCE CERTIFICATE - CAPSTONE PROJECT

ANALYSING NEIGHBOURHOODS IN SINGAPORE

INTRODUCTION

- Singapore is a small, highly developed nation-state
- Second-most dense country in the world
- High standards of education, healthcare, and personal safety
- Making Singapore the most expensive city in the world to live in, especially for expats



THE BUSINESS PROBLEM:

- How does one find a place to live in?
- Obvious answer is in the central area, but prices are prohibitively expensive
- What are the main amenities and facilities in each area?
- Shed some insight on the different neighbourhoods in Singapore and what they might offer to a prospective buyer
- Given the high cost of buying/renting a house in Singapore, this analysis would help expats as well as local Singaporeans

THE DATA

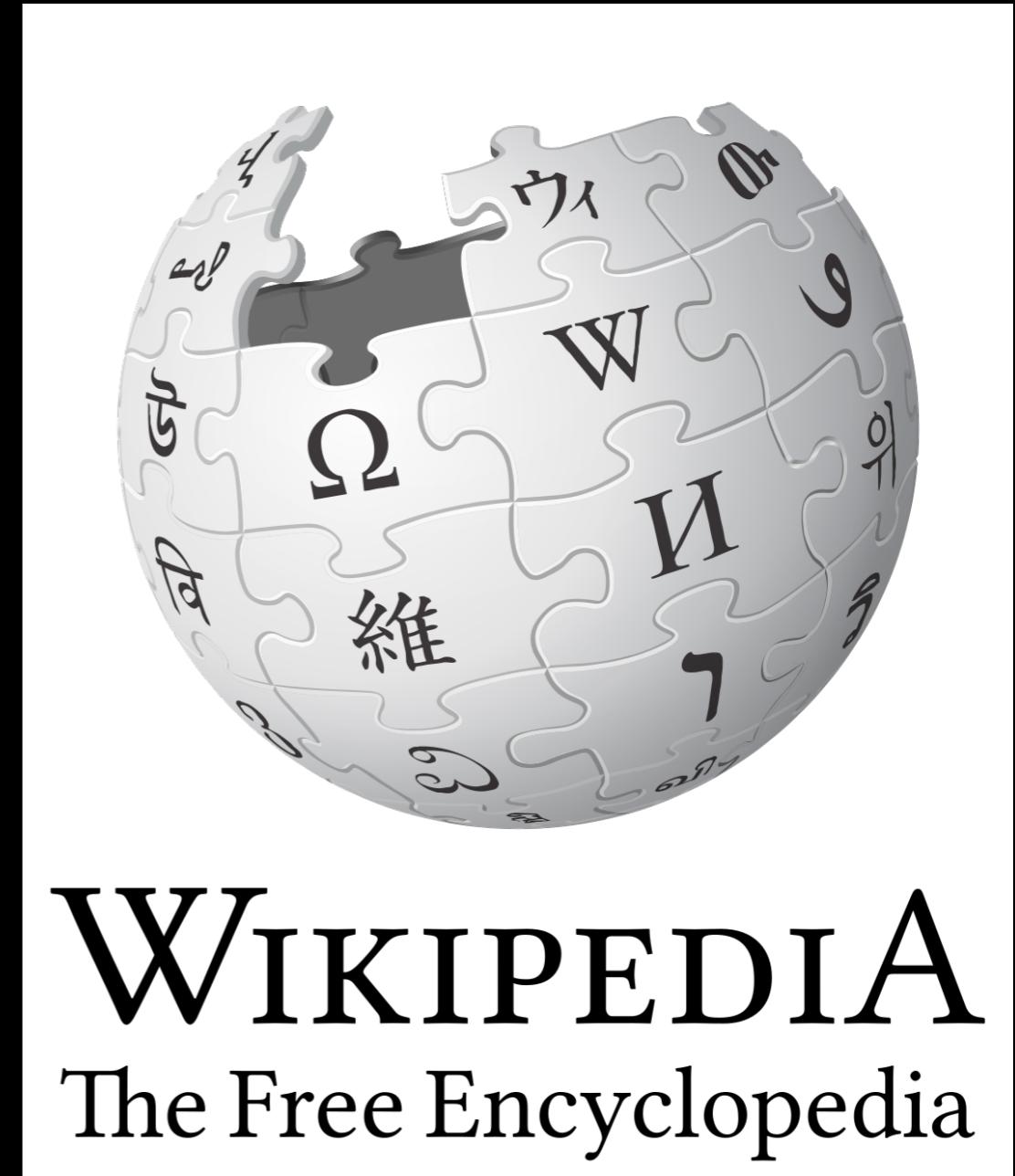
	Area	Region	Area (km2)	Population	Density (/km2)	Latitude	Longitude
0	Sungei Kadut	North	15.99	780	53.2	1.415	103.753
1	Orchard	Central	0.96	990	960.3	1.30527	103.833
2	Southern Islands	Central	6.07	1800	244	1.27109	103.863
3	Changi	East	40.61	2080	62.3	1.35252	103.987
4	Mandai	North	11.77	2090	180.2	1.42353	103.803
5	Downtown Core	Central	4.34	2510	580	1.28667	103.854
6	Singapore River	Central	0.96	2980	2842.2	1.28918	103.845
7	Newton	Central	2.07	7640	3700	1.31298	103.839
8	River Valley	Central	1.48	9930	6230.5	1.3084	103.886
9	Rochor	Central	1.62	13450	9034.1	1.30398	103.853

...after some web-scraping and data wrangling...

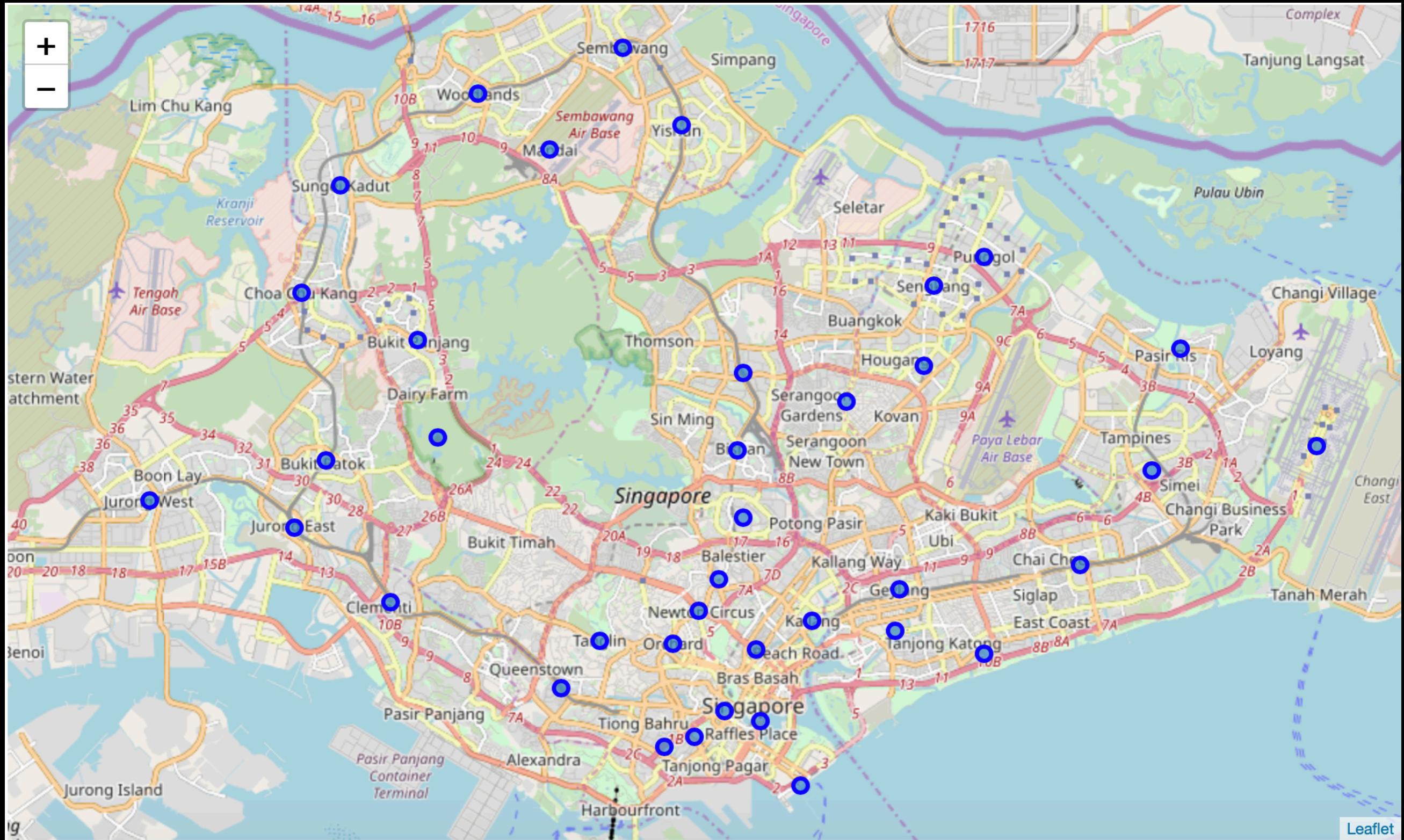
DATA SOURCES



FOURSQUARE



VISUALISING NEIGHBOURHOODS

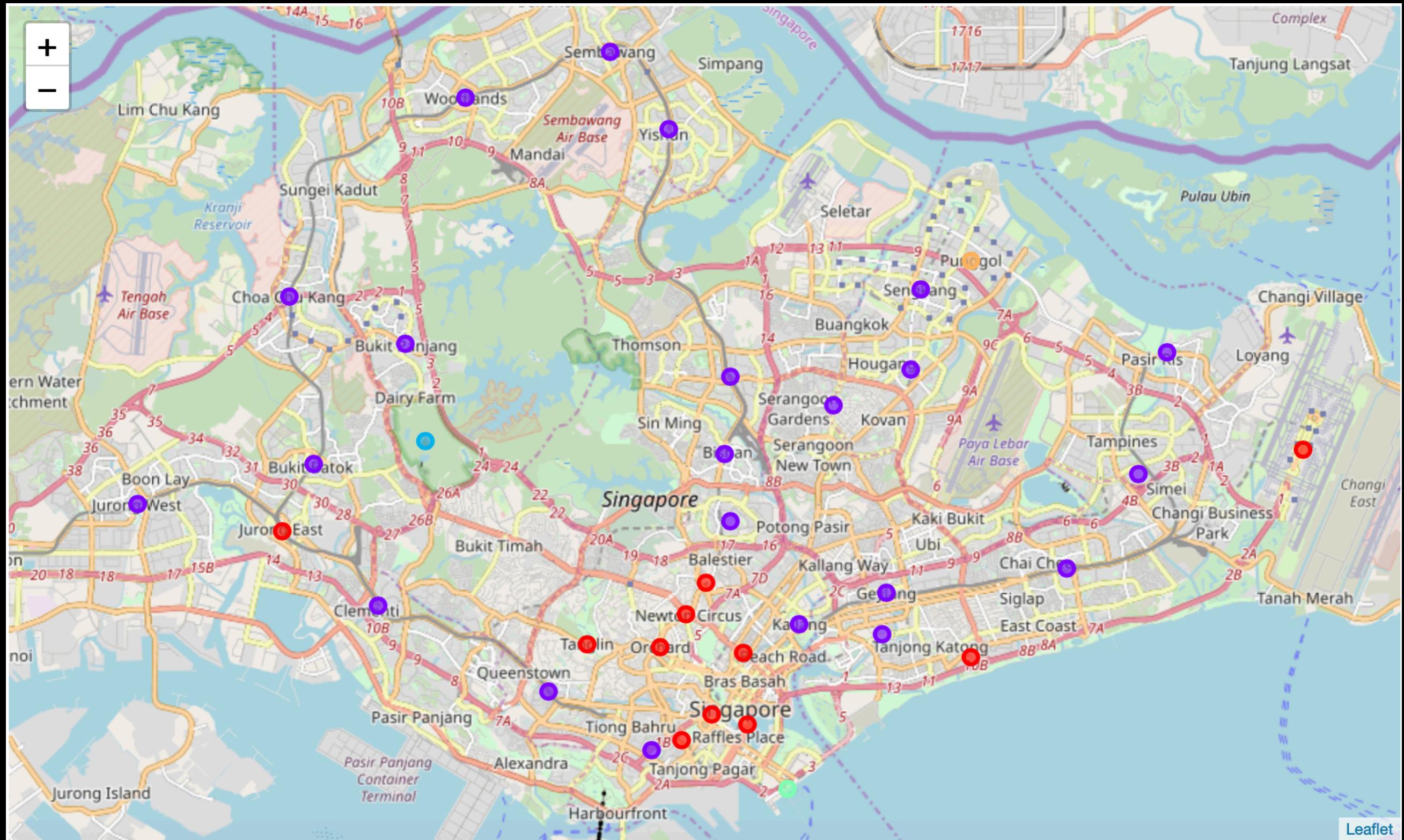


PROGRAMS USED

- GeoPy
- Folium

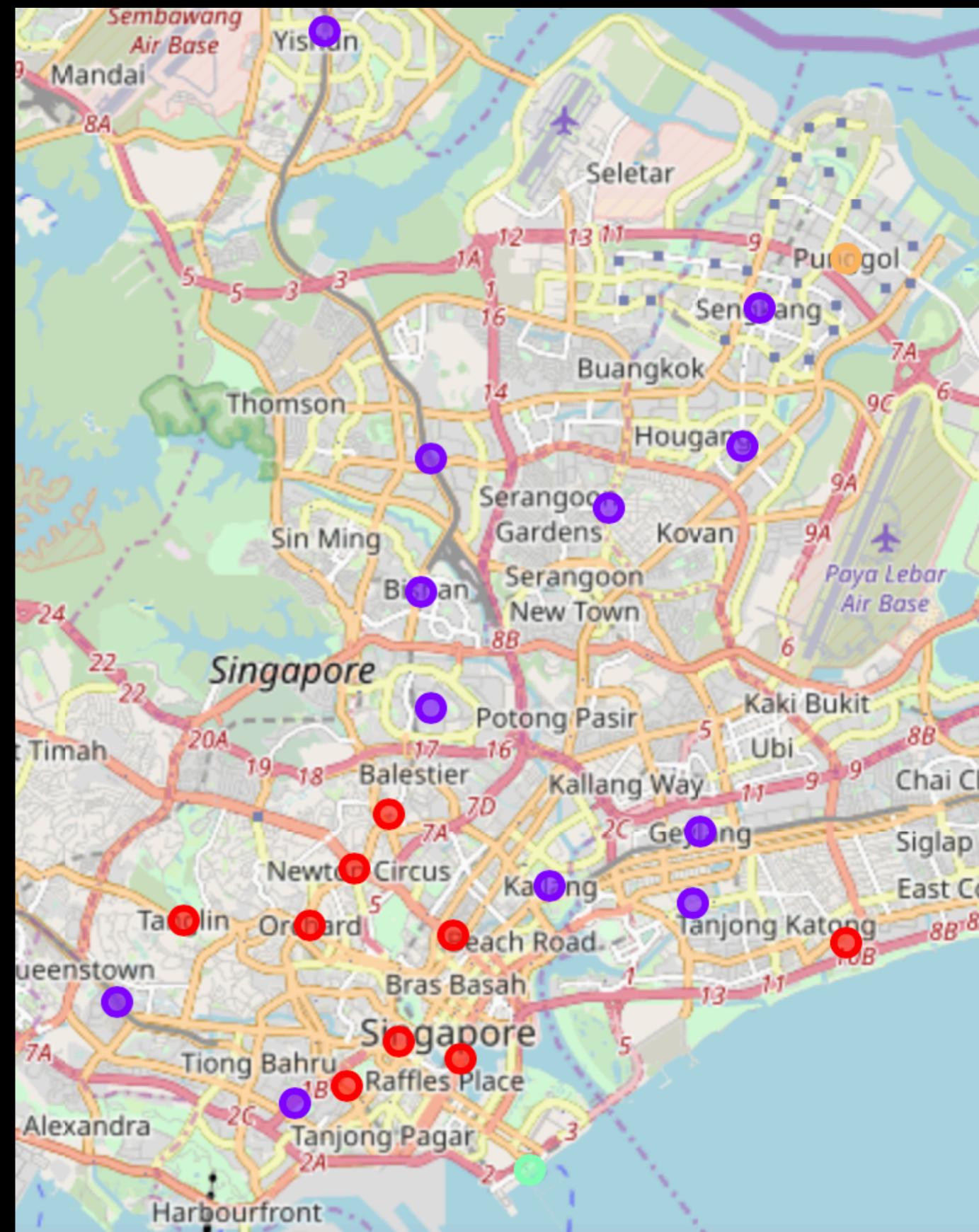


CLUSTERING OF NEIGHBOURHOODS



RESULTS: CENTRAL CLUSTER

- Clustered in the central/south location
 - Most developed and cosmopolitan area.
 - As expected there are more affluent venues like Restaurants, Hotels and Café's.
 - The Word-Cloud generated from the venues shows many Cosmopolitan Dining venues from Italian, to Japanese, and even Vegan food

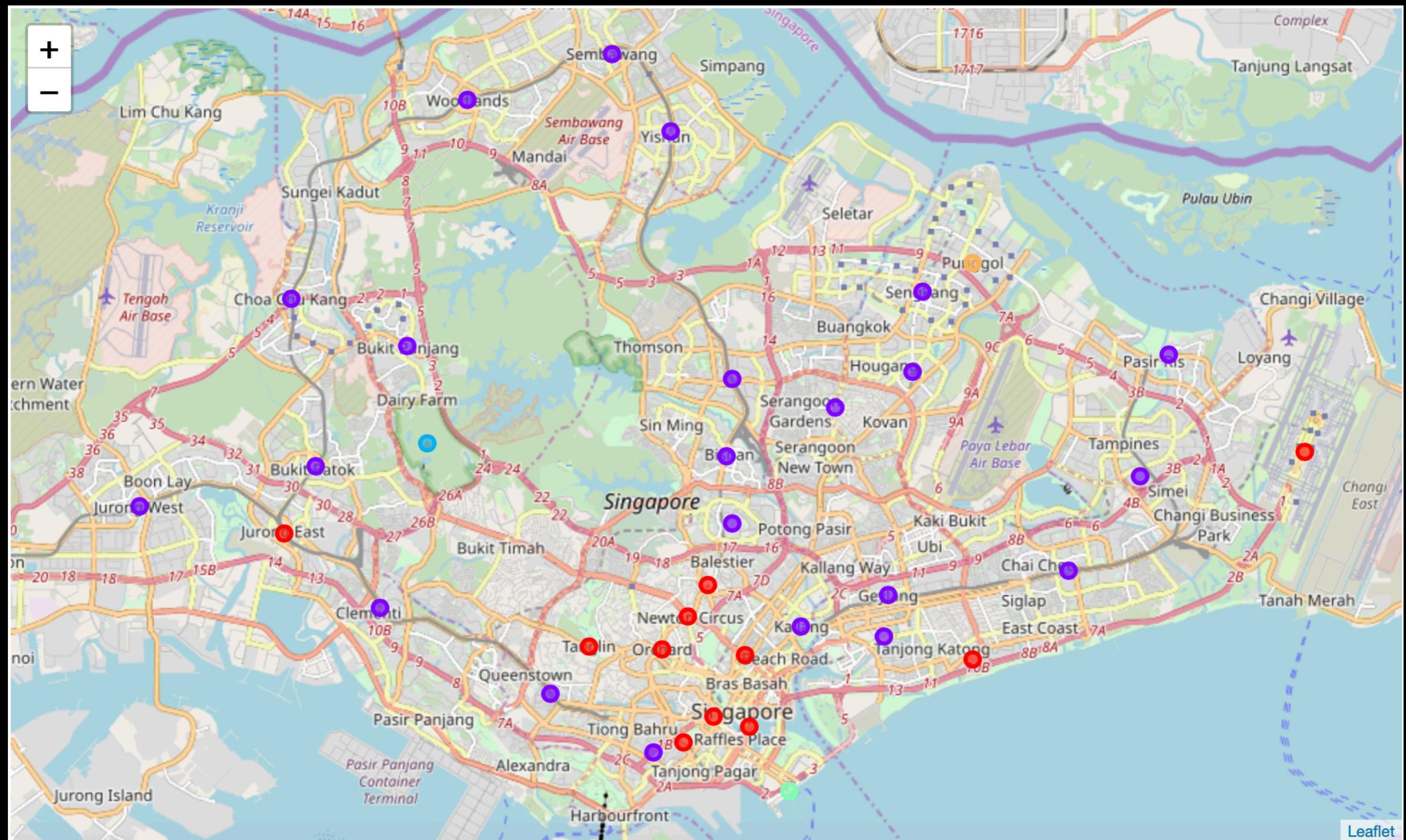


All the **red** dots.

WORDCLOUD FOR CENTRAL AREA



RESULTS: "HEARTLAND" AREAS



Basically, all the **purple** dots.

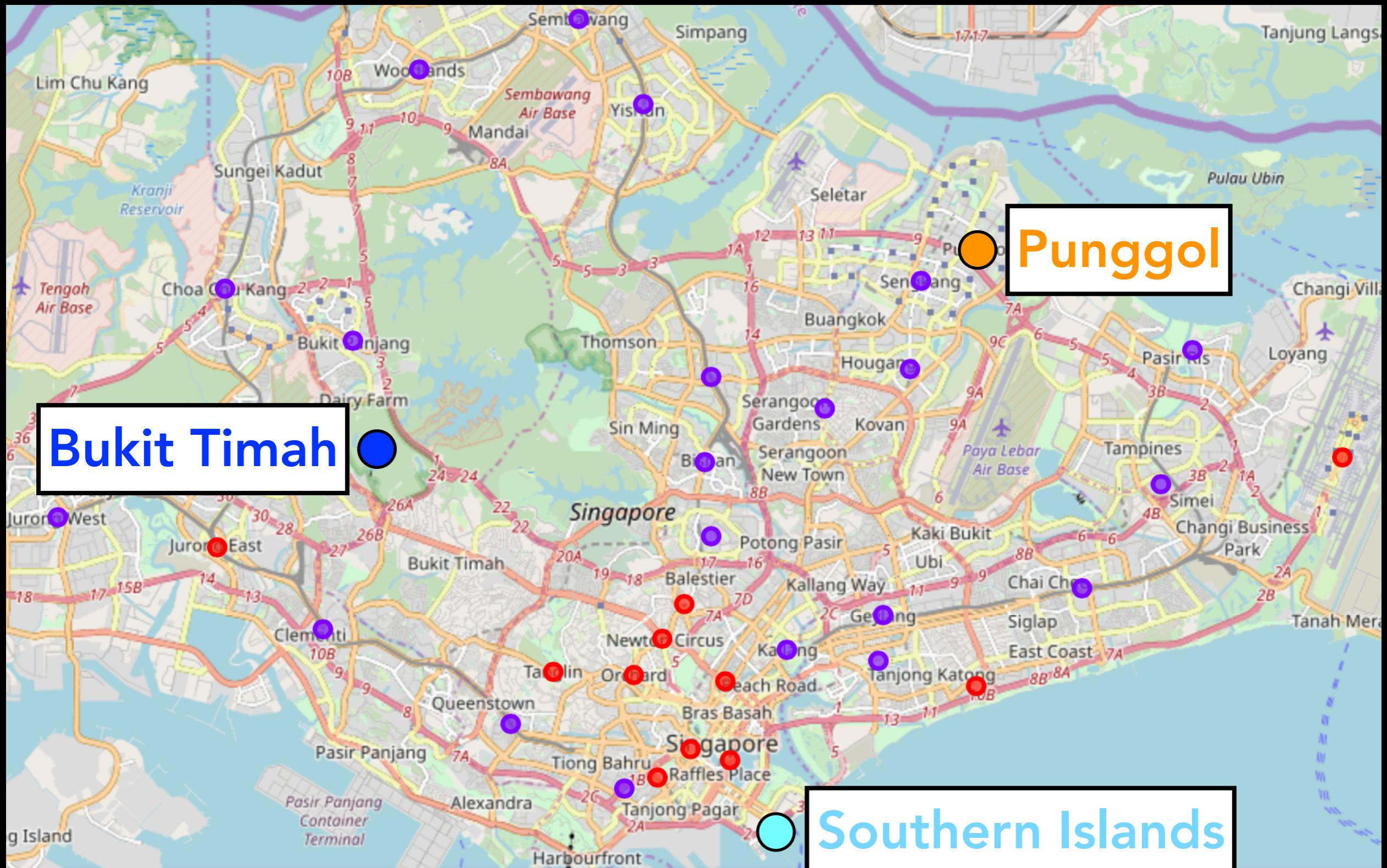
RESULTS: "HEARTLAND" AREAS

- Public housing areas where most of the working class live
- More accessible venues, like Food Courts, Supermarkets, and Asian/Seafood Restaurants.

WORDCLOUD FOR HEARTLAND AREA



3 OUTLIERS:



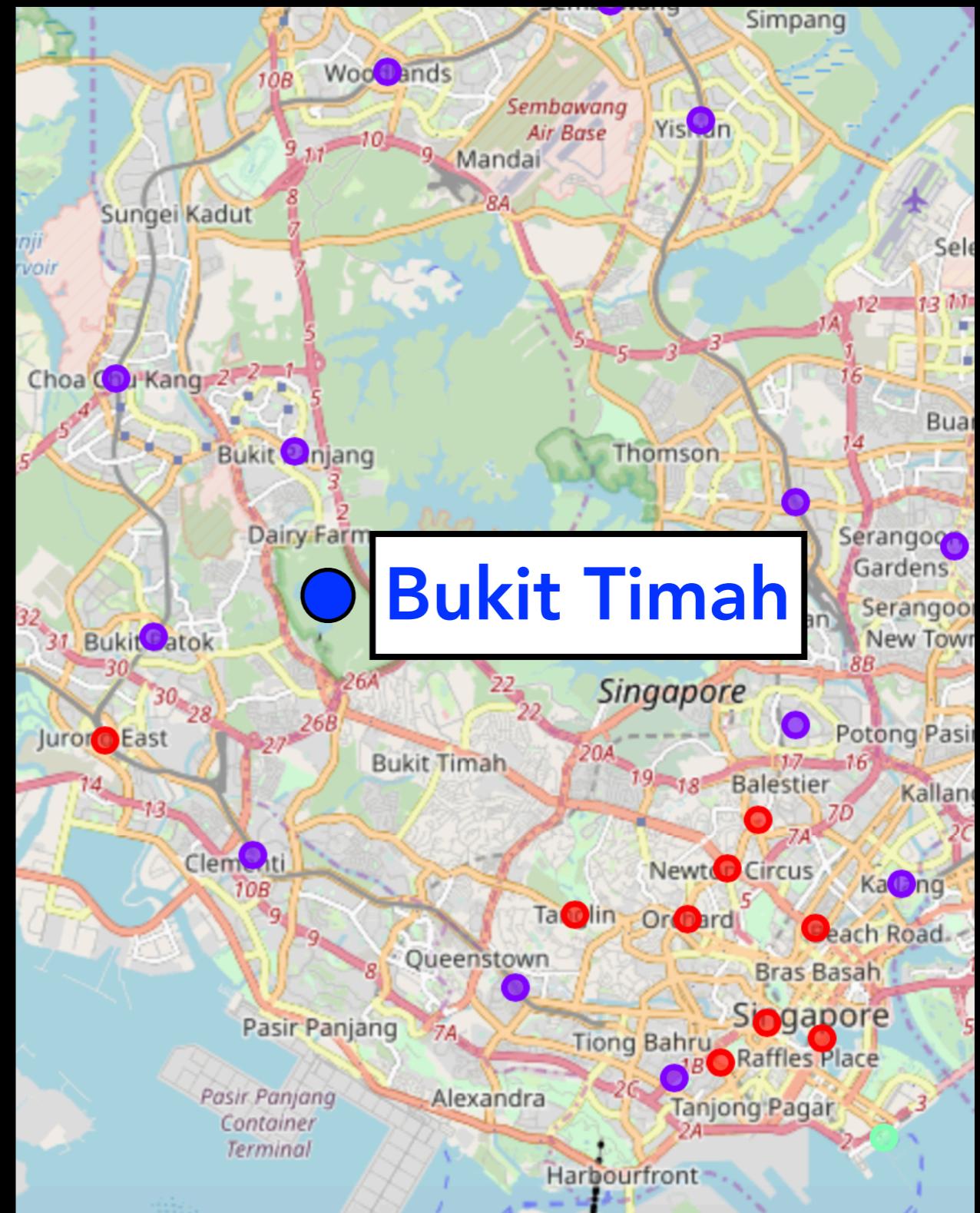
OUTLIER: PUNGGOL

- Venues here typically fit those of a heartland neighborhood: fastfood restaurant, supermarket
- However, Punggol is a newly developing housing area, so the venues and amenities are quite sparse within that area
- If we look closer at the venue data, Punggol only has 10 venues within a 750 metre radius of the town center



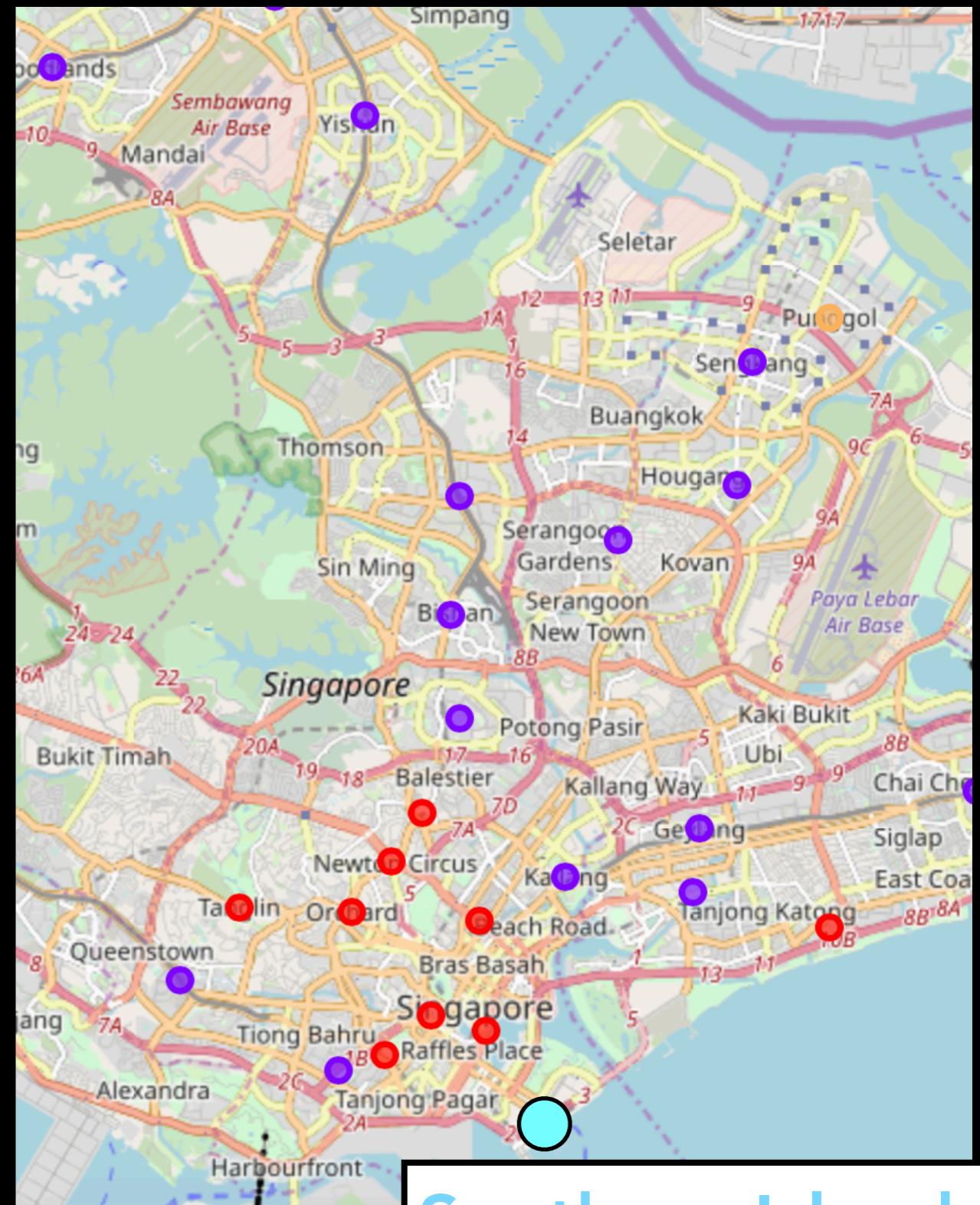
OUTLIER: BUKIT TIMAH

- Bukit Timah is home to Singapore's largest nature reserve, and we can see that from the venue data around the location.



OUTLIER: SOUTHERN ISLANDS

- Small islands, with Sentosa being the biggest one
- All the Islands are tourist spots, and we can see that in the venue data
- Sentosa has many high end resorts, spas, as well as a host of other tourist attractions



OUTLIER VENUE DATA

Punggol

Area	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	
28	Punggol	4	Fast Food Restaurant	Sandwich Place	Café	Dessert Shop	Gym / Fitness Center	Supermarket	Chinese Restaurant	Japanese Restaurant	High School	Diner

Bukit Timah

Area	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	
14	Bukit Timah	2	Trail	Mountain	Rest Area	Scenic Lookout	Nature Preserve	Lake	Tourist Information Center	Bike Trail	Park	Yoga Studio

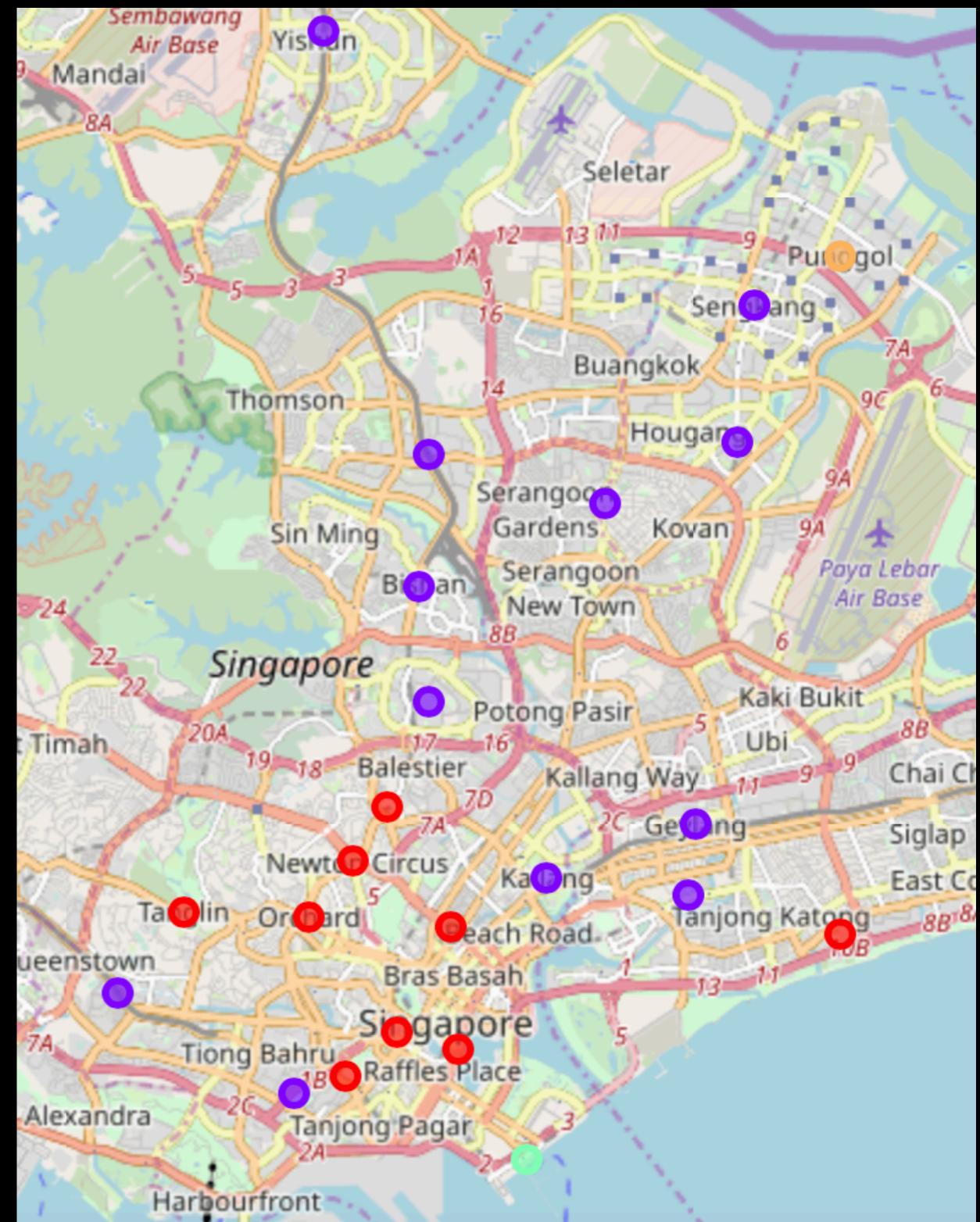
Southern Islands

Area	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	
2	Southern Islands	3	Cruise	Boat or Ferry	Pier	Cafeteria	BBQ Joint	Metro Station	Mexican Restaurant	Bus Line	Government Building	History Museum

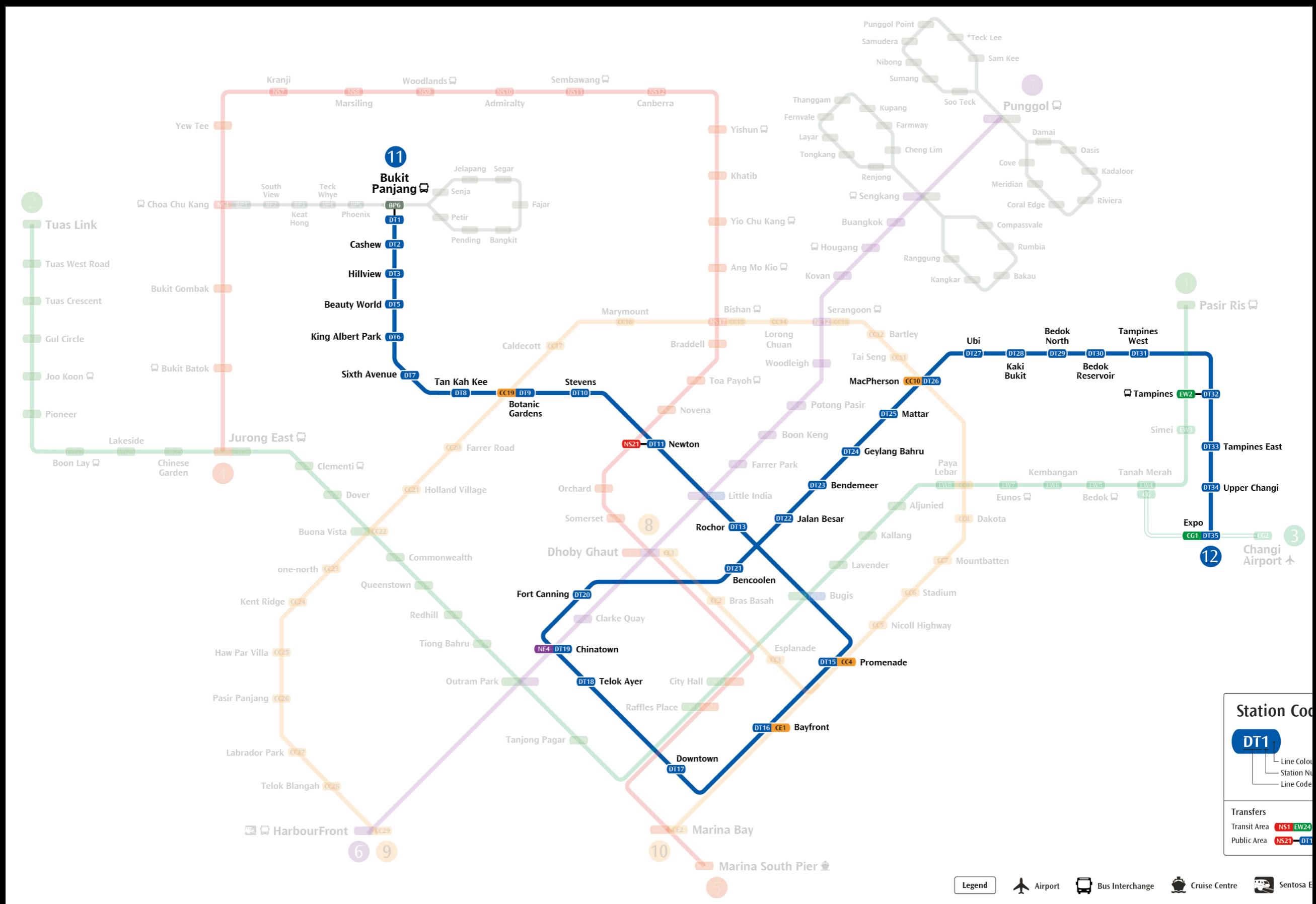
CONCLUSION AND RECOMMENDATIONS

TWO MAIN TYPES OF NEIGHBOURHOODS

- It turns out that Singapore neighbourhoods are quite homogenous.
- If you want to have the benefits of the central area, you would have to pay the high prices of staying there
- However, "Heartland" clusters have all the very important venues like Supermarkets, Food courts, etc



DOWNTOWN LINE



- New subway line called the Downtown Line, which links to Central/Downtown area
- Train comes every 2 to 7 minutes and brings passengers to the Central/Downtown area within minutes.
- Can also see from the subway map above that it is generally quite easy to get anywhere within Singapore quickly
- ...though the trains might be pretty packed at times

FURTHER ANALYSIS & IMPROVEMENTS

- Analyse travelling data between locations
- For example, how long does it take to travel from one location to another, and how would that affect the process of choosing a place to live in
- Singapore's transport infrastructure is always expanding and improving
- There will definitely be a lot of data we can look at in that area, and analysing it can be useful to many people