The Battle of Neighborhoods in Singapore

Introduction

Singapore is an international vibrant country city in Asia. Singapore is the world's most competitive economy, according to an updated global league table. It scored 84.8 out of a possible 100, beating the United States to the top spot in the ranking of 141 economies. The US, which topped the charts last year, scored 83.7. Thanks to its strategic location, reliable government and business-friendly environment, Singapore become top choice for global business entities to put their APAC headquarters in. Expatriates pick Singapore as their most wanted place for their next move because it's safe, bilingual and multinational. One possible and real-life question firstly come up when Expatriate relocate to Singapore would be, where should I live, or where should I rent my house if the accommodation is not arranged by company which should be most of the cases. Most company provides relocation package and allowance to let you choose yourself the place you want to stay. Singapore is a small island but contains 28 districts, which further splits into different areas. It's indeed a headache for those who come to Singapore for first time to choose which neighborhood is best for them. In this project, I will go through the data from different districts and areas using four square API to explore these neighborhoods.

Data

To simplify the analysis, assumption that the expatriates mostly work in CBD area or we called Core Central Region (CCR) in Singapore has been made. Depends on Expatriate profile, he or she might come to Singapore alone or with family, so a two-bed room condo unit or one-bedroom unit might be in favor to them probably. With a budget of 3000SGD, an expatriate could get a one-bedroom or just a studio in CCR region, while in Rest of Central Region (RCR), he/she could rent a two-bedroom condo unit. The commute time from RCR to CBD is within 30min by public transport or less than 20min by car, which should be acceptable. To start with RCR areas in Singapore, I googled "Singapore RCR" and retrieved a table of areas in each of the RCR districts.

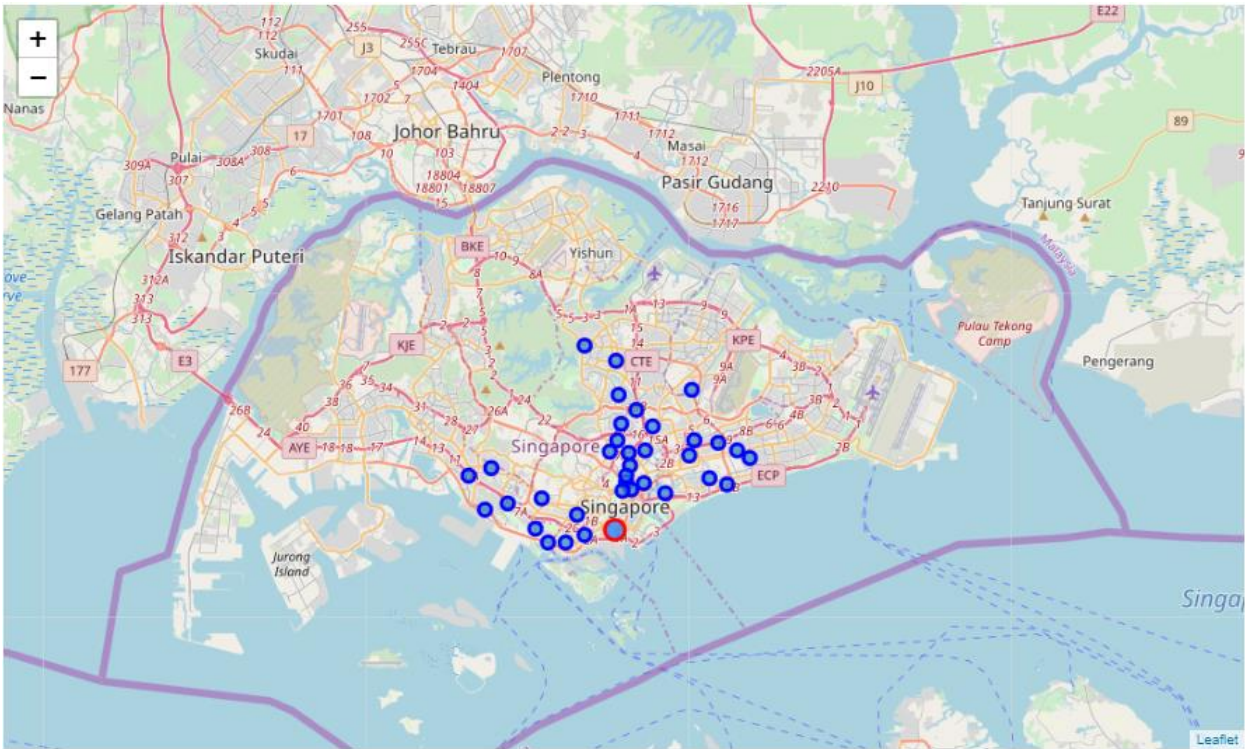|	District	Area
1	3	Alexandra Road, Tiong Bahru, Queenstown
2	4	Keppel, Mount Faber, Telok Blangah
3	5	Buona Vista, Dover, Pasir Panjang, West Coast
4	7	Beach Road, Bencoolen Road, Bugis, Rochor
5	8	Little India, Farrer Park, Serangoon Road
6	12	Balestier, Moulmein, Novena, Toa Payoh
7	13	Potong Pasir, Macpherson
8	14	Eunos, Geylang, Kembangan, Paya Lebar
9	15	Katong, Marine Parade, Siglap, Tanjong Rhu
10	20	Ang Mo Kio, Bishan, Braddell Road, Thomson

These general areas will be used to explore the most popular venues through Foursquare API. Let's first separate the areas into columns, and sort them in the order of district they belonged to respectively.
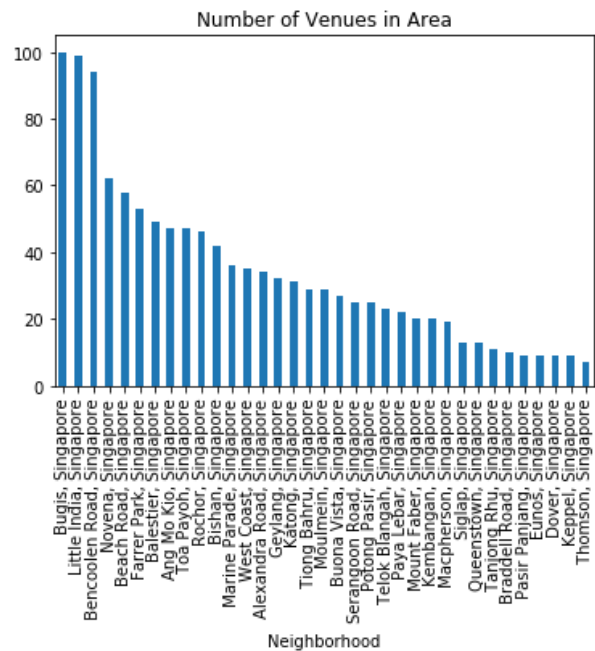
Methodology

We will use geopy package to acquire the geographic coordinates (Latitude and longitude) of each area. To save time and avoid "service timed out" issue seen from geolocator, I export the coordinates to an csv file for future extraction. At beginning, I just use area name to obtain the coordinates directly, but it turns out many areas ended with wrong coordinates. After that I added "Singapore" postfix in the query string, and it gives correct location for all places.

	District	Area	Latitude	Longitude
0	3	Alexandra Road, Singapore	1.278088	103.802975
1	3	Queenstown, Singapore	1.294623	103.806045
2	3	Tiong Bahru, Singapore	1.286197	103.825765
3	4	Keppel, Singapore	1.274836	103.829539
4	4	Telok Blangah, Singapore	1.270586	103.809863
5	4	Mount Faber, Singapore	1.271152	103.819459
6	5	Pasir Panjang, Singapore	1.288834	103.775657
7	5	West Coast, Singapore	1.307230	103.766728
8	5	Dover, Singapore	1.311421	103.778627
9	5	Buona Vista, Singapore	1.292460	103.787773
10	7	Rochor, Singapore	1.303984	103.852612
11	7	Bugis, Singapore	1.299476	103.855089
12	7	Bencoolen Road, Singapore	1.299016	103.850475
13	7	Beach Road, Singapore	1.303052	103.862267
14	8	Farrer Park, Singapore	1.312755	103.854374
15	8	Little India, Singapore	1.307457	103.852572
16	8	Serangoon Road, Singapore	1.320970	103.862685
17	12	Moulmein, Singapore	1.319374	103.853540
18	12	Balestier, Singapore	1.326226	103.847315
19	12	Novena, Singapore	1.320084	103.843492
20	12	Toa Payoh, Singapore	1.335391	103.849741
21	13	Potong Pasir, Singapore	1.334189	103.867093
22	13	Macpherson, Singapore	1.326207	103.889507
23	14	Paya Lebar, Singapore	1.353899	103.887821
24	14	Kembangan, Singapore	1.321032	103.912927
25	14	Geylang, Singapore	1.318186	103.887056
26	14	Eunos, Singapore	1.325406	103.902560
27	15	Marine Parade, Singapore	1.302689	103.907395
28	15	Siglap, Singapore	1.316999	103.919587
29	15	Tanjong Rhu, Singapore	1.297343	103.873764
30	15	Katong, Singapore	1.305789	103.897631
31	20	Braddell Road, Singapore	1.343236	103.857872
32	20	Ang Mo Kio, Singapore	1.369842	103.846609
33	20	Bishan, Singapore	1.351452	103.848250
34	20	Thomson, Singapore	1.377716	103.829524

Plot on the map to see the areas spreading in the whole island. Noted that the downtown of Singapore is not at the center but rather South of island. The downtown spot is highlighted using red circle.
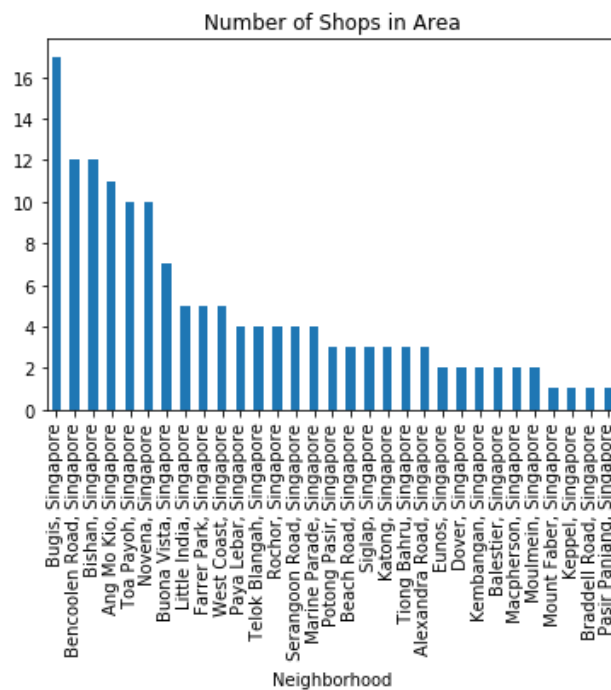

After that I use Foursquare API to explore the RCR neighborhoods, I populated top 100 venues to try to get a glimpse of the popular spots. First let look at in general the venues across these neighborhoods. Take note of those areas with venue less than 20, it might mean they are less populated areas with less facilities and amenities.

As a female expat, the nature for shopping might dominant her intention to look for some places with the greatest number of shops, I understand that desire and quickly plotted the bar chart with the greatest number of shops in RCR areas. The "[S|s] hop" includes all kinds of shop, so in certain extent, it indicates the convenience level of that area. Let's remember follow 5 areas that contains most shops:
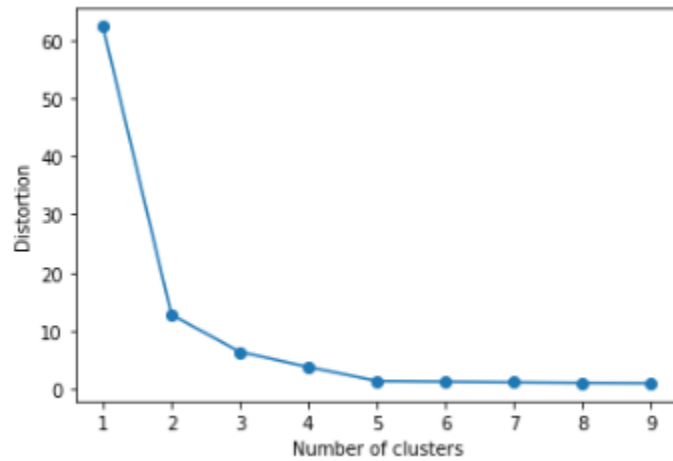
1. **Bugis**
2. **Bencoolen**
3. **Bishan**
4. **Ang Mo Kio**
5. **Toa Payoh**

Finally, we want to use Kmeans to cluster RCR areas and to see if they can be divided into groups that with commonalities.
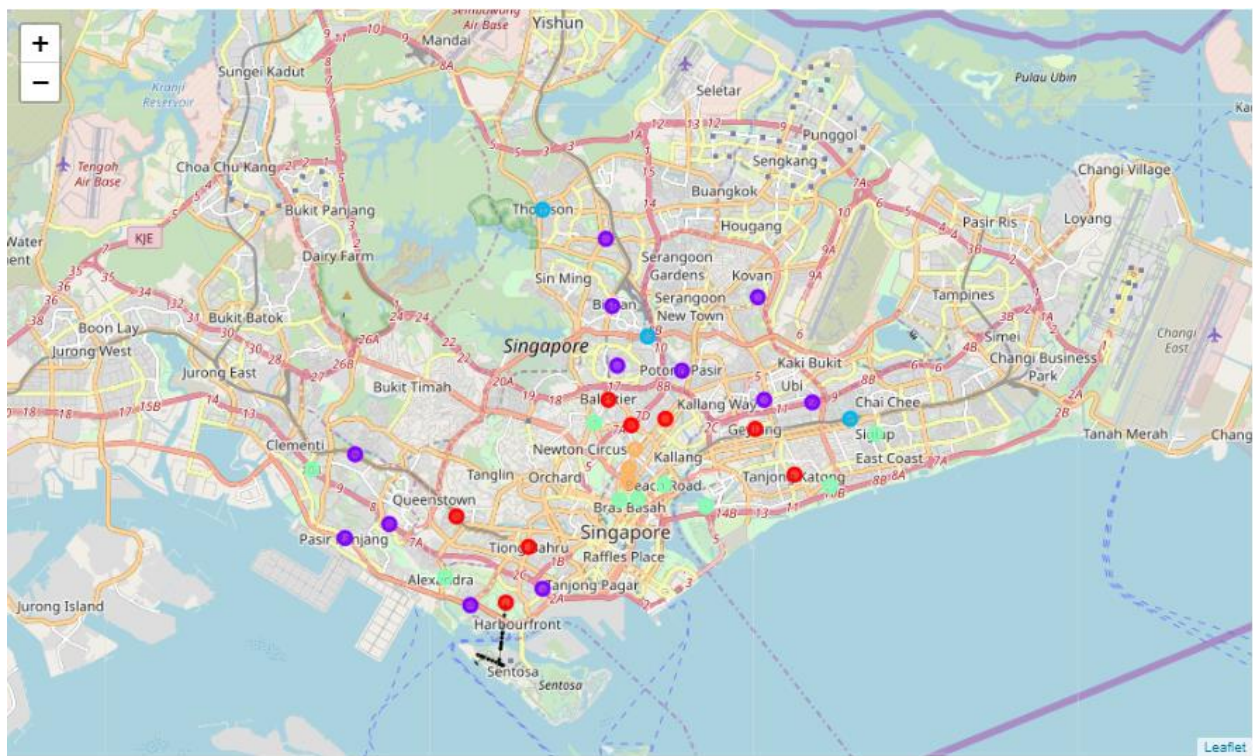
Results

We picked the top 10 common venues for all RCR areas. Then we use elbow method to determine the optimized K for Kmean Clustering, we can see that k=5 gives the best result.

	District	Area	Latitude	Longitude	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
14	8	Farrer Park, Singapore	1.312755	103.854374	4	Indian Restaurant	Café	Chinese Restaurant	Vegetarian / Vegan Restaurant	Hotel	Fried Chicken Joint	Asian Restaurant	Frozen Yogurt Shop
15	8	Little India, Singapore	1.307457	103.852572	4	Indian Restaurant	Vegetarian / Vegan Restaurant	Hotel	Café	Chinese Restaurant	Hostel	Asian Restaurant	Noodle House
10	7	Rochor, Singapore	1.303984	103.852612	4	Indian Restaurant	Vegetarian / Vegan Restaurant	Café	Chinese Restaurant	Dessert Shop	Art Gallery	Food	Shopping Plaza
0	3	Alexandra Road, Singapore	1.278088	103.802975	3	Café	Sushi Restaurant	Fast Food Restaurant	Art Gallery	Deli / Bodega	Bus Station	Sporting Goods Shop	Garden
29	15	Tanjong Rhu, Singapore	1.297343	103.873764	3	Bus Station	Golf Course	Gym / Fitness Center	Mexican Restaurant	Stadium	Café	Golf Driving Range	Thai Restaurant
28	15	Siglap, Singapore	1.316999	103.919587	3	Coffee Shop	Park	Dessert Shop	Bus Stop	Bakery	Spanish Restaurant	BBQ Joint	Café
27	15	Marine Parade, Singapore	1.302689	103.907395	3	Hotel	Multiplex	Japanese Restaurant	Chinese Restaurant	Massage Studio	Salad Place	Indian Restaurant	Bistro
7	5	West Coast, Singapore	1.307230	103.766728	3	Bus Station	Chinese Restaurant	Café	Market	Indian Restaurant	Pool	Japanese Restaurant	Sporting Goods Shop
19	12	Novena, Singapore	1.320084	103.843492	3	Café	Coffee Shop	Ramen Restaurant	Hotel	Chinese Restaurant	Italian Restaurant	Japanese Restaurant	Asian Restaurant
11	7	Bugis, Singapore	1.299476	103.855089	3	Café	Japanese Restaurant	Hotel	Bakery	Cocktail Bar	Chinese Restaurant	Dessert Shop	Bookstore
12	7	Bencoolen Road, Singapore	1.299016	103.850475	3	Café	Hotel	Japanese Restaurant	Chinese Restaurant	Food Court	Gift Shop	Ice Cream Shop	Sports Bar
13	7	Beach Road, Singapore	1.303052	103.862267	3	Thai Restaurant	Hotel	Restaurant	Café	Indian Restaurant	Coffee Shop	Indonesian Restaurant	Italian Restaurant
31	20	Braddell Road, Singapore	1.343236	103.857872	2	Seafood Restaurant	Bus Stop	Noodle House	Food Court	Coffee Shop	Trail	Chinese Restaurant	Yoga Studio
24	14	Kembangan, Singapore	1.321032	103.912927	2	Chinese Restaurant	Indian Restaurant	Bus Stop	BBQ Joint	Shopping Mall	Food Court	Bistro	Supermarket
34	20	Thomson, Singapore	1.377716	103.829524	2	Indian Restaurant	Seafood Restaurant	Italian Restaurant	Japanese Restaurant	Bus Stop	Chinese Restaurant	Snack Place	Yoga Studio
9	5	Buona Vista, Singapore	1.292460	103.787773	1	Coffee Shop	Café	Food Court	Bus Station	Hong Kong Restaurant	Kebab Restaurant	Pharmacy	Office
3	4	Keppel, Singapore	1.274836	103.829539	1	Asian Restaurant	Food Court	Hotel	Furniture / Home Store	Coffee Shop	Vegetarian / Vegan Restaurant	Paper / Office Supplies Store	Yoga Studio
33	20	Bishan, Singapore	1.351452	103.848250	1	Coffee Shop	Food Court	Bubble Tea Shop	Café	Supermarket	Cosmetics Shop	Pet Store	Japanese Restaurant
32	20	Ang Mo Kio, Singapore	1.369842	103.846609	1	Food Court	Coffee Shop	Snack Place	Sandwich Place	Japanese Restaurant	Supermarket	Dessert Shop	Bubble Tea Shop

						Lounge	Sandwich Place	Bubble Tea Shop	Bowling Alley	College Cafeteria	Coffee Shop	Pool Hall	Cafeteria
8	5	Dover, Singapore	1.311421	103.778627	1	Lounge	Sandwich Place	Bubble Tea Shop	Bowling Alley	College Cafeteria	Coffee Shop	Pool Hall	Cafeteria
20	12	Toa Payoh, Singapore	1.335391	103.849741	1	Noodle House	Coffee Shop	Food Court	Asian Restaurant	Chinese Restaurant	Snack Place	Steakhouse	Café
21	13	Potong Pasir, Singapore	1.334189	103.867093	1	Convenience Store	Bus Station	Gym	Snack Place	Fast Food Restaurant	Food Court	Theater	Shopping Mall
22	13	Macpherson, Singapore	1.326207	103.889507	1	Bus Station	Noodle House	Food Court	Furniture / Home Store	Playground	Gym / Fitness Center	Coffee Shop	Office
23	14	Paya Lebar, Singapore	1.353899	103.887821	1	Noodle House	Coffee Shop	Bakery	Bus Station	Food Court	Breakfast Spot	Cafeteria	Café
6	5	Pasir Panjang, Singapore	1.288834	103.775657	1	Bus Station	Pier	Indian Restaurant	Asian Restaurant	Dog Run	Boat or Ferry	Food Court	Miscellaneous Shop
26	14	Eunos, Singapore	1.325406	103.902560	1	Coffee Shop	Grocery Store	Japanese Restaurant	Food Court	Bus Station	Martial Arts Dojo	Fujian Restaurant	Diner
4	4	Telok Blangah, Singapore	1.270586	103.809863	1	Food Court	Pool	Bus Station	Convenience Store	Shopping Mall	Metro Station	Market	Board Shop
2	3	Tiong Bahru, Singapore	1.286197	103.825765	0	Chinese Restaurant	Coffee Shop	Food Court	Bakery	Bar	Café	Fast Food Restaurant	Supermarket
30	15	Katong, Singapore	1.305789	103.897631	0	Chinese Restaurant	Italian Restaurant	Ice Cream Shop	Asian Restaurant	Noodle House	Café	Bakery	Malay Restaurant
25	14	Geylang, Singapore	1.318186	103.887056	0	Chinese Restaurant	Food Court	Noodle House	Vegetarian / Vegan Restaurant	Seafood Restaurant	Dim Sum Restaurant	Asian Restaurant	Grocery Store
5	4	Mount Faber, Singapore	1.271152	103.819459	0	Chinese Restaurant	Food Court	Café	Trail	Dessert Shop	Scenic Lookout	Bus Stop	Cable Car
16	8	Serangoon Road, Singapore	1.320970	103.862685	0	Chinese Restaurant	Noodle House	Coffee Shop	Asian Restaurant	Cafeteria	Bakery	Shopping Mall	Food Court
18	12	Balestier, Singapore	1.326226	103.847315	0	Chinese Restaurant	Hotel	Bakery	Food Court	Noodle House	Fast Food Restaurant	Modern European Restaurant	Sandwich Place
1	3	Queenstown, Singapore	1.294623	103.806045	0	Chinese Restaurant	Food Court	Seafood Restaurant	Spa	Café	Pool	Noodle House	Train Station
17	12	Moulmein, Singapore	1.319374	103.853540	0	Chinese Restaurant	Asian Restaurant	Seafood Restaurant	Dessert Shop	Noodle House	Hotel	Food	Soup Place

Discussion

Based on k=5 we successfully cluster the RCR areas into 5 groups. We can see from the chart that Cluster 0 is mostly occupied with Restaurant (especially Chinese Restaurant). This cluster we could call it **Mid-Class Chinese Zone**. Cluster 1 is more facilitated with public infrastructures like Bus Station, Food Court, Coffee Shop, which provides convenience and localization, so we call it **Classic Living Zone**. Cluster 2 has mixed flavors in restaurant style, so we call it **Mixed Living Zone**. Cluster 3 has Café, Hotel as primary venues, which indicates certain level of relaxation, slow pace in lifestyle, so we call it **Relax Zone**. Cluster 4 has most frequent visits to Indian Restaurant and Vegetarian food, which clearly indicates that there are substantial number of Indian immigrants concentrated in these areas, so we call it using the most representative area name: **Little Indian Zone**.

Let's go back to the top 5 areas that we draw from those with most shops, Bugis and Bencoolen is at Relax Zone. Bishan/Ang Mo Kio/Toh Payoh belongs to Classic Living Zone.

1. **Bugis** → Relax Zone
2. **Bencoolen** → Relax Zone
3. **Bishan** → Classic Living Zone
4. **Ang Mo Kio** → Classic Living Zone
5. **Toa Payoh** → Classic Living Zone

Based on above analysis and review, depends on the background of the expatriates, I would suggest different area for them to start with at the beginning their journey in Singapore. For example, a Chinese family with housewife and kids, I would suggest staying in Bishan/Ang Mo Kio/Toa Payoh, they could enjoy convenience brought by plenty of shops and amenities, with easy access of public transport, they can reach any part of island easily. Another example, an Indian single professional, I would suggest renting a place in Little India or Ferry Park, where he could enjoy most authentic Indian food and social with people having similar background or culture. A young couple both loving Chinese/Asian food could choose Mid-Class Chinese Zone as well since they have most Chinese restaurants and Asia food available.

Conclusion

In this project I'm trying to use the data to provide some insight for foreign talents that going to start a new journey in Singapore. The analysis is based on a few assumptions so it has limitations in real life application, where the case will be more complicated. But in general, this report provides useful information to expatriates when they try to explore their first accommodation in Singapore and certainly suggests some good candidates for their consideration.