The Battle of Neighborhoods

Exploring business opportunity around train stations' neighborhood in Singapore

1. Introduction

1.1 Background Information

Singapore railway system is made up of five Mass Rapid Transit (MRT) lines and two Light Rapid Transit (LRT) lines. The MRT & LRT 230km system has over three million daily ridership. There are a total of 187 Mass Rapid Transit (MRT)/Light Rapid Transit (LRT) train stations as of Jan 2019.

In general, the neighborhoods around MRT/LRT stations are highly populated and many shopping centers, shops, business offices are found near the MRT/LRT stations. The typical business or shops near the railway station include shopping malls, supermarkets, coffee shops, restaurants, dessert shops and etc. The kinds of business or shops clustered around the railway stations could vary significantly from station to station. As such, it will be interesting and beneficial for those who are keen in seeking business opportunity in the neighborhood area of railway stations to have a better idea of what are the most common business and/or shops that exist currently around these railway stations so as to make a better business decision.

1.2 Business Problem

To find out the existing common business or shops in the neighborhood around MRT/LRT stations and to explore business opportunity based on the analysis of the MRT/LRT trains' neighborhood data.

1.3 Target Audience

People who are interested in opening a shop for certain business of their interest at location near any of the MRT/LRT stations in Singapore

2. Data Acquisition and Cleaning

2.1 Location Data of MRT/LRT train stations

The location data (latitude & longitude coordinates) of MRT & LRT stations in Singapore is obtained from the following data source:

https://data.world/hxchua/train-stations-in-singapore

The following two methods can be used to retrieve the latitude & longitude data of train stations from the above website:

(1) Direct downloading of .csv file

!wget -q -O 'mrtlrt_sg.csv' https://data.world/hxchua/train-stations-in-singapore/workspace/file?filename=mrtsg.csv

(2) Calling pandas.read_csv() to read the location data from a provided URL into a dataframe:

```
import pandas as pd
url = 'https://query.data.world/s/heji2ztgpnwx5j5362iqgspyjioh2u'
df_sgp = pd.read_csv(url)
```

The csv data read in consists of 8 columns of data, namely 'OBJECTID', ;STN NAME', ;STN NO', 'X', 'Y', 'Latitude', 'Longitude' and 'COLOR', as shown in the following diagram:

0	BJECTID	STN_NAME	STN_NO	X	Y	Latitude	Longitude	COLO
0	12	ADMIRALTY MRT STATION	NS10	24402.1063	46918.1131	1.440585	103.800998	RE
1	16	ALJUNIED MRT STATION	EW9	33518.6049	33190.0020	1.316433	103.882893	GREE
2	33	ANG MO KIO MRT STATION	NS16	29807.2655	39105.7720	1.369933	103.849553	RE
3	81	BAKAU LRT STATION	SE3	36026.0821	41113.8766	1.388093	103.905418	OTHE
4	80	BANGKIT LRT STATION	BP9	21248.2460	40220.9693	1.380018	103.772667	OTHE
		-		-	-		-	
82	175	WOODLANDS SOUTH MRT STATION	TE3	23607.8309	45444.7113	1.427260	103.793863	OTHE
83	146	WOODLEIGH MRT STATION	NE11	32173.3186	35706.3794	1.339190	103.870808	PURP
84	6	YEW TEE MRT STATION	NSS	18438.9791	42158.0124	1.397535	103.747431	RI
85	41	YIO CHU KANG MRT STATION	NS15	29294.1283	40413.0820	1.381756	103.844944	R
86	13	YISHUN MRT STATION	NS13	28187.6787	45686.0701	1.429443	103.835005	RE

There are a total of 187 rows of data (with each row represents a train stations) retrieved. In our analysis, only 4 columns of data, i.e. 'STN NAME', 'STN NO', 'Latitude', 'Longitude', are needed. The unwanted columns of data will be discarded.

For some train stations, the same station name could be associated with more than one station number, for instance, the 'Bayfront MRT station' has two station numbers, i.e. 'DT16' and 'CE1', as these train stations comprise of platforms for more than one MRT lines and these platforms even though are linked but they could be at a distance from each other and hence each station no ('STN NO') is having its own latitude & longitude data. In our analysis, each station number is treated as a unique station and for the sake of station identification

completeness, the 'STN NAME' and 'STN NO' are combined to form the 'Station ID' (Station Identifier) and subsequent data analysis will be performed based on the 'Station ID' data.

The following diagram shows a new dataframe which contains only the required 'Station ID', 'Latitude' and 'Longitude' data.

```
df_stnloc = df_sgp[['Latitude', 'Longitude']].copy(deep=True)
df_stnloc['Station ID'] = df_sgp['STN_NAME'] + ' (' + df_sgp['STN_NO'] + ')'

# move Station_ID column to the first column
new_columns = [df_stnloc.columns[-1]] + list(df_stnloc.columns[:-1])
df_stnloc = df_stnloc[new_columns]
df_stnloc.head()
Station_ID_Latitude_Longitude
```

	Station ID	Latitude	Longitude
0	ADMIRALTY MRT STATION (NS10)	1.440585	103.800998
1	ALJUNIED MRT STATION (EW9)	1.316433	103.882893
2	ANG MO KIO MRT STATION (NS16)	1.369933	103.849553
3	BAKAU LRT STATION (SE3)	1.388093	103.905418
4	BANGKIT LRT STATION (BP9)	1.380018	103.772667

2.2 Latitude & Longitude Data of Singapore

The Python's geopy library is used to obtain the latitude and longitude values of Singapore.

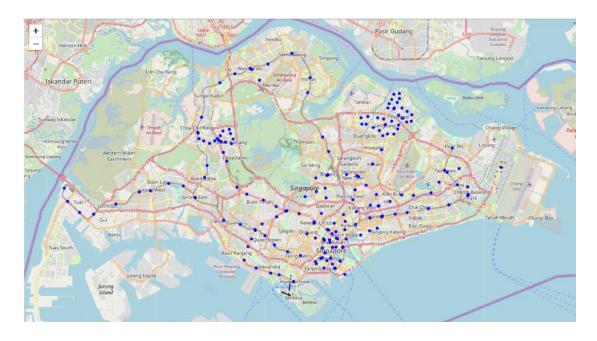
```
address = 'Singapore'

geolocator = Nominatim(user_agent="sg_explorer")
location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude

print ('The latitude and longitude of Singapore is ({},{})'.format(latitude, longitude))
The latitude and longitude of Singapore is (1.340863,103.830391822121)
```

The latitude and longitude data of Singapore is needed for drawing a map of Singapore using Python's folium library.

Together with the latitude & longitude data of train stations, a map of Singapore with markers of train station is generated which is shown in the diagram below:



2.3 Foursquare's Neighborhood Venues Data

Foursquare Places Data API is called to find out the venues (up to 50) located within 500m from each of the train station.

The Python code that calls the Foursquare Places Data API calls for retrieving the nearby venues of each train station is shown below:

```
LIMIT = 50 # limit of number of venues returned by Foursquare API
RADIUS = 500 # define radius
def getNearbyVenues(station_ids, latitudes, longitudes, radius=RADIUS):
 count = 1
 venues_list=[]
 for stn_id, lat, lng in zip(station_ids, latitudes, longitudes):
   print(count, stn_id)
   count = count + 1
   # create the API request URL
CLIENT_ID,
     CLIENT_SECRET,
     VERSION,
     lat,
     Ing,
     radius,
     LIMIT)
   # make the GET request
   results = requests.get(url).json()["response"]['groups'][0]['items']
   venues_list.append([(
       stn_id,
```

```
lat,
        Ing,
        v['venue']['name'],
        v['venue']['location']['lat'],
        v['venue']['location']['lng'],
        v['venue']['categories'][0]['name']) for v in results])
  nearby_venues = pd.DataFrame([item for venue_list in venues_list for item in venue_list])
  nearby_venues.columns = [
          'Station ID',
          'Stn Latitude',
         'Stn Longitude',
          'Venue',
          'Venue Latitude',
          'Venue Longitude',
          'Venue Category']
  return(nearby_venues)
sgp_venues = getNearbyVenues(station_ids=df_stnloc['Station ID'],
                  latitudes=df_stnloc['Latitude'],
                  longitudes=df_stnloc['Longitude']
```

The venue, its latitude & longitude data as well as the venue category the venue belongs to are tabulated in a dataframe as shown in the diagram below. These data will then be further processed and analyzed so as to identify the most common venue categories for each of the train stations.

	Station ID	Stn Latitude	Stn Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	ADMIRALTY MRT STATION (NS10)	1.440585	103.800998	Kempung Admiralty Hewker Centre	1.439939	103.800774	Food Court
1	ADMIRALTY MRT STATION (NS10)	1.440585	103.800998	Starbucks	1.439761	103.800659	Coffee Shop
2	ADMIRALTY MRT STATION (NS10)	1.440585	103.800998	NTUC fairprice	1.439955	103.800761	Supermarket
3	ADMIRALTY MRT STATION (NS10)	1.440585	103.800998	Saamsudeen	1.439802	103.800750	Halal Restaurant
4	ADMIRALTY MRT STATION (NS10)	1.440585	103.800998	NTUC FairPrice	1.437707	103.797636	Supermarket
5	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Phoon Huat & Co	1.316521	103.881152	Kitchen Supply Store
6	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	The Skewer Bar	1.313674	103.883870	88Q Joint
7	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Hong Qin Fish & Duck Porridge	1.315787	103.885663	Chinese Restaurant
8	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	No Signboard Seafood Restaurant	1.313155	103.882700	Seafood Restaurant
9	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Tan Ser Seng Herbs (Turtle) Restaurant 生成山積補品	1.314068	103.879981	Chinese Restaurant
10	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	J.B. Ah Meng Restaurant	1.313735	103.886182	Chinese Restaurant
11	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	代息符 Yes Natural F & B Vegetarian Restaurant	1.315828	103.883807	Vegetarian / Vegan Restaurant
12	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Builders At Sims	1.317739	103.879848	Cuffé
13	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Tai Dong Teochew Braised Duck Rice	1.317166	103.879990	Food Truck
14	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	The Lorong 24A shophouse series	1.312777	103.884045	Boarding House
15	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Koung's Wan Ian Mee 異氏雲存而 (Koung's Wan Ian Mee)	1.314860	103.880855	Noodle House
16	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Shuang Shun Chicken Rice	1.312680	103.880536	Asian Restaurant
17	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	7-Eleven	1.312758	103.880738	Convenience Store
18	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Penang Seafood Restaurant	1.314833	103.882075	Seafood Restaurant
19	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Sims Vista Market & Food Centre	1.316978	103.879382	Food Court
20	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Aikido Shinju-kai (Singapore) HQ 心常会本彩进场	1.315173	103.883155	Martial Arts Dojo
21	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Ci Hang Western & Chinese Vegetarian Fast Food	1.315744	103.883248	Vegetarian / Vegan Restaurant
22	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Hallywood Duck Rice • Duck Parridge	1.318095	103.879745	Chinese Restaurant
23	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Durians @ Lorong 21 Gaylang	1.314700	103.879937	Farmers Market
24	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	The Ranch	1.316328	103.883760	Steakhouse
25	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Shi Wei Xian HongKong Tim Sum	1.319740	103.885760	Dim Sum Restaurant
26	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Tasvee Restaurant	1.313421	103.883765	Indian Restaurant
27	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	觀音音 Kwan Inn Vegetarian Food	1.315932	103.886388	Vegetarian / Vegan Restaurant
28	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Swee Guan Hokkien Mee	1.313999	103.885706	Noodle House
29	ALJUNIED MRT STATION (EW9)	1.316433	103.882893	Sin Hin Restaurant	1.319785	103.885765	Asian Restaurant

3. Methodology

3.1 Exploratory Analysis

After obtaining the data of venues (along with their venue categories) for each of the train station, exploratory analysis is performed to find out the total number of venues retrieved and the number of venues for each station.

Find out how many venues were returned for each neighborhood

	Stn Latitude	Stn Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Station ID						
ADMIRALTY MRT STATION (NS10)	5	5	5	5	5	5
ALJUNIED MRT STATION (EW9)	45	45	45	45	45	45
ANG MO KIO MRT STATION (NS16)	40	40	40	40	40	40
BAKAU LRT STATION (SE3)	12	12	12	12	12	12
BANGKIT LRT STATION (BP9)	11	11	11	11	11	11
	-			-		-
OODLANDS SOUTH MRT STATION (TE3)	6	6	6	6	6	6
WOODLEIGH MRT STATION (NE11)	11	11	11	11	11	11
YEW TEE MRT STATION (NS5)	9	9	9	9	9	9
YIO CHU KANG MRT STATION (NS15)	14	14	14	14	14	14
YISHUN MRT STATION (NS13)	48	48	48	48	48	48
7 rows × 6 columns						
gp_venues.shape						
5337. 7)						

Based on the data collected, it is noticed that a total of 5337 neighborhood venues are retrieved for the 187 train stations.

Find out how many unique categories can be curated from all the returned venues

```
print('There are {} uniques categories.'.format(len(sgp_venues['Venue Category'].unique())))
There are 308 uniques categories.
```

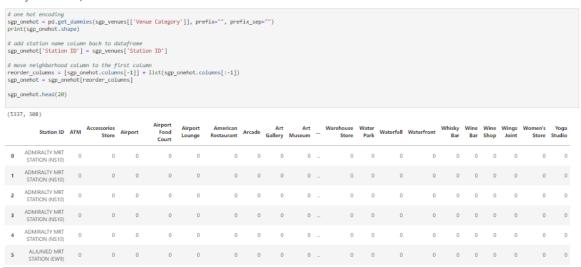
It is further analyzed to find out the 5337 venues fall under 308 unique venue categories.

3.2 Cluster Analysis

The objective of cluster analysis is to group the train stations into different clusters according to the individual station's five most common or popular venue categories.

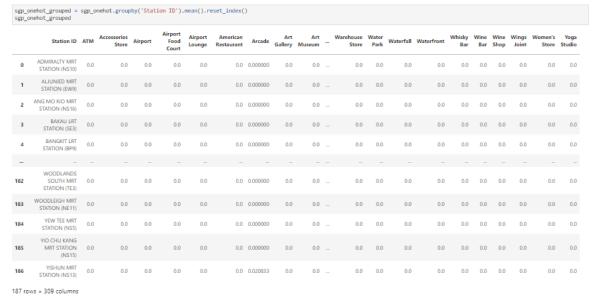
To find out the 5 most common venue categories for each of the train stations, one hot encoding method is applied.

Analyze each MRT/LRT station



The mean of frequency of occurrence of venue category for each of the train stations is computed.

Group rows by station id and taking the mean of the frequency of occurrence for each venue ategory



The top 5 most common venue categories and the associated frequency of occurrence for each station is printed out as shown below. Please refer to the Appendix of this report for the full list of data.

```
num_top_venues = 5
for stn_id in sgp_onehot_grouped['Station ID']:
    print("----"+stn_id+"----")
    temp = sgp_onehot_grouped[sgp_onehot_grouped['Station ID'] == stn_id].T.reset_index()
    temp.columns = ['venue','freq']
    temp = temp.iloc[1:]
   temp['freq'] = temp['freq'].astype(float)
   temp = temp.round({'freq': 2})
print(temp.sort_values('freq', ascending=False).reset_index(drop=True).head(num_top_venues))
    print('\n')
----ADMIRALTY MRT STATION (NS10)----
                          venue freq
                    Supermarket 0.4
                   Coffee Shop 0.2
Food Court 0.2
1
               Halal Restaurant 0.2
4 Paper / Office Supplies Store 0.0
----ALJUNIED MRT STATION (EW9)----
                          venue freq
             Chinese Restaurant 0.13
0
1
                         Café 0.07
             Asian Restaurant 0.07
2
                  Noodle House 0.07
4 Vegetarian / Vegan Restaurant 0.07
----ANG MO KIO MRT STATION (NS16)----
               venue freq
        Coffee Shop 0.10
0
          Food Court 0.10
       Dessert Shop 0.08
3 Japanese Restaurant 0.05
          Snack Place 0.05
```

The top 5 most common venue categories for each train station is sorted and tabulated in a new dataframe for further cluster analysis.

	Station ID	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	ADMIRALTY MRT STATION (NS10)	Supermarket	Halal Restaurant	Food Court	Coffee Shop	Yoga Studio
1	ALJUNIED MRT STATION (EW9)	Chinese Restaurant	Vegetarian / Vegan Restaurant	Café	Noodle House	Asian Restaurant
2	ANG MO KIO MRT STATION (NS16)	Food Court	Coffee Shop	Dessert Shop	Snack Place	Supermarket
3	BAKAU LRT STATION (SE3)	Trail	Food Stand	Food & Drink Shop	Fast Food Restaurant	Sandwich Place
4	BANGKIT LRT STATION (BP9)	Food Court	Fruit & Vegetable Store	Bike Trail	Spa	Park
5	BARTLEY MRT STATION (CC12)	Pet Store	Bus Station	Noodle House	Metro Station	Café
6	BAYFRONT MRT STATION (CE1)	Hotel	Boutique	Bridge	Tea Room	Casino
7	BAYFRONT MRT STATION (DT16)	Hotel	Boutique	Bridge	Tea Room	Casino
8	BEAUTY WORLD MRT STATION (DTS)	Korean Restaurant	Café	Chinese Restaurant	Food Court	Asian Restaurant
9	BEDOK MRT STATION (EW5)	Chinese Restaurant	Coffee Shop	Japanese Restaurant	Food Court	Sandwich Place
10	BEDOK NORTH MRT STATION (DT29)	Food Court	Indian Restaurant	Basketball Court	Laundromat	Food & Drink Shop
11	BEDOK RESERVOIR MRT STATION (DT30)	Noodle House	Park	Supermarket	Food Court	Asian Restaurant
12	BENCOOLEN MRT STATION (DT21)	Café	Hotel	Japanese Restaurant	Coffee Shop	Restaurant
13	BENDEMEER MRT STATION (DT23)	Hostel	BBQ Joint	Vegetarian / Vegan Restaurant	Coffee Shop	Restaurant
14	BISHAN MRT STATION (CC15)	Coffee Shop	Food Court	Bubble Tea Shop	Chinese Restaurant	Japanese Restaurant
15	BISHAN MRT STATION (NS17)	Coffee Shop	Food Court	Bubble Tea Shop	Chinese Restaurant	Japanese Restaurant
16	BOON KENG MRT STATION (NE9)	Chinese Restaurant	Noodle House	Seafood Restaurant	Fast Food Restaurant	Bakery
17	BOON LAY MRT STATION (EW27)	Asian Restaurant	Japanese Restaurant	Fast Food Restaurant	Chinese Restaurant	Dessert Shop
18	BOTANIC GARDENS MRT STATION (CC19)	Asian Restaurant	Bakery	Café	Noodle House	French Restaurant
19	BOTANIC GARDENS MRT STATION (DT9)	Asian Restaurant	Café	Bakery	Noodle House	Burger Joint

With the MRT/LRT station's 5 top most common venue categories data obtained in previous steps, the following two clustering algorithms are applied to the data:

- 1) k-Means Clustering
- 2) Hierarchical Clustering

For the clusters generated using the above mentioned clustering algorithms, each of the clusters will be examined to determine the discriminating venue categories that distinguish each cluster.

3.2.1 Clustering of Train Stations using k-Means Clustering Algorithm

Setting k=5 and use scikit-learn library's KMeans class to run k-means clustering algorithm to cluster the train stations into 5 clusters based on the train stations' venue categories.

Run k-means to cluster the neighborhood into 5 clusters.

```
# import k-means from clustering stage
from sklearn.cluster import KMeans
# set number of clusters
kclusters = 5
sgp_onehot_grouped_clustering = sgp_onehot_grouped.drop('Station ID', 1)
# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=0).fit(sgp_onehot_grouped_clustering)
# check cluster label generated for each row in the dataframe
kmeans.labels_[0:186]
array([4, 0, 4, 3, 4, 2, 3, 3, 3, 3, 4, 3, 3, 4, 4, 0, 3, 3, 3, 0, 3,
       2, 3, 3, 4, 2, 4, 3, 3, 3, 3, 3, 2, 3, 4, 3, 3, 0, 4, 4, 3, 3, 3,
       3, 0, 2, 3, 0, 0, 1, 3, 3, 3, 4, 3, 3, 0, 3, 3, 4, 3, 3, 0, 4, 3,
      4, 4, 3, 3, 2, 3, 3, 3, 3, 4, 3, 3, 3, 4, 3, 3, 4, 0, 4, 4, 2,
      0, 3, 3, 3, 4, 3, 4, 3, 3, 3, 2, 2, 3, 3, 3, 4, 0, 4, 0, 0, 0, 0,
      3, 3, 3, 3, 3, 3, 3, 0, 3, 3, 4, 3, 3, 0, 3, 3, 3, 3, 3,
      0, 3, 3, 4, 0, 2, 3, 3, 3, 3, 4, 3, 3, 3, 3, 3, 3, 3, 3, 4,
       4, 3, 3, 3, 0, 3, 3, 3, 3, 3, 3, 3, 3, 2, 3, 3, 3, 4, 0, 4, 2, 3,
       3, 1, 4, 2, 3, 3, 4, 3, 3, 0], dtype=int32)
```

3.2.2 Clustering of Train Stations using Hierarchical Clustering Algorithm

Use scipy library to perform agglomerative approach-based Hierarchical Clustering to group the train stations into 5 clusters.

In the function call of scipy.cluster.hierarchy.linkage(), the linkage parameter value of "average" is used while in the function call of scipy.cluster.hierarchy.fcluster(), the k and criterion parameters are set to 5 and 'maxclust' are used in order to perform hierarchical clustering of up to 5 clusters.

```
import scipy
leng = hc_feature_mtx.shape[0]
D = scipy.zeros([leng,leng])
for i in range(leng):
    for j in range(leng):
        D[i,j] = scipy.spatial.distance.euclidean(hc_feature_mtx[i], hc_feature_mtx[j])
```

Use average method as the linkage

```
from scipy.cluster import hierarchy
import pylab
import scipy.cluster.hierarchy
Z = hierarchy.linkage(D, 'average')
```

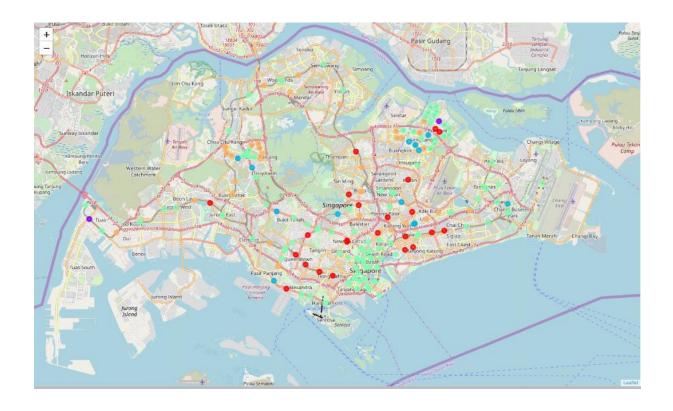
Forms flat clusters from the hierarchical clustering defined by the linkage matrix Z

4. Results

4.1 Train Station clusters obtained via k-Means Clustering algorithm, with k=5

	Cluster Label	Station ID	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	
0	4	ADMIRALTY MRT STATION (NS10)	Supermarket	Halal Restaurant	Food Court	Coffee Shop	Yoga Studio	
- 1	0	ALJUNIED MRT STATION (EW9)	Chinese Restaurant	Vegetarian / Vegan Restaurant	Café	Noodle House	Asian Restaurant	
2	4	ANG MO KIO MRT STATION (NS16)	Food Court	Coffee Shop	Dessert Shop	Snack Place	Supermarket	
3	3	BAKAU LRT STATION (SE3)	Trail	Food Stand	Food & Drink Shop	Fast Food Restaurant	Sandwich Place	
4	4	BANGKIT LRT STATION (BP9)	Food Court	Fruit & Vegetable Store	Bike Trail	Spa	Park	
		-	-	-	-	-	-	
182	4	WOODLANDS SOUTH MRT STATION (TE3)	Food Court	Park	Trail	Gym / Fitness Center	Video Store	
183	3	WOODLEIGH MRT STATION (NE11)	Café	Convenience Store	Chinese Restaurant	Soccer Field	Nightclub	
184	3	YEW TEE MRT STATION (NSS)	Fast Food Restaurant	Diner	Shopping Mall	Pool	Food Court	
185	0	YIO CHU KANG MRT STATION (NS15)	Food Court	Chinese Restaurant	Noodle House	Coffee Shop	Seafood Restaurant	
186	3	YISHUN MRT STATION (NS13)	Chinese Restaurant	Food Court	Italian Restaurant	Fried Chicken Joint	Grocery Store	
187 r	187 rows × 7 columns							

4.1.1 Data Visualization



4.1.2 Examining cluster's characteristics

Cluster 1

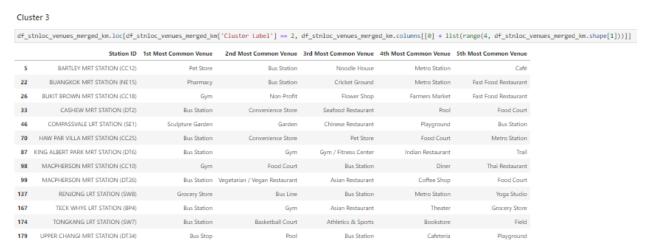
Cluster 1 – marked with red circle in the above map and consists of 23 train stations and characterized by having plenty of restaurants, particularly Chinese & Indian restaurants

	Station ID	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	ALJUNIED MRT STATION (EW9)	Chinese Restaurant	Vegetarian / Vegan Restaurant	Café	Noodle House	Asian Restaurant
16	BOON KENG MRT STATION (NE9)	Chinese Restaurant	Noodle House	Seafood Restaurant	Fast Food Restaurant	Bakery
20	BRADDELL MRT STATION (NS18)	Noodle House	Chinese Restaurant	Food Court	Café	Thai Restaurant
38	CHINESE GARDEN MRT STATION (EW25)	Chinese Restaurant	Coffee Shop	Indian Restaurant	Food Court	Café
45	COMMONWEALTH MRT STATION (EW20)	Chinese Restaurant	Coffee Shop	Asian Restaurant	Noodle House	Indian Restaurant
48	COVE LRT STATION (PE1)	Indian Restaurant	Coffee Shop	Supermarket	Gym	Chinese Restaurant
49	DAKOTA MRT STATION (CC8)	Noodle House	Chinese Restaurant	Asian Restaurant	Seafood Restaurant	Dessert Shop
57	EUNOS MRT STATION (EW7)	Chinese Restaurant	Noodle House	Coffee Shop	Breakfast Spot	Asian Restaurant
63	FARRER ROAD MRT STATION (CC20)	Chinese Restaurant	Gym / Fitness Center	Food Court	Noodle House	Metro Station
84	KEMBANGAN MRT STATION (EW6)	Indian Restaurant	Chinese Restaurant	Asian Restaurant	Bistro	Shopping Mall
88	KOVAN MRT STATION (NE13)	Chinese Restaurant	Noodle House	Food Court	Asian Restaurant	Café
104	MARYMOUNT MRT STATION (CC16)	Chinese Restaurant	Bakery	Outdoors & Recreation	Food Court	Thai Restaurant
106	MERIDIAN LRT STATION (PE2)	Garden	Chinese Restaurant	Coffee Shop	Casino	Yoga Studio
107	MOUNTBATTEN MRT STATION (CC7)	Noodle House	Food Court	Chinese Restaurant	Fast Food Restaurant	Dessert Shop
108	NEWTON MRT STATION (DT11)	Chinese Restaurant	Seafood Restaurant	Italian Restaurant	Hotel Bar	Indian Restaurant
109	NEWTON MRT STATION (NS21)	Chinese Restaurant	Italian Restaurant	Hotel Bar	Seafood Restaurant	Indian Restaurant
118	PASIR PANJANG MRT STATION (CC26)	Chinese Restaurant	Food Court	Thai Restaurant	Indian Restaurant	Asian Restaurant
126	POTONG PASIR MRT STATION (NE10)	Chinese Restaurant	Convenience Store	Coffee Shop	Food Court	Fast Food Restaurant
132	QUEENSTOWN MRT STATION (EW19)	Chinese Restaurant	Food Court	Train Station	Spa	Pool
136	REDHILL MRT STATION (EW18)	Chinese Restaurant	Coffee Shop	Park	Train Station	Malay Restaurant
158	TAI SENG MRT STATION (CC11)	Chinese Restaurant	Café	Food Court	Coffee Shop	Seafood Restaurant
172	TIONG BAHRU MRT STATION (EW17)	Chinese Restaurant	Coffee Shop	Food Court	Bakery	Japanese Restaurant
185	YIO CHU KANG MRT STATION (NS15)	Food Court	Chinese Restaurant	Noodle House	Coffee Shop	Seafood Restaurant

Cluster 2 – marked with purple circle in the above map and consists of only 2 train stations and does not exhibit any obvious characteristic other than both are having yoga studio.



Cluster 3 – marked with light blue circle in the above map and consists of 13 train stations and mainly characterized by having bus station/stop or gym



Cluster 4 – marked with light green in the above map. It is the biggest cluster consisting 115 train stations and somewhat characterized by having café, hotel, Japanese/Korean restaurant in their top 5 most common venue categories.



Cluster 5 – marked with light orange circle in the above map and consists of 34 train stations, mainly characterized by having food courts and coffee shops

Cluster 5 1

df_stnloc_venues_merged_km.loc[df_stnloc_venues_merged_km['Cluster_Label'] --- 4, df_stnloc_venues_merged_km.columns[[0] + list(range(4, df_stnloc_venues_merged_km.shape[1]))]]

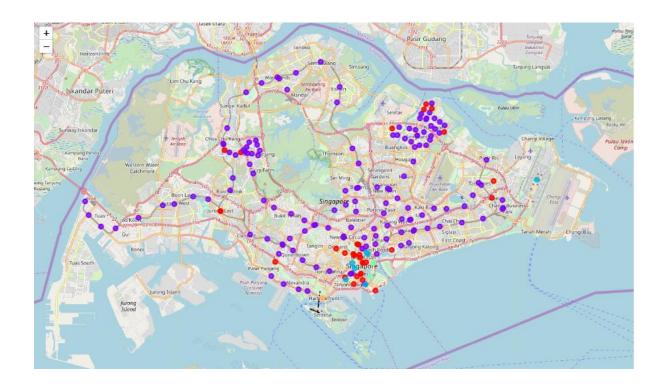
Part Content Confee Shop Supermerket Heal Restaurant Food Court Confee Shop Stock Price Supermerket		Station ID	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
## BANCAT LRT STATION (BPD) Food Court Fruit & Vegetable States Bike Stall Spa Park ## BEDOX RESURDOR MANUS STATION (DTB) Noode Photose Park Supermerked Food Court Asian Bentaurent ## BESHAN MIST STATION (ECTS) Coffee Shop Food Court Bubble Ires Shop Chinese Restaurant Japaneses Bentaurent ## BESHAN MIST STATION (DST) Coffee Shop Food Court Bubble Ires Shop Chinese Restaurant Japaneses Bentaurent ## BESHAN MIST STATION (DST) Coffee Shop Food Court Bubble Ires Shop Chinese Restaurant Japaneses Bentaurent ## BESHAN MIST STATION (DST) Coffee Shop Chinese Restaurant Food Court Bubble Ires Shop Chinese Restaurant Apareses Bentaurent ## BESHAN MIST STATION (DST) Food Court Stadium Convenience More Invest Station Sandsich Place ## CHACA CHIL SKAN (SMIST STATION (DST) Coffee Shop Food Court Coffee Shop Food Court ## CONCA CHIL SKAN (SMIST STATION (DST) Coffee Shop Food Food Restaurant Furriture / Home Store Asian Restaurant Playground ## COVER MIST STATION (DST) Coffee Shop Food Court Food Court Coffee Shop Place Food Restaurant Furriture / Home Store Asian Restaurant Playground ## COVER MIST STATION (DST) Coffee Shop Food Court Coffee Shop Place Food Restaurant Food Court Coffee Shop Food Court Coffee Shop Food Court Coffee Shop Supermerket Food Restaurant Bus Station Food Court Purk Fast Food Restaurant Bus Station Food Court Purk Fast Food Restaurant Bus Station Food Court Purk Fast Food Restaurant Bus Station Food Court Coffee Shop Supe	0	ADMIRALTY MRT STATION (NS10)	Supermarket	Halal Restaurant	Food Court	Coffee Shop	Yoga Studio
BEDOX RESIDUORISMIS SIATION (DTS) Nondie House Park Supermerist Food Court Asian Retalacered Japanese Retalacered Japanes	2	ANG MO KIO MRT STATION (NS16)	Food Court	Coffee Shop	Dessert Shop	Snack Place	Supermarket
14 BBHAN MRI SIARION (CCTS) Coffee Shop Food Court Bubble Ne Shop Chrese Bestaurent Japanese Bestaurent 15 BSHAN MRI SIARION (NCT) Coffee Shop Food Court Bubble Ne Shop Chrese Bestaurent 16 BBHAN MRI SIARION (NCT) Coffee Shop Chrese Instaurent 17 BURIT GOMBAK MRI SIARION (NCT) Food Court Sadium Conversioner Store Institution Sential Store 18 CHENG LIM LIST SIARION (NCT) Feet Food Bestaurent 19 CHENG LIM LIST SIARION (NCT) Feet Food Bestaurent 19 CHENG LIM LIST SIARION (NCT) Feet Food Bestaurent 10 CHENG CHILD KINSTAURON (NCT) Feet Food Bestaurent 10 CHENG CHILD KINSTAURON (NCT) Feet Food Bestaurent 10 CHENG CHILD KINSTAURON (NCT) Coffee Shop Feet Food Bestaurent 10 CHENG CHILD KINSTAURON (NCT) Coffee Shop Feet Food Bestaurent 10 CHENG CHILD KINSTAURON (NCT) Coffee Shop Feet Food Bestaurent 10 CHENG CHILD KINSTAURON (NCT) Feet Food Court Food Court Certific Shop Feet Food Co	4	BANGKIT LRT STATION (8P9)	Food Court	Fruit & Vegetable Store	Bike Ireil	Spa	Park
BISHAN MIRI STATION (RST1) Coffee Shop Food Court Bubble Ive Shop Chinese Restaurant Japannese Restaurant	11	BEDOK RESERVOIR MRT STATION (DT30)	Noodle House	Park	Supermarket	Food Court	Asian Restaurant
### BUNIT BATOK MIT STATION (NS.1) ### Confirm Stop ### Confirm Station ### BUNIT BATOK MIT STATION (NS.1) ### BUNIT BATOK	14	BISHAN MRT STATION (CC15)	Coffee Shop	Food Court	Bubble Tea Shop	Chinese Restaurant	Japanese Restaurant
### BURGE COMBAK MRIE STATION (NSS) Find Court **Station** **Coffee Shop Asian Restaurant** **Coffee Shop Asian Restaurant** **Pertry Shop Food Court** **Tond Court** **Coffee Shop Feet Tond Restaurant** **Coffee Shop Feet Tond Restaurant** **CHICA CHU KANG, URE STATION (NSVA) **COFFEE Shop Feet Tond Restaurant** **CHICA CHU KANG, MRIE STATION (NSVA) **COFFEE Shop Feet Tond Restaurant** **CHICA CHU KANG, MRIE STATION (NSVA) **COFFEE Shop Feet Tond Restaurant** **COFFEE Shop Feet Tond Restaurant** **COFFEE Shop Tond Court** **Coffee Shop Tond Court** **Coffee Shop Tond Court** **Coffee Shop Department Store** **Coffee Shop De	15	BISHAN MRT STATION (NS17)	Coffee Shap	Food Court	Bubble Tea Shop	Chinese Restaurant	Japanese Restaurant
Ceffee Shop Fact Food Restaurant Coffee Shop Fact Food Restaurant Furniture / Home Store Asian Restaurant Playground CHOA CHU KANG LRI STATICIN (SPT) Coffee Shop Fact Food Restaurant Furniture / Home Store Asian Restaurant Playground CHOA CHU KANG MINI STATICIN (SPXEZ) Coffee Shop Fact Food Restaurant Furniture / Home Store Asian Restaurant Playground LAG CHOA CHU KANG MINI STATICIN (SPXEZ) Coffee Shop Fact Food Restaurant Furniture / Home Store Asian Restaurant Playground LAG CHOA CHU KANG MINI STATICIN (SPXEZ) Coffee Shop Fact Food Restaurant Food Court Coffee Shop Togs Studies February Coffee Shop Food Court Coffee Shop Togs Studies GEFLANG BAFRUUME STATICIN (SWS) Coffee Shop Food Court Asian Restaurant Indian Restaurant Coffee Shop Department Store Café Bus Station GEFLANG BAFRUUME STATICIN (SWS) Electronics Store Insin Station Food Court Corresisence Shop Bus Station Food Court Corresisence Store Cafe Shop Fleat Mini Station Food Court Corresisence Store Bus Station (SWS) Coffee Shop Food Court Corresisence Store Bus Station (SWS) Fast Food Restaurant Bus Store Grocey Store Daff Restaurant Mini Station (SWS) Coffee Shop Food Court Corresisence Store Bus Shop Shop Shop Bus Station (SWS) Coffee Shop Vietnames Restaurant Sandwich Flace Korrean Restaurant Medical Confee Shop Supermerkst Correctiones Store Bakery Place Bus Station (SWS) Correctiones Store Shop Supermerkst Correctiones Store Bakery Indian Restaurant Bus Store Place Shop Supermerkst Correctiones Store Bakery Place Bus Station (SWS) Confee Shop Food Court Correctiones Store Correctiones Store Bakery Place Bus Station (SWS) Correctiones Store Shop Supermerkst Correctiones Store Bakery Place Bus Station (SWS) Confee Shop Food Court Correctiones Store Place Fast Food Restaurant Hairmant Bus Station (SWS) Food Court Fault Food Court Correctiones Store Place Fast Food Restaurant Hairmant Place Studies	25	BUKIT BATOK MRT STATION (NS2)	Coffee Shop	Chinese Restaurant	Food Court	Bakery	Spa
19 CHOA CHU KANG URI STATION (BPT) Coffee Shop Fact Food Restaurant Furniture / Home Store Asian Restaurant Playground CHOA CHU KANG MILI STATION (NS4) Coffee Shop Fact Food Restaurant Furniture / Home Store Asian Restaurant Playground Station (RW02) Coffee Shop Fact Food Restaurant Food Court Sandwich Place Coffee Shop Voga Studio FALR URI STATION (BW02) Fact Food Restaurant Food Court Asian Restaurant Indian Restaurant Coffee Shop Voga Studio Cort Asian Restaurant Indian Restaurant Indian Restaurant Indian Restaurant Coffee Shop Department Store Cafe Bus Station (CEYLANG BARRU MILI STATION (BY02) Electronics Store India Station Food Court Coffee Shop Department Store Cafe Studio Restaurant Station (RW02) Electronics Store India Station Food Court Coffee Shop Place Market Station (RW02) Electronics Store India Station Food Court Coffee Shop Food Court Coffee Shop Food Court Defe Fatt Food Restaurant Bus Station RALE HONG URI STATION (BPT2) Commence Store Food Court Defe Fatt Food Restaurant Bus Store Station (RW02) Electronics Store Bus Shop State Pack Restaurant Bus Store Grocery Store Bisk Shop State Pack RESTAURANT (BUSIA) (BPT2) Coffee Shop Food Court Corvenience Store Bisk Shop State Pack RESTAURANT (BUSIA) (BPT2) Coffee Shop Food Court Corvenience Store Bisk Shop State Pack RESTAURANT (BUSIA) (BPT2) Coffee Shop Grocery Store Deff (Bodege Coffee Shop Supermarket Corvenience Store Bakery Pack Restaurant Defe (Bodege Corvenience Store Bakery Veges Restaurant Furniers Market Restaurant Bakery India Restaurant Furniers Market Restaurant Furniers Market Restaurant Furniers Station Restaurant Pack Market Restaurant Furniers Station Restaurant Furniers Market Restaurant Furniers Station Restaurant Pack Market Restaurant Furniers Station Restaurant Furniers Stati	27	BUKIT GOMBAK MRT STATION (NS3)	Tood Court	Stadium	Convenience Store	Train Station	Sandwich Place
CHOA CHU KANG MILI STATION (NICA) Coffee Shop Fact Food Restaurant Furniture / Home Store Asian Restaurant Playground	35	CHENG UM LRT STATION (SW1)	Fast Food Restaurant	Coffee Shop	Asian Restaurant	Pastry Shop	Food Court
DOVERMINI STATION (2002) College Cefeteria Fact Code (Section Factor College Cefeteria Food Court Coffee Shop Yoga Shudio LAJAR LRES STATION (8071) Fast Food Court Coffee Shop Food Court Asian Restaurant Indian Restaurant Coffee Shop Tood Court Coffee Shop Department Store Coffee Shop Food Court Coffee Shop Department Store Coffee Shop Section Coffee Shop Section Store Coffee Shop Department Store Coffee Shop Section Store Coffee Shop Section Store Coffee Shop Department Store Coffee Shop Section Sectio	39	CHOA CHU KANG LRT STATION (BP1)	Coffee Shap	Fast Food Restaurant	Furniture / Hame Store	Asian Restaurant	Playground
Fall Flank Res Station (BPID) Fast food Restaurant College Celeteria Food Court Coffee Shop Yoga Studio Final Food Court Asian Restaurant Indian Restaurant Cafe GEYLANG BAHRU MRI STATION (BIDS) Food Court Coffee Shop Department Store Cafe GEYLANG BAHRU MRI STATION (BIDS) Food Court Coffee Shop Department Store Cafe GUL CIRCLE MRI STATION (BIDS) Electronics Store Insin Station Food Court Coffee Shop Head Market GUL CIRCLE MRI STATION (BIDS) Electronics Store Insin Station Food Court Corresponding Station (BIDS) Electronics Store Food Court Park Fast Food Restaurant Bus Station KASI BURNI MRI STATION (BIDS) Coffee Shop Food Court Corresponding Store Bike Shop State Park KEAT HONG URI STATION (BIDS) Fast Food Restaurant Bus Stop Grocery Store Deli Padege Cafe KEAT HONG URI STATION (BIDS) Fast Food Restaurant Coffee Shop Supermarket Corresponding Store Bakery LAKESIM MRI STATION (BIDS) Corresponding Store Shop Supermarket Corresponding Vegetarian /	40	CHOA CHU KANG MRT STATION (NS4)	Coffee Shop	Fast Food Restaurant	Furniture / Home Store	Asian Restaurant	Playground
FINANÇALE LICI STATION (SWS) Coffee Shop Food Court Asian Restaurant Indian Restaurant Cofee Shop GESTANG BAPRIU MILI STATION (EWSI) Food Court Coffee Shop Department Store Coffee Shop Russ Market Coffee Shop Russ Market Coffee Shop Russ Market Coffee Shop Russ Market Station Road Court Coffee Shop Russ Market Russ Market Station (RP12) Convenience Store Food Court Convenience Store Bike Shop State Perk RASH HONG LICI STATION (RP12) Convenience Store Food Court Convenience Store Bike Shop State Perk RASH HONG LICI STATION (RP12) Coffee Shop Food Court Convenience Store Bike Shop State Perk RASH HONG LICI STATION (RP12) Fast Food Restaurant Bus Stop Grocery Store Deli / Bodega Cafe REAL HONG LICI STATION (RP12) Fast Food Restaurant Bus Stop Grocery Store Deli / Bodega Cafe REAL HONG LICI STATION (RP12) Fast Food Restaurant Sandwich Place Rorean Restaurant Medical Center REAL HONG LICI STATION (RP14) Asian Restaurant Coffee Shop Supermarket Convenience Store Bulary RP1 LARES DEM RESTAURANT (RP14) Fast Food Restaurant Coffee Shop Supermarket Convenience Store Bulary RP1 LARES DEM RESTAURANT (RW2) Convenience Store Snack Place Coffee Shop Vegetarian / Vegen Restaurant Farmark Market LAVAR LICI STATION (RW2) Grocery Store Pizza Place Coffee Shop Vegetarian / Vegen Restaurant Bus Store Market Restaurant Restaurant Bus Store Pizza Place Fast Food Restaurant Health Restaurant Bus Store Perk Market Perk Market Restaurant Resta	54	DOVER MRT STATION (EW22)	College Cafeteria	Fast Food Restaurant	Food Court	Sandwich Place	Coffee Shap
GEYLANG BAHILU MILI STATION (EW30) Electronics Store Iran Station Food Court Coffee Shop Flee Market GUL CIRCLE MIRI STATION (EW30) Electronics Store Iran Station Food Court Coffee Shop Flee Market The LEAPANC LIRI STATION (BP12) Convenience Store Food Court Park Fast Food Basksurant Bus Station KASI BURIT MILI STATION (DT20) Coffee Shop Food Court Convenience Store Bike Shop State Park KEAT HONG LIRI STATION (BP3) Fast Food Basksurant Bus Stop Grocery Store Delir Bodege Carle KEAT HONG LIRI STATION (BC24) Coffee Shop Vietnamere Restaurant Sandesich Place Korean Basksurant Medical Center KEAT RIDGE MIRI STATION (VS14) Asian Basksurant Coffee Shop Supermarket Convenience Store Bakery LAXESIDE MIRI STATION (WS14) Asian Basksurant Coffee Shop Supermarket Convenience Store Bakery LAXES LIRI STATION (SW6) Convenience Store Snack Place Coffee Shop Vegetarian / Veget Basksurant Farmers Market LAYAR LIRI STATION (SW6) Coffee Shop Food Court Asian Basksurant Basksurant Basksurant MARISLING MIRI STATION (NS2) Grocery Store Pizza Place Fast Food Basksurant Hairan Basksurant Bus Stop MARISLING MIRI STATION (DT25) Food Court Coffee Shop Bus Station Vegetarian / Veget Basksurant Park LAYAR LIRI STATION (SP8) Food Court Fast Food Basksurant Gym Metro Station Wings Joint MARISLING MIRI STATION (SES) Food Court Fast Food Court Coffee Shop Vegetarian / Veget Basksurant Park Market SAGR LIRI STATION (SES) Food Court Fast Food Court Coffee Shop Vegetarian / Veget Basksurant Park SEGAR LIRI STATION (SP7) Market Food Court Vegetarian Station Vegetarian / Veget Station Wings Joint Market SOUTH VIEW LIRI STATION (SP7) Fast Food Restaurant Food Court Vegetarian Station Flower Shop Fast Food Restaurant ThanGOAM LIRI STATION (SP7) Fast Food Restaurant Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store TOO DESTRUCTOR OF STATION (SP7) Fast Food Restaurant Furniture / Home Store Bakery Coffee Shop Paper / Office Shop Paper / Office Supplies Store TOO DESTRUCTOR OF STATION (SP7) Food Court Asian Hardau	60	FAJAR LRT STATION (BP10)	Fast Food Restaurant	College Cafeteria	Food Court	Coffee Shap	Yoga Studio
GUL CIRCLE MRT STATION (EWID) Electronics Store Irain Station Food Court Park Fast Food Restaurant Bus Station SASS BUSIT MRU STATION (BP2) Convenience Store Food Court Convenience Store Bike Shop State Park SEAT HONG LRT STATION (BP3) Fast Food Restaurant Bus Stop Grocery Store Deli / Bodega Cafe SEAT RUDGE MRT STATION (SC24) Coffee Shop Vietnameur Restaurant Sandeich Place KEAT HONG LRT STATION (KC24) Coffee Shop Vietnameur Restaurant Sandeich Place KEAT HONG LRT STATION (KC24) Anian Restaurant Coffee Shop Supermarket Convenience Store RHABIB MRT STATION (KC24) Anian Restaurant Coffee Shop Supermarket Convenience Store Bakery LAXESIDE MRT STATION (KC24) Coffee Shop Food Court Anian Restaurant Bakery Indian Restaurant Bakery Indian Restaurant Medical Center Bakery LAYAR LRT STATION (KC24) Coffee Shop Food Court Anian Restaurant Bakery Indian Restaurant Bakery Indian Restaurant Bakery Indian Restaurant Coffee Shop Bus Station Wegetarian / Vegen Restaurant Bus Stop MARTIAR MRT STATION (KC25) Food Court Coffee Shop Bus Station Wegetarian / Vegen Restaurant Park Market SEGAR LRT STATION (KC25) Food Court Fruit & Vegetable Store Mincellaneous Shop Park Market SEGAR LRT STATION (KC25) Food Court Fruit & Vegetable Store Mincellaneous Shop Park Market SEGAR LRT STATION (KC25) Food Court Fruit & Vegetable Store Mincellaneous Shop Park Market SEGAR LRT STATION (KC25) Food Court Fruit & Vegetable Store Mincellaneous Shop Park Market SEGAR LRT STATION (KC25) Food Court Fruit & Vegetable Store Mincellaneous Shop Park Market SEGAR LRT STATION (KC25) Food Court Fruit & Vegetable Store Food Court Food Co	64	FERNIVALE LRT STATION (SWS)	Coffee Shop	Food Court	Asian Restaurant	Indian Restaurant	Café
Fig. 1 F	66	GEYLANG BAHRU MRT STATION (DT24)	Food Court	Coffee Shop	Department Store	Café	Bus Station
80 KAN BURIT MIU STATION (DT.8) Coffee Shop Food Court Convenience Store Bike Shop Skate Perk 83 KEAT HONG LRI STATION (BP3) Fast Food Bentaurant Bun Stop Grocery Store Deli / Bodege Carle 85 KENT RIDGE MIU STATION (CCA) Coffee Shop Vietnamese Rentaurant Sandeich Place Korsen Restaurant Medical Center 86 KHAIIB MIU STATION (NST4) Asian Rentaurant Coffee Shop Supermarket Convenience Store Bakery 92 LARESIDE MIU STATION (EWIS) Convenience Store Snack Place Coffee Shop Vegetarian / Vegen Rentaurant Farmers Markot 94 LAVAR LRI STATION (SWIS) Convenience Store Pizza Place 95 LAVAR LRI STATION (SWIS) Grocery Store Pizza Place 103 MARSILING MIU STATION (SWIS) Grocery Store Pizza Place 104 MARSILING MIU STATION (SWIS) Grocery Store Pizza Place 105 MARTIAR MIU STATION (SWIS) Food Court Coffee Shop Bus Station Vegetarian / Vegen Rentaurant Bus Stop 106 MARTIAR MIU STATION (SWIS) Food Court Fruit & Vegetable Store Mincellaneous Shop Park Market 135 RANGGUNG LRI STATION (SWIS) Food Court Fruit & Vegetable Store Mincellaneous Shop Park Market 136 SEGAR LRI STATION (SWIS) Food Court Fast Food Restaurant Gym Metro Station Wings Joint 148 SEGAR LRI STATION (SWIS) Fast Food Bustaurant Food Court Vege Studio Flower Shop Fast Food Restaurant 154 SOUTH VIEW LRI STATION (SWIS) Fast Food Restaurant Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store 176 THANGGAM LRI STATION (SWI) Ceffee Shop Bus Stop Cupcake Shop Southern / Soul Food Restaurant Dessert Shop 177 THANGGAM LRI STATION (SWI) Ceffee Shop Snack Place Food Court Dessert Shop Paper / Office Supplies Store 178 LIGH PARCH MIU STATION (SWI) Ceffee Shop Snack Place Food Court Dessert Shop Paper / Office Supplies Store	67	GUL CIRCLE MRT STATION (EW30)	Electronics Store	Train Station	Food Court	Coffee Shop	Flea Market
REAT HONG URI STATION (RP3) Fast Food Bentaurant Bus Stop Grocery Store Deli / Bodege Cafe 85 KENT RIDGE MRI STATION (CCA) Coffee Shop Vietnamese Bentaurant Sandeich Place Korsen Bestaurant Medical Center 86 KHAIIB MRI STATION (NS14) Asian Bentaurant Coffee Shop Supermarket Convenience Store Eaksey 92 LARESIDE MRI STATION (EW8) Convenience Store Snack Place Coffee Shop Vegetation / Veget Bestaurant Farmers Market 94 LAVAR LRI STATION (SW8) Coffee Shop Food Court Asian Bestaurant Bakery Indian Bestaurant 103 MARSILING MRI STATION (SW8) Grocery Store Pizza Place Fast Food Bestaurant Heinan Bestaurant Bus Stop 105 MAITAR MRI STATION (DI2S) Food Court Coffee Shop Bus Station Vegetation / Vegetation / Vegetation Asian Bestaurant 122 PENDING LRI STATION (SP8) Food Court Fruit & Vegetable Store Miscellaneous Shop Park Market 135 RANGGUNG LRI STATION (SP8) Food Court Fault & Vegetable Store Miscellaneous Shop Park Market 136 SEGAR LRI STATION (SP9) Fast Food Bestaurant Coffee Shop Yoge Studio Flower Shop 153 SOO TECK LRI STATION (SP9) Fast Food Bestaurant Food Court Vege Studio Flower Shop Fast Food Bestaurant 154 SOUTH VIEW LRI STATION (SP9) Fast Food Bestaurant Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store 176 THANGGAM LRI STATION (SW4) Coffee Shop Bus Stop Cupcake Shop Southern / Soul Food Restaurant Dessett Shop 177 THANGGAM LRI STATION (SW4) Coffee Shop Snack Place Food Court Dessett Shop Paper / Office Supplies Store 178 LIGHT MIS STATION (SW4) Coffee Shop Snack Place Food Court Dessett Shop Pool 178 LIGHT MIS STATION (DI27) Food Court Asian Bestaurant Bus Station Restaurant Chinese Bestaurant Chines	75	JELAPANG LRT STATION (BP12)	Convenience Store	Food Court	Park	Fast Food Restaurant	Bus Station
85 KENT RIDGE MRIL STATION (CCA) Coffee Shop Vietnamese Rentaurant Sandwich Place Koreen Restaurant Medical Center 86 KHAIIB MRIL STATION (WS14) Asian Restaurant Coffee Shop Supermarket Convenience Store Bakery 92 LARESIDE MRIL STATION (EWB) Convenience Store Snack Place Coffee Shop Viegetainn / Viegen Restaurant Farmers Market 94 LAYAR LRI STATION (EWB) Coffee Shop Food Court Asian Restaurant Bakery Indian Restaurant 103 MARSULING MRIL STATION (SNB) Grocery Store Pizza Place Fast Food Restaurant Heinen Restaurant Bus Stop 105 MALTAR MRIL STATION (DIZS) Food Court Coffee Shop Bus Station Viegetainn / Viegen Restaurant Perk 122 PENDING LRI STATION (DIZS) Food Court Fruit & Viegetable Store Miscellaneous Shop Perk Market 135 RANGGUNG LRI STATION (SPB) Food Court Fruit & Viegetable Store Miscellaneous Shop Perk Market 136 SEGAR LRI STATION (SPB) Food Court Fast Food Restaurant Cym Melro Station Wings Joint 147 SEGAR LRI STATION (PVT) Market Food Court Viege Studio Flower Shop Fast Food Restaurant 154 SOUTH VIEW LRI STATION (SPD) Fast Food Restaurant Furniture / Home Store Bakery Coffee Shop Peper / Office Supplies Store 176 THANGGAM LRI STATION (SW4) Coffee Shop Bus Store Food Court Dessert Shop Peper / Office Supplies Store 177 THANGGAM LRI STATION (SW4) Coffee Shop Bus Store Food Court Dessert Shop Peper / Office Supplies Store 178 LDB PARCH MRI STATION (SW4) Coffee Shop Snack Place Food Court Dessert Shop Peper / Office Supplies Store 179 TOOR PARCH MRI STATION (SW4) Coffee Shop Snack Place Food Court Dessert Shop Peper / Office Supplies Store	80	KAKI BUKIT MRT STATION (DT28)	Coffee Shop	Food Court	Convenience Store	Bike Shop	Skate Park
RHAILB MRT STATION (NST4) Asian Rentaurant Coffee Shop Supermarket Convenience Store Bakey LARESIDE MRT STATION (SW8) Convenience Store Snack Place Coffee Shop Vegetarian / Vegen Restaurant Farmers Market LAYAR LRT STATION (SW8) Coffee Shop Flood Court Asian Restaurant Bakery Indian Restaurant Bus Stop MATSLING MRT STATION (DT25) Flood Court Coffee Shop Bus Station Vegetarian / Vegen Restaurant Bus Stop MATSLING MRT STATION (DT25) Flood Court Coffee Shop Bus Station Vegetarian / Vegen Restaurant Bus Stop Park Restaurant Park Restaurant Park SCAR LRT STATION (SPR) Flood Court First Food Restaurant Coffee Shop SCAR LRT STATION (SPT) Fast Food Restaurant Food Court Scar Coffee Shop SOO TECK LRT STATION (W7) Market Fast Food Court Food Court Scar Coffee Shop SOUTH VIEW LRT STATION (SPZ) Fast Food Restaurant Furniture / Home Store Restaurant SOUTH VIEW LRT STATION (SW4) Coffee Shop Bus Stop Cupcake Shop Food Court Park Food Restaurant Dessert Shop THANGGAM LRT STATION (SW4) Coffee Shop Snack Place Food Court Restaurant Dessert Shop Fool THANGGAM LRT STATION (SW4) Coffee Shop Snack Place Food Court Restaurant Dessert Shop Pool TRE USE MIN STATION (SW4) Coffee Shop Snack Place Food Court Restaurant Dessert Shop Pool	83	KEAT HONG LRT STATION (BP3)	Fast Food Restaurant	Bus Stop	Grocery Store	Deli / Bodega	Café
LAKESIDE MRIT STATION (SWIN) Convenience Store Snack Place Coffee Shop Vegetarian / Vegan Restaurant Farmers Market LAYAR RRT STATION (SWIN) Coffee Shop Food Court Asian Restaurant Balancy Indian Restaurant MARSLING MRIT STATION (NES) Grocery Store Pizza Place Fast Food Restaurant Heinan Restaurant Bus Stop MARTIAR MRIT STATION (DT25) Food Court Coffee Shop Bus Station Vegetarian / Vegan Restaurant Park Park PENDING LRT STATION (DT25) Food Court Fruit & Vegetable Store Miscellaneous Shop Park Melost MARTIAR MRIT STATION (SES) Food Court Fruit & Vegetable Store Miscellaneous Shop Park Melost Martin STATION (SES) Food Court Fast Food Restaurant Coym Melos Station Wings Joint SEGAR LRT STATION (SES) Food Court Food Court Coffee Shop Yoga Studio Flower Shop SOO TECK LRT STATION (9W7) Market Food Court Yoga Studio Flower Shop Fast Food Restaurant SOUTH VIEW LRT STATION (SWI) Fast Food Restaurant Furniture / Home Store Balancy Coffee Shop Paper / Office Supplies Store THANGGAM LRT STATION (SWI) Coffee Shop Bus Stop Cupcake Shop Southern / Soul Food Restaurant Dessert Shop 10A PARICH MRIT STATION (SWI) Coffee Shop Snack Place Food Court Dessert Shop Pool 10B MIST STATION (DIZ7) Food Court Asian Restaurant Bus Station Restaurant Chinese Restaurant	85	KENT RIDGE MRT STATION (CC24)	Coffee Shop	Vietnamese Restaurant	Sandwich Place	Korean Restaurant	Medical Center
LAYAR LRT STATION (SW6) Coffee Shop Food Court Anien Restaurant Bakery Indian Restaurant MARSLING MRT STATION (NS8) Grocey Store Pizza Place Fast Food Restaurant Heinan Restaurant Bus Stop MARTILAR MRT STATION (DT25) MARTILAR MRT STATION (DT25) Food Court Coffee Shop Bus Station Vegetarian / Vegen Restaurant Park Park Park Park PRODING LRT STATION (BR8) Food Court Fast Food Restaurant Cym Metro Station Wings Joint Martilar	86	KHATIB MRT STATION (NS14)	Asian Restaurant	Coffee Shop	Supermarket	Convenience Store	Bakery
103 MARSLING MRIT STATION (NSR) Grocery Store Pizza Place Fast Food Restaurant Hainen Restaurant Bus Stop 105 MAI TAR MRIT STATION (DT25) Food Court Coffee Shop Bus Station Vegetarian / Vegen Restaurant Park 122 PENDING LRI STATION (BRIS) Food Court Fruit & Vegetable Store Miscellaneous Shop Park Market 135 RANGOUNG LRI STATION (SES) Food Court Fast Food Restaurant Cym Metro Station Wings Joint 143 SEGAR LRI STATION (BP1) Fast Food Restaurant Food Court Coffee Shop Yoga Studio Flower Shop 153 SOO TECK LRI STATION (PW7) Market Food Court Yoga Studio Flower Shop Fast Food Restaurant 154 SOUTH VIEW LRI STATION (BP2) Fast Food Restaurant Furniture / Home Store Bellery Coffee Shop Paper / Office Supplies Store 176 THANGGAM LRI STATION (SW4) Coffee Shop Bus Stop Cupcake Shop Southern / Soul Food Restaurant Dessett Shop 177 TO THANGGAM LRI STATION (SW4) Coffee Shop Snack Place Food Court Dessett Shop Pool 178 USB MIS STATION (DT27) Food Court Asian Restaurant Bus Station Restaurant Chinese Restaurant	92	LAKESIDE MRT STATION (EW26)	Convenience Store	Snack Place	Coffee Shap	Vegetarian / Vegan Restaurant	Farmers Market
105 MAI TAR MRT STATION (DIZS) Food Court Coffee Shop Bus Station Vegetarian / Vegetarian / Vegetarian / Perk 122 PENDING LRT STATION (BRB) Food Court Fruit & Vegetable Store Miscellaneous Shop Perk Market 135 RANGGUNG LRT STATION (SES) Food Court Fast Food Resburant Gym Metro Station Wings Joint 143 SEGAR LRT STATION (BPT) Fast Food Resburant Food Court Coffee Shop Yoga Studio Flower Shop 153 SOD TECK LRT STATION (PW7) Market Food Court Yoga Studio Flower Shop Fast Food Resburant 154 SOUTH VIEW LRT STATION (PW2) Fast Food Resburant Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store 177 THANGGAM LRT STATION (SW1) Coffee Shop Bus Stop Cupcake Shop Southern / Soul Food Resburant Dessett Shop 178 LB MRT STATION (NST9) Coffee Shop Snack Place Food Court Dessett Shop Pool 179 LB MRT STATION (DIZ7) Food Court Asian Resburant Bus Station Resburant Chinese Resburant	94	LAYAR LRT STATION (SW6)	Coffee Shap	Food Court	Asian Restaurant	Bakery	Indian Restaurant
122 PENDING LRT STATION (BPB) Food Court Fruit & Vegetable Store Miscellaneous Shop Perk Market 135 RANGGUNG LRT STATION (SES) Food Court Fast Food Resbursert Gym Metro Station Wings Joint 143 SEGAR LRT STATION (BPT) Fast Food Resbursert Food Court Coffee Shop Yoga Studio Flower Shop 153 SOD TECK LRT STATION (PW7) Market Food Court Yoga Studio Flower Shop Fast Food Resbursert 154 SOUTH VIEW LRT STATION (BPZ) Fast Food Resbursert Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store 177 THANGGAM LRT STATION (SW1) Coffee Shop Bus Stop Cupcake Shop Southern / Soul Food Resbursert Dessert Shop 178 TOA PARCH MRT STATION (NS19) Coffee Shop Snack Place Food Court Dessert Shop Pool 179 LUBI MRT STATION (DTZ) Food Court Asian Resbursert Bus Station Resbursert Chinese Resbursert	103	MARSILING MRT STATION (NS8)	Grocery Store	Pizza Place	Fast Food Restaurant	Heinen Resteurent	Bus Stop
135 RANGGURG URI STATION (SES) Food Court Fast Food Rentaurant Gym Metro Station Wings Joint 148 SEGAR URI STATION (8P11) Fast Food Rentaurant Food Court Coffee Shop Yoge Studio Flower Shop 153 SOO TECK URI STATION (PW7) Market Food Court Yoge Studio Flower Shop Fast Food Rentaurant 154 SOUTH YIEW LRI STATION (8P2) Fast Food Rentaurant Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store 177 IHANGGAM URI STATION (SW4) Coffee Shop Bus Stop Cupcake Shop Southern / Soul Food Rentaurant Dessert Shop 178 IOA PAYOR MRI STATION (NS19) Coffee Shop Snack Place Food Court Dessert Shop Pool 179 UBI MRI STATION (DT27) Food Court Asian Rentaurant Bus Station Rentaurant Chinese Rentaurant	105	MAITAR MRI STATION (DE25)	Food Court	Coffee Shop	Bus Station	Vegetarian / Vegan Restaurant	Park
148 SEGAR LRI SIAHON (8P11) Fast Food Restaurant Food Court Coffee Shop Yoge Studio Flower Shop 153 SOO ECK LRI SIAHON (9W7) Market Food Court Yoge Studio Flower Shop Fast Food Restaurant 154 SOUTH VIEW LRI SIAHON (8P2) Fast Food Restaurant Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store 171 THANGGAM LRI SIAHON (SW4) Coffee Shop Bus Stop Cupcake Shop Southern / Soul Food Restaurant Dessert Shop 173 TOA PAROTH MRI SIAHON (NS19) Coffee Shop Snack Place Food Court Dessert Shop Pool 176 UBI MRI SIAHON (DIZ7) Food Court Asian Restaurant Bus Station Restaurant Chinese Restaurant	122	PENDING LRT STATION (BP8)	Food Court	Fruit & Vegetable Store	Miscellaneous Shop	Park	Market
153 SOD TECK LRT STATION (PW7) Market Food Court Yoge Studio Flower Shop Feet Food Restaurant 154 SOUTH VIEW LRT STATION (BP2) Fast Food Restaurant Furniture / Home Store Believy Coffee Shop Paper / Office Supplies Store 171 THANGGAM LRT STATION (SW4) Coffee Shop Bus Stop Cupcaker Shop Southern / Soul Food Restaurant Dessert Shop 173 TOA PAROTH MRT STATION (VS19) Coffee Shop Snack Place Food Court Dessert Shop Pool 176 UBI MRT STATION (DT27) Food Court Asian Restaurant Bus Station Restaurant Chinese Restaurant	135	RANGGUNG URT STATION (SES)	Food Court	Fast Food Restaurant	Gym	Metro Station	Wings Joint
154 SOUTH VIEW LRT STATION (BP2) Fast Food Restaurant Furniture / Home Store Belany Coffee Shap Paper / Office Supplies Store 171 THANGGAM LRT STATION (SW4) Coffee Shap Bus Stop Cupcake Shap Southern / Soul Food Restaurant Dessert Shap 173 TOA PAPOH MRT STATION (VS19) Coffee Shap Snack Place Food Court Dessert Shap Pool 176 UBI MRT STATION (DT27) Food Court Asian Restaurant Bus Station Restaurant Chinese Restaurant	143	SEGAR LRT STATION (BP11)	Fast Food Restaurant	Food Court	Coffee Shop	Yoga Studio	Flower Shop
171 THANGGAM LRT STATION (SW4) Coffee Shop Bus Stop Cupcake Shop Southern / Soul Food Restaurant Dessert Shop 173 TOA PAYOH MRT STATION (NST9) Coffee Shop Snack Place Food Court Dessert Shop Pool 178 UBI MRT STATION (DT27) Food Court Asian Restaurant Bus Station Restaurant Chinese Restaurant	153	SOO TECK LRT STATION (PW7)	Market	Food Court	Yoga Studio	Flower Shop	Fast Food Restaurant
173 TOA PAYOH MRT STATION (NS19) Coffee Shop Snack Place Food Court Dessert Shop Pool 178 UBI MRI STATION (DT27) Food Court Anien Restaurant Bus Station Restaurant Chinese Restaurant	154	SOUTH VIEW LRT STATION (BP2)	Fast Food Restaurant	Furniture / Home Store	Bakery	Coffee Shap	Paper / Office Supplies Store
176 UBI MRI STATION (D127) Food Court Asian Restaurant Bus Station Restaurant Chinese Restaurant	171	THANGGAM LRT STATION (SW4)	Coffee Shop	Bus Stop	Cupcake Shop	Southern / Soul Food Restaurant	Dessert Shop
	173	TOA PAYOH MRT STATION (NS19)	Coffee Shop	Snack Place	Food Court	Dessert Shop	Pool
182 WOODLANDS SOUTH MIRE STATION (TES) Food Court Park Irail Gym / Fitness Center Video Store	178	UBI MILI STATION (DT27)	Food Court	Asian Restaurant	Bus Station	Restaurant	Chinese Restaurant
	182	WOODLANDS SOUTH MRT STATION (TE3)	Food Court	Park	Ireil	Gym / Fitness Center	Video Store

4.2 Train Station Clusters obtained via Hierarchical Clustering with agglomerative approach, up to 5 flat clusters formed

	Cluster Label	Station ID	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	1	ADMIRALTY MRT STATION (NS10)	Supermarket	Halal Restaurant	Food Court	Coffee Shop	Yoga Studio
1	1	ALJUNIED MRT STATION (EW9)	Chinese Restaurant	Vegetarian / Vegan Restaurant	Café	Noodle House	Asian Restaurant
2	1	ANG MO KIO MRT STATION (NS16)	Food Court	Coffee Shop	Dessert Shop	Snack Place	Supermarket
3	1	BAKAU LRT STATION (SE3)	Trail	Food Stand	Food & Drink Shop	Fast Food Restaurant	Sandwich Place
4	1	BANGKIT LRT STATION (BP9)	Food Court	Fruit & Vegetable Store	Bike Trail	Spa	Park
			-	-	-	-	-
182	1	WOODLANDS SOUTH MRT STATION (TE3)	Food Court	Park	Trail	Gym / Fitness Center	Video Store
183	1	WOODLEIGH MRT STATION (NE11)	Café	Convenience Store	Chinese Restaurant	Soccer Field	Nightclub
184	1	YEW TEE MRT STATION (NSS)	Fast Food Restaurant	Diner	Shopping Mall	Pool	Food Court
185	1	YIO CHU KANG MRT STATION (NS15)	Food Court	Chinese Restaurant	Noodle House	Coffee Shop	Seafood Restaurant
186	1	YISHUN MRT STATION (NS13)	Chinese Restaurant	Food Court	Italian Restaurant	Fried Chicken Joint	Grocery Store

187 rows × 7 columns

4.2.1 Data Visualization



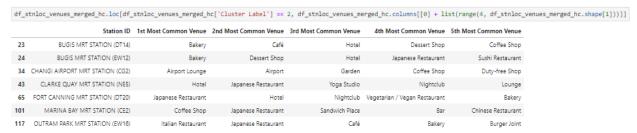
4.2.2 Examining cluster's characteristics

Cluster 1 – marked with purple circles in the above map and it is the biggest cluster comprising of 142 stations, primarily characterized by having eating places e.g. food courts, Chinese restaurants, fast food restaurants, coffee shops.

	nloc_venues_merged_hc.loc[df_stn	loc_venues_merged_hc[Cluster Label'] == 1, de	f_stnloc_venues_merged	_hc.columns[[0] + list	(range(4, df_stnloc_ve
	Station ID	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	ADMIRALTY MRT STATION (NS10)	Supermarket	Halal Restaurant	Food Court	Coffee Shop	Yoga Studio
1	ALJUNIED MRT STATION (EW9)	Chinese Restaurant	Vegetarian / Vegan Restaurant	Café	Noodle House	Asian Restaurant
2	ANG MO KIO MRT STATION (NS16)	Food Court	Coffee Shop	Dessert Shop	Snack Place	Supermarket
3	BAKAU LRT STATION (SE3)	Trail	Food Stand	Food & Drink Shop	Fast Food Restaurant	Sandwich Place
4	BANGKIT LRT STATION (BP9)	Food Court	Fruit & Vegetable Store	Bike Trail	Spa	Park
	***		***	***	***	***
182	WOODLANDS SOUTH MRT STATION (TE3)	Food Court	Park	Trail	Gym / Fitness Center	Video Store
183	WOODLEIGH MRT STATION (NE11)	Café	Convenience Store	Chinese Restaurant	Soccer Field	Nightclub
184	YEW TEE MRT STATION (NSS)	Fast Food Restaurant	Diner	Shopping Mall	Pool	Food Court
185	YIO CHU KANG MRT STATION (NS15)	Food Court	Chinese Restaurant	Noodle House	Coffee Shop	Seafood Restaurant
186	YISHUN MRT STATION (NS13)	Chinese Restaurant	Food Court	Italian Restaurant	Fried Chicken Joint	Grocery Store

Cluster 2 – marked with light blue circles and consists of 7 stations, primarily characterized by having Japanese restaurant, hotel or bakery.

Cluster 2 1



Cluster 3 – marked with light green circles and consists of 4 train stations, characterized by having hotel as the 1^{st} or 2^{nd} most common venue category.

Cluster 3



Cluster 4 – marked with light orange circles and consists of 2 train stations located very near to each other, characterized by having "clothing store" as the 1st most common venue category.

Cluster 4 1



Cluster 5 – marked with red circles in the above map and consists of 32 train stations, characterized by most of them having café, coffee shop or hotel as their top 5 most common venue categories.

Cluster 5

df_stnloc_venues_merged_hc.loc[df_stnloc_venues_merged_hc['Cluster_Label'] == 5, df_stnloc_venues_merged_hc.columns[[8] + list(range(4, df_stnloc_venues_merged_hc.shape[1])))]]

12 BIANCOLLIN MILI SIAILON (CIZ) Cali Chinese Restaurant Confree Shop Restaurant 21 BIANS BASAH MISI SIAILON (CIZ) Hotel Cali Chinese Relatiorant Restaurant Recream Norgh 42 CITY HALL MIST SIAILON (MSC) Hotel Cacié Shropping Mal Franch Relationant Coctatel Bar 52 DHODY CHALL MIST SIAILON (MSC) Laperiere Relationant Hotel Cali Devos Power 52 DHODY CHALL MIST SIAILON (MSC) Carié Hotel Ageneres Relationant Dovest Shop 53 DHODY CHALL MIST SIAILON (MSC) Carié Hotel Ageneres Relationant Drovest Shop Commercis Shop 54 DHODY CHALL MIST SIAILON (CC) Carié Hotel Mession Relationant Duraging Reference Commercis Shop 54 SURVAIN (MSC ASI MIST SIAILON (CC) Carié in Charac Commercis Relationant Japanese Relationant Bubble in Shop Shopping Med 54 ALITICA EAST MIST SIAILON (CC) Coffee Shop Chinese Relationant Sapensee Relationant Bubble in Shop Shopping Med		Station ID	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Cocket Bur	12	BENCOOLEN MRT STATION (DT21)	Café	Hatel	Japanese Restaurant	Coffee Shop	Restaurant
Control Cont	21	BRAS BASAH MRT STATION (CC2)	Hotel	Culié	Chinese Restaurent	Restaurent	ke Cream Shop
Design Cellul Mill Station (RSS) Design S	41	CITY HALL MRT STATION (EW13)	Hotel	Café	Shopping Mall	French Restaurant	Cocktail Bar
52 DHODY CHAUT MIT STATION (ECT) Japanese Restaurant Hotel Cafe Description 53 DHODY CHAUT MIT STATION (ECT) Cafe Hotel Japanese Restaurant Description Courselics Shop 55 DOWNIDOWN MIT STATION (ECT) Hotel Hotel Mexican Restaurant Bub Courselics Shop 36 ESPLANADE MIT STATION (ECX) Hotel Concert Hotel Ber Dumpting Restaurant Shopping Med 77 JURIONG EAST MIT STATION (EXXX) Coffee Shop Chinese Restaurant Japanese Restaurant Bubble less Shop Shopping Med 85 ALRIONG EAST MIT STATION (ECX) Coffee Shop Chinese Restaurant Japanese Restaurant Bubble less Shop Shopping Med 86 LITTLE INDIA MIT STATION (ECX) Coffee Shop Vistramener Restaurant Sandeisch Place Korean Bentaurant Medical Centre 96 LITTLE INDIA MIT STATION (ECX) Eduction Bester in Ferry Mexican Restaurant Hotel Bokery Mexican Restaurant 110 NEGNOLIST STATION (ECX) Soutique Best for Ferry M	42	CITY HALL MRT STATION (NS25)	Hotel	Cufé	Shopping Mall	French Restaurant	Cocktail Bar
13	51	DHOBY GHAUT MRT STATION (NS24)	Café	Hatel	Japanese Restaurant	Cosmetics Shop	Park
DOWNTOWN MILE STATION (DITT)	52	DHOBY GHAUT MRT STATION (NE6)	Japanese Restaurant	Hatel	Café	Dessert Shop	Cosmetics Shop
ESPLANADE MILI STATION (ECC) Hotel Connect Held Ber Dumpling Bestaurant Shapping Mel	53	DHOBY GHAUT MRT STATION (CC1)	Café	Hatel	Japanese Restaurant	Dessert Shop	Cosmetics Shop
Junioria Past Mill Station (RWA) Coffee Shop Chinese Restaurant Japanese Restaurant Bubble Ive Shop Shopping Mel	55	DOWNTOWN MRI STATION (DI17)	Café	Hatel	Mexican Restaurant	Pub	Gym
ARICNE EAST MIRT STATION (NST) Coffee Shop Chrises Restaurant Japanese Restaurant Bubble les Shop Shopping Mel	56	ESPLANADE MRT STATION (CC3)	Hotel	Concert Hall	Bar	Dumpling Restaurant	Shopping Mail
SERTI RIDGE MILI STATION (ECP4) Coffee Shop Vietnamene Restaurant Sandwich Place Korean Restaurant Medical Center	77	JURONG EAST MRT STATION (EW24)	Coffee Shap	Chinese Restaurant	Japanese Restaurant	Bubble Tea Shop	Shopping Mail
Beauty Breakfast Spot Marina Station (NEST) Indian Restaurant Wegetanian / Wegetanianian / Wegetanian / Wegetanianianian / Wegetanianianian / Wegetanianianianianianianianianianianianiania	78	JURONG EAST MRT STATION (NS1)	Coffee Shap	Chinese Restaurant	Japanese Restaurant	Bubble Tea Shop	Shopping Mail
102 MAINNA SOUTH PIER MRT STATION (P6278) Boat or Ferry Mexican Restaurant Gestropub Road Metro Station 110 NIBONG LRT STATION (P6272) Sociate Station Bee Farm Station Chinese Restaurant 115 CINCHARD MRT STATION (R622) Boutique Bakery Chinese Restaurant Coffee Shop Such Restaurant 116 CUITRAM PAIK MIT STATION (R528) Chinese Restaurant Burger Joint Wine Ear Modern European Restaurant 124 PHOENIX LRT STATION (R528) Inval Vegetarien / Vegen Restaurant Chinese Breakfast Place Their Restaurant Light Rail Station 133 RAFILES PLACE MRT STATION (R528) Japanese Restaurant Café Coffee Shop Chinese Restaurant Cocktall Bre 134 RAFILES PLACE MRT STATION (R528) Japanese Restaurant Café Coffee Shop Chinese Restaurant Cocktall Bre 135 ROCHOR MRE STATION (R528) Gestropub Fact Food Restaurant Seefood Restaurant Fabring Spot Pool Hall 139 ROCHOR MRE STATION (R528) Chinese Restaurant Seefood	85	KENT RIDGE MRT STATION (CC24)	Coffee Shap	Vietnamese Restaurant	Sandwich Place	Korean Restaurant	Medical Center
Ber Farm Steekhouse Chinese Restaurant	96	LITTLE INDIA MRT STATION (NE7)	Indian Restaurant	Vegetarian / Vegan Restaurant	Hotel	Bakery	Breakfast Spot
Bolicy Collect Name Station (NSS) Bourings Bolicy Chinese Restaurant Ligarese Restaurant Burger Joint Wire Ear Modern European Restaurant	102	MARINA SOUTH PIER MRT STATION (NS28)	Boat or Ferry	Mexican Restaurant	Gestropub	Road	Metro Station
THE OUTBAM PAIR MIT STATION (NES) Chinese Restaurant Japanese Restaurant Burger Joint Wee See Modern European Restaurant Light Restaurant Place Their Restaurant Upts Restaurant Place Their Restaurant Place Their Restaurant Place Shop Phinese Restaurant Place Their Restaurant Place Place Shop Phinese Restaurant Place	110	NIBONG LRT STATION (PWS)	Soccer Field	Bar	farm	Steakhouse	Chinese Restaurant
PHOENIX LRI STATION (BPS) Inal Vegetation / Veget Restaurant Chrimse Breident Place Their Restaurant Light Red Station (BPS) (Appendix First STATION (BPS)) (Appendix First Station Cocket Ber Coffee Shop Chrimse Restaurant Cocket Ber Coffee Shop Chrimse Restaurant Cocket Ber Station (NS26) (Appendix First Station (NS26) (Appendix First Station (NS26) (Appnexis Restaurant Cocket Ber Station (NS26) (Appnexis Restaurant Shopping Mell Japanexis Restaurant Coffee Shop Autice Ber Station (NS26) (Appnexis Restaurant Shopping Mell Japanexis Restaurant Coffee Shop Autice Ber Station (NS26) (Appnexis Restaurant Shopping Mell	115	ORCHARD MRT STATION (NS22)	Boutique	Bakery	Chinese Restaurant	Coffee Shop	Sushi Restaurant
133 RAFILES FLACE MRT STATION (EW14) Japanese Restaurant Cafe Coffee Shop Chinese Restaurant Cocktail Ber 134 RAFILES FLACE MRT STATION (RS26) Japanese Restaurant Cafe Coffee Shop Chinese Restaurant Cocktail Ber 138 RIVERIA LIUI STATION (PS26) Japanese Restaurant Cafe Coffee Shop Chinese Restaurant Cocktail Ber 139 RIVERIA LIUI STATION (PS26) Japanese Restaurant Vegetarian / Vegetalian / Vege	116	OUTRAM PARK MRT STATION (NE3)	Chinese Restaurant	Japanese Restaurant	Burger Jaint	Wine Bar	Modern European Restaurant
134 RAFFLES PLACE MRT STATION (PS276) Japanese Restaurant Cafe Coffee Shop Chinese Restaurant Cocktail Ser REVISIA LIUI STATION (PS276) Japanese Restaurant Cafe Coffee Shop Chinese Restaurant Coffee Shop ROCHOR MRT STATION (DT33) Indian Restaurant Vegestation / Veges Restaurant Hotel Museum Coffee Shop 142 SAMUDERA LITI STATION (PW4) Soccer Field Ber Sporting Goods Shop Hisrbor / Marina Street Field Ber Sporting Goods Shop Hisrbor / Marina Street Field Similar STATION (FW3) Chinese Restaurant Shopping Mall Japanese Restaurant Coffee Shop Juice Ber Stop SIMEI MRT STATION (FW3) Japanese Restaurant Wine Ber Hotel Clothing Store Coffee Shop South View Liti STATION (FW2) Fast Food Restaurant Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store STATION (FW3) Coffee Shop Indian Restaurant Bock Club South Indian Restaurant Food & Drink Shop Indian Restaurant Restaurant Food & Drink Shop Indian Restaurant Restaurant Food & Drink Shop Indian Restaurant Res	124	PHOENIX LRT STATION (BPS)	Inil	Vegetarian / Vegan Restaurant	Chinese Breakfast Place	Thai Restaurant	Light Rail Station
138 RIVERALIE STATION (PEA) Gestropub Fast Food Restaurant Seefood Restaurant Fishing Spot Pool Hall 139 RICHOR MIEL STATION (DITS) Indian Restaurant Veges Restaurant Hotel Museum Coffee Shop 142 SAMUDERA LIE STATION (PWA) Soccer Field Ber Sporting Goods Shop Harbor / Marina Streekhouse 150 SIMEL MIEL STATION (FWS) Chinese Restaurant Shopping Mail Japanese Restaurant Coffee Shop Juice Ber 152 SOMERSET MIEL STATION (NS23) Japanese Restaurant Wine Ber Hotel Gothing Store Coffee Shop 154 SOUTH VIEW LIE STATION (RS2) Fast Food Restaurant Furniture / Home Store Balway Coffee Shop 155 STADIUM MIEL STATION (CG) Stadium Coffee Shop Soup Place Japanese Restaurant Gothing Store 156 STADIUM MIEL STATION (CG) Stadium Coffee Shop Indian Restaurant Rock Club South Indian Restaurant 157 SAMUNES EAST MIEL STATION (EWIS) Japanese Restaurant Coffee Shop Balway Hotel Restaurant 158 STADIUM STATION (EWIS) Japanese Restaurant Coffee Shop Balway Hotel Restaurant 158 STADIUM STATION (EWIS) Japanese Restaurant Coffee Shop Balway Hotel Ramen Restaurant 159 SAMUNES EAST MIEL STATION (EWIS) Japanese Restaurant Coffee Shop Balway Hotel Ramen Restaurant 160 SECK LEE LIE STATION (EWIS) Japanese Restaurant Light Real Station Yoggs Studio Section New Section Coffee Shop	133	RAFFLES PLACE MRT STATION (EW14)	Japanese Restaurant	Cirli	Coffee Shop	Chinese Restaurant	Cocktail Bar
Total Tota	134	RAFFLES PLACE MRT STATION (NS26)	Japanese Restaurant	Cirli	Coffee Shop	Chinese Restaurant	Cocktail Bar
142 SAMUDERA LRI STATION (PW4) Social Field Bir Sporting Goods Shop Harbor / Marins Marins Markhouse 150 SIMEL MILL STATION (NS23) Chinese Restaurant Shopping Mell Japanese Restaurant Coffee Shop Auice Ber 152 SOMERISET MRIT STATION (NS23) Japanese Restaurant Wine Ber Hotel Cothing Store Coffee Shop 154 SOUTH VIEW LRIT STATION (RP2) Fast Food Restaurant Furniture / Home Store Balkery Coffee Shop Paper / Office Supplies Store 155 STADIUM MILL STATION (CC8) Stadium Coffee Shop South Place Japanese Restaurant Clothing Store 159 TAMINNES EAST MRIT STATION (CISS) Coffee Shop Indian Restaurant Rock Club South Indian Restaurant Food & Drink Shop 165 TANJONG PAGAII MRIT STATION (CW15) Japanese Restaurant Coffee Shop Balway Hotel Restaurant 166 TECK LEE LRIT STATION (CW15) Japanese Restaurant Light Real Station Yoge Studio Inval Pool 168 TELOK AYER MILL STATION (DT18)	138	RIVIERA LIST STATION (PE4)	Gestropub	Fast Food Restaurant	Seafood Restaurant	Fishing Spot	Pool Hall
150 SIME MILI STATION (EWS) Clinese Restaurent Shopping Mell Japanese Restaurent Coffee Shop Auice Ber 152 SOMEISET MRT STATION (NS23) Japanese Restaurent Wine Ber Hotel Clothing Store Coffee Shop 154 SOUTH VIEW LRT STATION (RS2) Feet Food Restaurent Furniture / Home Store Bekery Coffee Shop Paper / Office Supplies Store 155 STADIUM MILI STATION (CC6) Stadium Coffee Shop Soup Place Japanese Restaurent Clothing Store 156 IAMURNES EAST MILI STATION (DT33) Coffee Shop Indian Restaurent Restaurent Restaurent Rock Club South Indian Restaurent Food & Drink Shop 165 IAMURN STATION (EWTS) Japanese Restaurent Coffee Shop Bekery Hotel Restaurent Restaurent IG6 TECK LEE LRT STATION (EWTS) Japanese Restaurent Light Real Station Yoge Studio Ineil Pool 166 IEECK APER MILI STATION (DT33) Japanese Restaurent Korean Restaurent Restaurent Wine Sier Coffee Shop	139	ROCHOR MRT STATION (DT13)	Indian Restaurant	Vegetarian / Vegan Restaurant	Hotel	Museum	Coffee Shop
132 SOMERSET MRT STATION (RS23) Japanese Restaurant Wine Bar Hotel Clothing Store Coffee Shop 154 SOUTH VIEW LRT STATION (RS2) Fast Food Restaurant Furniture / Home Store Biskery Coffee Shop Paper / Office Supplies Store 155 STADIUM MILI STATION (CC8) Stadium Coffee Shop Soup Place Japanese Restaurant Clothing Store 159 LAMPINES EAST MILI STATION (DE3) Coffee Shop Inclien Restaurant Book Club South Indian Restaurant Food & Drink Shop 165 SANJONG PAGAR MRT STATION (EWIS) Japanese Restaurant Coffee Shop Bakery Hotel Remem Restaurant 166 TECK LEE LRT STATION (EWIS) Fast Food Restaurant Light Real Station Yoge Studio Inal Pool 168 TELOK AYER MRT STATION (DT18) Japanese Restaurant Korean Restaurant Restaurant Wine Star Coffee Shop	142	SAMUDERA LRT STATION (PW4)	Soccer Field	Ber	Sporting Goods Shop	Harbor / Marina	Steakhouse
154 SOUTH VIEW LRT STATION (8P2) Fast Food Restaurant Furniture / Home Store Bakery Coffee Shop Paper / Office Supplies Store 155 STADRUM MRT STATION (CC6) Stadium Coffee Shop Soup Place Japanese Restaurant Cothing Store 159 LAMPINES EAST MRT STATION (CD3) Coffee Shop Indian Restaurant Rock Club South Indian Restaurant Food & Drink Shop 165 IANUONG PRAGAIL MRT STATION (EVIS) Japanese Restaurant Coffee Shop Bakery Hotel Research 166 TECK LEE LRT STATION (PWZ) Fast Food Restaurant Light Real Station Yoge Studio Invil Pool 168 IELOK AYER MRT STATION (DT18) Japanese Restaurant Korean Restaurant Restaurant Wine Ser Coffee Shop	150	SIMEI MRT STATION (EW3)	Chinese Restaurant	Shopping Mall	Japanese Restaurant	Coffee Shop	Juice Bar
155 STADIUM MILI STATION (CCB) Stedium Coffee Shop Soup Place Japanese Restaurant Clothing Store 159 TAMPINES EAST MIRI STATION (DTSS) Coffee Shop Indian Restaurant Rock Club South Indian Restaurant Food & Drink Shop 165 TANJONG PAGARI MIRI STATION (EWTS) Japanese Restaurant Light Rail Station Yoga Studio Invil Pool 166 TECK LEE LIRI STATION (FWZ) Fast Food Restaurant Light Rail Station Yoga Studio Invil Pool 168 TELOK AYER MIRI STATION (DTS) Japanese Restaurant Korean Restaurant Restaurant Wine Bar Coffee Shop	152	SOMERSET MRT STATION (NS23)	Japanese Restaurant	Wine Bar	Hatel	Clothing Store	Coffee Shop
159 LAMPINES EAST MRI STARION (DISS) Coffee Shop Indian Restaurant Rock Club South Indian Restaurant Food & Drink Shop 165 IANUONG PAGAR MRIT STARION (EWIS) Japanese Restaurant Coffee Shop Bakery Hotel Ramen Restaurant 166 TECK LEE LRIT STARION (PWZ) Fast Food Restaurant Light Rail Station Yoge Studio Invil Pool 168 TELOK AYER MRIT STARION (DTR) Japanese Restaurant Korean Restaurant Restaurant Wine Bar Coffee Shop	154	SOUTH VIEW LRT STATION (BP2)	Fast Food Restaurant	Furniture / Home Store	Balory	Coffee Shop	Paper / Office Supplies Store
165 SANJONG PAGAR MRT STATION (EWTS) Japanese Restaurant Coffee Shop Bakery Hotel Remen Restaurant 166 TECK LEE LRT STATION (PWZ) Fast Food Restaurant Light Rail Station Yoga Studio Inail Pool 168 TELOK AYER MRT STATION (DT18) Japanese Restaurant Korean Restaurant Restaurant Wine Bar Coffee Shop	155	STADIUM MRT STATION (CC6)	Stadium	Coffee Shop	Soup Place	Japanese Restaurant	Clothing Store
166 TECK LEE LRT STATION (PWZ) Fast Food Restaurant Light Rail Station Yoga Studio Inail Pool 168 1ELOK AYER MRIL STATION (DT18) Japanese Restaurant Korean Restaurant Restaurant Wine Bar Coffee Shop	159	TAMPINES EAST MRT STATION (DT33)	Coffee Shap	Indian Restaurant	Rock Club	South Indian Restaurant	Food & Drink Shop
168 TELOK AYER MRII STATION (DT18) Japanese Restaurant Korean Restaurant Restaurant Wine Bar Coffee Shop	165	TANJONG RAGAR MRT STATION (EW15)	Japanese Restaurant	Coffee Shop	Balorry	Hotel	Ramen Restaurant
	166	TECK LEE LRT STATION (PW2)	Fast Food Restaurant	Light Rail Station	Yoga Studio	frei	Pool
171 THANGGAM URI STATION (SW4) Coffee Shop Bus Stop Cupcake Shop Southern/Soul Food Restaurant Dessert Shop	168	TELOK AYER MRT STATION (DI 18)	Japanese Restaurant	Korean Restaurant	Restaurant	Wine Bar	Coffee Shop
	171	THANGGAM LRT STATION (SW4)	Coffee Shop	Bus Stop	Cupcake Shop	Southern / Soul Food Restaurant	Dessert Shop

5. Discussion

By comparing the outcome of clustering using k-means clustering algorithm and the hierarchical clustering algorithm, we have the following observations:

- 1) Even though both the clustering algorithms are set up to produce 5 clusters, the clustering outcomes are quite different.
- 2) There is a dominant cluster which covers a big majority of the train station, for instance the Cluster 4 of k-means clustering (includes 114 out of 187 stations) and Cluster 1 of hierarchical clustering (includes 143 out of 187 stations). However, the main characteristics of these two dominant clusters are quite different. The dominant cluster of hierarchical clustering is primarily characterized by having 'eating places' that include food courts, Chinese restaurants, fast food restaurants, coffee shops and etc. On the other hand, the dominant cluster of k-means clustering does not exhibit any obvious characteristic, it is more like a grouping of stations mostly having café, hotel, Japanese or Korean restaurant as their 1st or 2nd most common venue categories.
- 3) Besides both clustering algorithms produced a dominant cluster, both also produced a insignificant cluster which contains only two train stations, i.e Cluster 3 of k-means clustering and Cluster 4 of hierarchical clustering. Again, these two insignificant clusters are pretty different.

It is unclear to the author of this report at this stage what are the main factors contributing to the significantly different clustering outcome of these two algorithms. The lack of venues data of certain train stations, the values used for the clustering parameters (e.g. the number of clusters, linkage method) in each clustering algorithm, the inherent differences between the algorithm and etc, could potentially be the reasons that explain the differences in the clustering outcomes.

6. Conclusion

The analysis of the venue category data of the neighborhood venues of each MRT/LRT train stations in Singapore as presented in this report allows us to find out the top 5 most common venue categories in the neighborhood of each train station.

The clustering of the train stations either by k-means clustering algorithm or hierarchical clustering algorithm provides another guiding means for user to identify a group of train stations with similar characteristic (in terms of their most common venue categories) so as to narrow down the selection of train station of their interest. For instance, if a user interested in opening a Chinese restaurant in a train station's neighborhood with considerable less competition, he/she could base on the clustering outcome of k-means clustering to explore the train stations in Cluster 2 or 3, of which "eating venues" are not of the clusters' most common venue categories. Alternatively, he/she can make use of the clustering outcome of hierarchical clustering and tries to explore business opportunity in Cluster 3, 4 or 5.

Appendix

This list of the top 5 common venue categories and their associated frequency of occurrence of each MRT/LRT station in Singapore is given below:

```
----ADMIRALTY MRT STATION (NS10)----
              venue freq
0
            Supermarket 0.4
            Coffee Shop 0.2
1
            Food Court 0.2
2
         Halal Restaurant 0.2
4 Paper / Office Supplies Store 0.0
----ALJUNIED MRT STATION (EW9)----
              venue freq
        Chinese Restaurant 0.13
               Café 0.07
         Asian Restaurant 0.07
2
           Noodle House 0.07
3
4 Vegetarian / Vegan Restaurant 0.07
----ANG MO KIO MRT STATION (NS16)----
         venue freq
0
      Coffee Shop 0.10
1
      Food Court 0.10
      Dessert Shop 0.08
3 Japanese Restaurant 0.05
      Snack Place 0.05
----BAKAU LRT STATION (SE3)----
          venue freq
0 Fast Food Restaurant 0.08
       Food Stand 0.08
1
2
      Shopping Mall 0.08
3
          Trail 0.08
     Sandwich Place 0.08
----BANGKIT LRT STATION (BP9)----
               venue freq
            Food Court 0.18
0
              Market 0.09
1
            Bike Trail 0.09
2
3 Vegetarian / Vegan Restaurant 0.09
        Miscellaneous Shop 0.09
----BARTLEY MRT STATION (CC12)----
      venue freq
   Pet Store 0.3
1 Bus Station 0.3
2 Noodle House 0.2
3 Metro Station 0.1
       Café 0.1
```

----BAYFRONT MRT STATION (CE1)---venue freq Hotel 0.08 1 Boutique 0.08 2 Bridge 0.04 3 Casino 0.04 4 Theater 0.04 ----BAYFRONT MRT STATION (DT16)---venue freq 0 Hotel 0.08 1 Boutique 0.08 2 Bridge 0.04 3 Casino 0.04 4 Theater 0.04 ----BEAUTY WORLD MRT STATION (DT5)---venue freq 0 Korean Restaurant 0.12 1 Chinese Restaurant 0.12 Café 0.12 Food Court 0.06 4 Indian Restaurant 0.04 ----BEDOK MRT STATION (EW5)---venue freq 0 Chinese Restaurant 0.08 1 Japanese Restaurant 0.06 Coffee Shop 0.06 3 Food Court 0.04 Sandwich Place 0.04 ----BEDOK NORTH MRT STATION (DT29)---venue freq 0 Food Court 0.11 Café 0.06 2 Fast Food Restaurant 0.06 Pet Store 0.06 4 Sandwich Place 0.06 ----BEDOK RESERVOIR MRT STATION (DT30)---venue freq 0 Asian Restaurant 0.2 Food Court 0.2 Supermarket 0.2 2 Noodle House 0.2 3 Park 0.2 ----BENCOOLEN MRT STATION (DT21)---venue freq 0 Café 0.14 Hotel 0.08 1 Japanese Restaurant 0.06 2 Ice Cream Shop 0.04

4 Vegetarian / Vegan Restaurant 0.04

----BENDEMEER MRT STATION (DT23)---venue freq 0 Hostel 0.17 BBQ Joint 0.13 1 Coffee Shop 0.09 3 Vegetarian / Vegan Restaurant 0.09 Restaurant 0.09 ----BISHAN MRT STATION (CC15)---venue freq Coffee Shop 0.12 0 Food Court 0.09 2 Chinese Restaurant 0.07 Bubble Tea Shop 0.07 Supermarket 0.05 ----BISHAN MRT STATION (NS17)---venue freq 0 Coffee Shop 0.12 Food Court 0.09 1 2 Bubble Tea Shop 0.07 3 Chinese Restaurant 0.07 4 Electronics Store 0.05 ----BOON KENG MRT STATION (NE9)---venue freq 0 Noodle House 0.16 1 Chinese Restaurant 0.16 2 Bakery 0.08 3 Seafood Restaurant 0.08 Coffee Shop 0.08 ----BOON LAY MRT STATION (EW27)---venue freq Asian Restaurant 0.14 1 Japanese Restaurant 0.12 2 Fast Food Restaurant 0.10 Chinese Restaurant 0.08 Coffee Shop 0.06 4 ----BOTANIC GARDENS MRT STATION (CC19)---venue freq 0 Café 0.09 Bakery 0.09 1 2 Asian Restaurant 0.09 3 Noodle House 0.06 Supermarket 0.03 ----BOTANIC GARDENS MRT STATION (DT9)---venue freq Café 0.09 1 Asian Restaurant 0.09 Bakery 0.06 2 3 Noodle House 0.06

Supermarket 0.03

----BRADDELL MRT STATION (NS18)---venue freq Noodle House 0.13 1 Chinese Restaurant 0.10 2 Food Court 0.10 3 Café 0.08 Bakery 0.05 4 ----BRAS BASAH MRT STATION (CC2)---venue freq 0 Hotel 0.12 1 Café 0.10 2 Chinese Restaurant 0.08 Restaurant 0.04 Coffee Shop 0.04 ----BUANGKOK MRT STATION (NE15)---venue freq 0 Bus Station 0.15 Pharmacy 0.15 1 Cricket Ground 0.08 2 BBQ Joint 0.08 4 Fast Food Restaurant 0.08 ----BUGIS MRT STATION (DT14)---venue freq Bakery 0.08 1 Dessert Shop 0.06 Café 0.06 2 Hotel 0.06 3 4 Coffee Shop 0.04 ----BUGIS MRT STATION (EW12)---venue freq Bakery 0.08 Dessert Shop 0.06 Sushi Restaurant 0.04 3 Japanese Restaurant 0.04 Café 0.04 ----BUKIT BATOK MRT STATION (NS2)---venue freq Coffee Shop 0.16 1 Chinese Restaurant 0.08 2 Food Court 0.08 3 Spa 0.04 4 Mobile Phone Shop 0.04 ----BUKIT BROWN MRT STATION (CC18)---venue freq 0 Gym 0.5 Non-Profit 0.5 1 2 ATM 0.0

Other Great Outdoors 0.0

4 Paper / Office Supplies Store 0.0

----BUKIT GOMBAK MRT STATION (NS3)----

venue freq

- 0 Food Court 0.19
- 1 Stadium 0.10
- 2 Sandwich Place 0.05
- 3 Seafood Restaurant 0.05
- 4 Chinese Restaurant 0.05

----BUKIT PANJANG LRT STATION (BP6)----

venue freq

- 0 Fast Food Restaurant 0.06
- 1 Café 0.06
- 2 Coffee Shop 0.06
- 3 Sushi Restaurant 0.06
- 4 Asian Restaurant 0.06

----BUKIT PANJANG MRT STATION (DT1)----

venue freq

- 0 Café 0.07
- 1 Fast Food Restaurant 0.07
- 2 Sushi Restaurant 0.07
- 3 Coffee Shop 0.07
- 4 Asian Restaurant 0.07

----BUONA VISTA MRT STATION (CC22)----

venue freq

- 0 Japanese Restaurant 0.10
- 1 Coffee Shop 0.08
- 2 Asian Restaurant 0.05
- 3 Indian Restaurant 0.05
- 4 Salad Place 0.05

----BUONA VISTA MRT STATION (EW21)----

venue freq

- 0 Japanese Restaurant 0.08
- 1 Indian Restaurant 0.08
- 2 Coffee Shop 0.06
- 3 Chinese Restaurant 0.06
- Food Court 0.06

----CALDECOTT MRT STATION (CC17)----

venue freq

- 0 Flower Shop 0.55
- 1 Metro Station 0.18
- 2 Garden Center 0.09
- 3 Office 0.09
- 4 Sandwich Place 0.09

----CASHEW MRT STATION (DT2)----

venue freq

- 0 Bus Station 0.38
- 1 Pool 0.12
- 2 Seafood Restaurant 0.12

- 3 Convenience Store 0.12
- 4 Food Court 0.12

----CHANGI AIRPORT MRT STATION (CG2)----

venue freq

- 0 Airport Lounge 0.09
- 1 Airport 0.06
- 2 Garden 0.06
- 3 Snack Place 0.04
- 4 Duty-free Shop 0.04

----CHENG LIM LRT STATION (SW1)----

venue freq

- 0 Fast Food Restaurant 0.19
- 1 Coffee Shop 0.12
- 2 Video Store 0.06
- 3 Asian Restaurant 0.06
- 4 Shopping Mall 0.06

----CHINATOWN MRT STATION (DT19)----

venue freq

- 0 Hostel 0.10
- 1 Chinese Restaurant 0.08
- 2 Food Court 0.08
- 3 Seafood Restaurant 0.06
- 4 Spa 0.06

---- CHINATOWN MRT STATION (NE4)----

venue freq

- 0 Hostel 0.10
- 1 Food Court 0.10
- 2 Chinese Restaurant 0.08
- 3 Seafood Restaurant 0.06
- 4 Spa 0.06

----CHINESE GARDEN MRT STATION (EW25)----

venue freq

- 0 Chinese Restaurant 0.22
- 1 Coffee Shop 0.22
- 2 Food Court 0.11
- 3 Indian Restaurant 0.11
- 4 Train Station 0.11

----CHOA CHU KANG LRT STATION (BP1)----

venue freq

- 0 Coffee Shop 0.20
- 1 Fast Food Restaurant 0.13
- 2 Supermarket 0.07
- 3 Thai Restaurant 0.07
- 4 Food Court 0.07

----CHOA CHU KANG MRT STATION (NS4)----

venue freq

- Coffee Shop 0.20
- 1 Fast Food Restaurant 0.13

```
Supermarket 0.07
3
     Thai Restaurant 0.07
       Food Court 0.07
----CITY HALL MRT STATION (EW13)----
      venue freq
      Hotel 0.08
0
  Cocktail Bar 0.06
1
       Café 0.06
2
3 Coffee Shop 0.06
4 Shopping Mall 0.06
----CITY HALL MRT STATION (NS25)----
      venue freq
      Hotel 0.08
0
1 Cocktail Bar 0.06
       Café 0.06
3 Coffee Shop 0.06
4 Shopping Mall 0.06
----CLARKE QUAY MRT STATION (NE5)----
              venue freq
0
              Hotel 0.08
1
       Japanese Restaurant 0.06
2
           Yoga Studio 0.04
3 Vegetarian / Vegan Restaurant 0.04
            Nightclub 0.04
----CLEMENTI MRT STATION (EW23)----
        venue freq
      Coffee Shop 0.10
0
      Food Court 0.06
1
2 Chinese Restaurant 0.06
3 Asian Restaurant 0.06
4 Dim Sum Restaurant 0.04
----COMMONWEALTH MRT STATION (EW20)----
        venue freq
0 Chinese Restaurant 0.14
     Coffee Shop 0.10
2
     Noodle House 0.07
3
   Asian Restaurant 0.07
         Diner 0.03
----COMPASSVALE LRT STATION (SE1)----
        venue freq
0
        Garden 0.2
      Playground 0.2
      Bus Station 0.2
3 Sculpture Garden 0.2
4 Chinese Restaurant 0.2
```

----CORAL EDGE LRT STATION (PE3)---venue freq

Soccer Field 0.2

```
Pool Hall 0.1
3 Fast Food Restaurant 0.1
          Café 0.1
----COVE LRT STATION (PE1)----
        venue freq
0 Chinese Restaurant 0.14
     Coffee Shop 0.14
1
2
          Gym 0.14
3 Indian Restaurant 0.14
4 Seafood Restaurant 0.14
----DAKOTA MRT STATION (CC8)----
        venue freq
     Noodle House 0.22
1 Chinese Restaurant 0.16
  Asian Restaurant 0.09
     Dessert Shop 0.06
4 Seafood Restaurant 0.06
----DAMAI LRT STATION (PE7)----
              venue freq
0
             Tea Room 0.5
1
           High School 0.5
           Pastry Shop 0.0
3 Paper / Office Supplies Store 0.0
       Pakistani Restaurant 0.0
----DHOBY GHAUT MRT STATION (CC1)----
         venue freq
0
          Café 0.12
1 Japanese Restaurant 0.06
         Hotel 0.06
2
3
     Cosmetics Shop 0.04
      Dessert Shop 0.04
----DHOBY GHAUT MRT STATION (NE6)----
         venue freq
0 Japanese Restaurant 0.08
          Café 0.06
1
2
         Hotel 0.06
3
      Dessert Shop 0.04
     Cosmetics Shop 0.04
----DHOBY GHAUT MRT STATION (NS24)----
         venue freq
          Café 0.10
1 Japanese Restaurant 0.06
         Hotel 0.06
3
          Park 0.04
      Dessert Shop 0.04
----DOVER MRT STATION (EW22)----
         venue freq
```

Bus Station 0.1

- 0 College Cafeteria 0.29
- 1 Fast Food Restaurant 0.14
- 2 Coffee Shop 0.14
- 3 Sandwich Place 0.14
- 4 Food Court 0.14

----DOWNTOWN MRT STATION (DT17)----

venue freq

- 0 Café 0.12
- 1 Hotel 0.06
- 2 Mexican Restaurant 0.06
- 3 Gym 0.04
- 4 Japanese Restaurant 0.04

----ESPLANADE MRT STATION (CC3)----

venue freq

- 0 Hotel 0.14
- 1 Lounge 0.04
- 2 Concert Hall 0.04
- 3 Dumpling Restaurant 0.04
- 4 Shopping Mall 0.04

----EUNOS MRT STATION (EW7)----

venue freq

- 0 Chinese Restaurant 0.21
- Noodle House 0.11
- 2 Coffee Shop 0.11
- 3 Café 0.05
- 4 Arts & Crafts Store 0.05

----EXPO MRT STATION (CG1)----

venue freq

- 0 Café 0.12
- 1 Coffee Shop 0.10 2 Japanese Restaurant 0.08
- 3 Chinese Restaurant 0.08
- 4 Fast Food Restaurant 0.06

----EXPO MRT STATION (DT35)----

venue freq

- 0 Café 0.10
- 1 Japanese Restaurant 0.08
- 2 Coffee Shop 0.08
- 3 Chinese Restaurant 0.08
- 4 Fast Food Restaurant 0.06

----FAJAR LRT STATION (BP10)----

venue freq

- 0 Food Court 0.25
- 1 Coffee Shop 0.25
- 2 College Cafeteria 0.25
- 3 Fast Food Restaurant 0.25
- 4 Pastry Shop 0.00

----FARMWAY LRT STATION (SW2)----

```
venue freq
0
          Bridge 0.09
1
        Sake Bar 0.09
          Bistro 0.09
           Gym 0.09
3
4 Gym / Fitness Center 0.09
----FARRER PARK MRT STATION (NE8)----
              venue freq
0
        Indian Restaurant 0.20
1
               Café 0.14
2
        Chinese Restaurant 0.10
               Hotel 0.06
4 Vegetarian / Vegan Restaurant 0.06
----FARRER ROAD MRT STATION (CC20)----
          venue freq
  Chinese Restaurant 0.25
          Pool 0.06
   Convenience Store 0.06
2
      Metro Station 0.06
4 Gym / Fitness Center 0.06
----FERNVALE LRT STATION (SW5)----
         venue freq
0
      Coffee Shop 0.18
      Food Court 0.11
   Asian Restaurant 0.07
3 Japanese Restaurant 0.04
         Bakery 0.04
----FORT CANNING MRT STATION (DT20)----
         venue freq
0 Japanese Restaurant 0.12
          Hotel 0.08
          Spa 0.04
3
           Bar 0.04
        Wine Bar 0.04
----GEYLANG BAHRU MRT STATION (DT24)----
        venue freq
     Coffee Shop 0.2
0
      Food Court 0.2
     Bus Station 0.1
3 Department Store 0.1
4 Indian Restaurant 0.1
----GUL CIRCLE MRT STATION (EW30)----
        venue freq
     Coffee Shop 0.25
    Train Station 0.25
2 Electronics Store 0.25
      Food Court 0.25
```

4 Other Repair Shop 0.00

venue freq 0 Chinese Restaurant 0.06 Clothing Store 0.06 Multiplex 0.04 Coffee Shop 0.04 3 4 German Restaurant 0.04 ----HARBOURFRONT MRT STATION (NE1)---venue freq 0 Chinese Restaurant 0.06 Clothing Store 0.06 Multiplex 0.04 Coffee Shop 0.04 4 German Restaurant 0.04 ----HAW PAR VILLA MRT STATION (CC25)---venue freq 0 Bus Station 0.31 Theme Park 0.08 Metro Station 0.08 3 Convenience Store 0.08 Office 0.08 ----HILLVIEW MRT STATION (DT3)---venue freq 0 Café 0.11 Shopping Mall 0.07 1 Coffee Shop 0.07 3 Italian Restaurant 0.07 Ice Cream Shop 0.07 ----HOLLAND VILLAGE MRT STATION (CC21)---venue freq 0 Bar 0.08 Bakery 0.08 Ice Cream Shop 0.08 3 Italian Restaurant 0.05 Spa 0.05 ----HOUGANG MRT STATION (NE14)---venue freq 0 Food Court 0.08 Chinese Restaurant 0.08 1 2 Coffee Shop 0.08 3 Fast Food Restaurant 0.08 Dessert Shop 0.05 ----JALAN BESAR MRT STATION (DT22)---venue freq 0 Indian Restaurant 0.16 Café 0.08 1 Chinese Restaurant 0.08 3 Vegetarian / Vegan Restaurant 0.08 Hostel 0.06

----HARBOURFRONT MRT STATION (CC29)----

----JELAPANG LRT STATION (BP12)---venue freq 0 Bus Station 0.14 Multiplex 0.14 1 2 Fast Food Restaurant 0.14 Food Court 0.14 3 4 Supermarket 0.14 ----JOO KOON MRT STATION (EW29)---venue freq 0 Fast Food Restaurant 0.17 Bus Station 0.13 Snack Place 0.04 3 Chinese Restaurant 0.04 4 Gym / Fitness Center 0.04 ----JURONG EAST MRT STATION (EW24)---venue freq Coffee Shop 0.08 1 Chinese Restaurant 0.08 2 Japanese Restaurant 0.08 Bubble Tea Shop 0.06 Shopping Mall 0.04 ----JURONG EAST MRT STATION (NS1)---venue freq Coffee Shop 0.08 1 Chinese Restaurant 0.08 2 Japanese Restaurant 0.08 Bubble Tea Shop 0.06 3 Shopping Mall 0.04 ----KADALOOR LRT STATION (PE5)---venue freq Café 0.11 Gym 0.11 Bus Stop 0.11 3 Fishing Spot 0.06 4 Food Court 0.06 ----KAKI BUKIT MRT STATION (DT28)---venue freq 0 Coffee Shop 0.27 Food Court 0.18 1 Skate Park 0.09 2 Bike Shop 0.09 4 Convenience Store 0.09

----KALLANG MRT STATION (EW10)----

venue freq

0 Food Court 0.11

BBQ Joint 0.11

2 Snack Place 0.11

3 Hostel 0.11

4 Thai Restaurant 0.06

----KANGKAR LRT STATION (SE4)---venue freq Shopping Mall 0.08 0 Food Court 0.08 1 2 Basketball Court 0.08 3 Mexican Restaurant 0.08 Playground 0.08 ----KEAT HONG LRT STATION (BP3)---venue freq 0 Fast Food Restaurant 0.25 Coffee Shop 0.12 Deli / Bodega 0.12 Grocery Store 0.12 3 Bus Stop 0.12 4 ----KEMBANGAN MRT STATION (EW6)---venue freq 0 Chinese Restaurant 0.15 1 Indian Restaurant 0.15 Noodle House 0.05 3 Supermarket 0.05 4 Bistro 0.05 ----KENT RIDGE MRT STATION (CC24)---venue freq Coffee Shop 0.19 Snack Place 0.06 1 2 Korean Restaurant 0.06 Sandwich Place 0.06 3 Food 0.06 ----KHATIB MRT STATION (NS14)---venue freq Coffee Shop 0.13 1 Asian Restaurant 0.13 Supermarket 0.09 3 Bus Stop 0.09 4 Bakery 0.09 ----KING ALBERT PARK MRT STATION (DT6)---venue freq Bus Station 0.14 1 Gym / Fitness Center 0.10 2 Gym 0.10 3 Gas Station 0.05 Supermarket 0.05 ----KOVAN MRT STATION (NE13)---venue freq 0 Chinese Restaurant 0.14 Noodle House 0.11 1

2

3

Food Court 0.09

Café 0.07

4 Asian Restaurant 0.07

----KRANJI MRT STATION (NS7)----

venue freq 0 Racetrack 0.38 1 Dessert Shop 0.12 2 Noodle House 0.12 Bus Line 0.12 Bakery 0.12 ----KUPANG LRT STATION (SW3)---venue freq 0 Bridge 0.2 1 Supermarket 0.2 Bakery 0.2 3 Light Rail Station 0.2 Park 0.2 ----LABRADOR PARK MRT STATION (CC27)---venue freq 0 Café 0.06 Coffee Shop 0.06 1 2 Chinese Restaurant 0.06 3 Fast Food Restaurant 0.06 Sushi Restaurant 0.06 ----LAKESIDE MRT STATION (EW26)---venue freq 0 Coffee Shop 0.25 Convenience Store 0.25 1 2 Vegetarian / Vegan Restaurant 0.25 3 Snack Place 0.25 4 ATM 0.00 ----LAVENDER MRT STATION (EW11)---venue freq Coffee Shop 0.10 Restaurant 0.06 2 Fast Food Restaurant 0.06 Café 0.04 Bed & Breakfast 0.04 ----LAYAR LRT STATION (SW6)---venue freq 0 Coffee Shop 0.14 Food Court 0.10 1 Bakery 0.07 Asian Restaurant 0.07 4 Japanese Restaurant 0.03 ----LITTLE INDIA MRT STATION (DT12)---venue freq Indian Restaurant 0.27 1 Vegetarian / Vegan Restaurant 0.12 Café 0.10

3 Hostel 0.07 4 Hotel 0.07
LITTLE INDIA MRT STATION (NE7) venue freq 1 Indian Restaurant 0.40 1 Vegetarian / Vegan Restaurant 0.08 Hotel 0.06 Bakery 0.04 Breakfast Spot 0.04
LORONG CHUAN MRT STATION (CC14) venue freq 0
MACPHERSON MRT STATION (CC10) venue freq 0 Gym 0.13 1 Bus Station 0.13 2 Food Court 0.13 3 Metro Station 0.07 4 Furniture / Home Store 0.07
MACPHERSON MRT STATION (DT26) venue freq 0 Bus Station 0.14 1 Gym 0.09 2 Coffee Shop 0.09 3 Vegetarian / Vegan Restaurant 0.09 4 Food Court 0.09
MARINA BAY MRT STATION (CE2) venue freq Coffee Shop 0.16 Japanese Restaurant 0.10 Sandwich Place 0.08 Chinese Restaurant 0.06 Bar 0.06
MARINA BAY MRT STATION (NS27) venue freq 0 Pub 0.08 1 Mexican Restaurant 0.04 2 Gym 0.04 3 Government Building 0.04 4 Sushi Restaurant 0.04
MARINA SOUTH PIER MRT STATION (NS28) venue freq Boat or Ferry 0.25 BBQ Joint 0.12

- 2 Metro Station 0.12
- 3 Mexican Restaurant 0.12
- 4 History Museum 0.12

----MARSILING MRT STATION (NS8)----

venue freq

- 0 Grocery Store 0.17
- 1 Japanese Restaurant 0.08
- 2 Coffee Shop 0.08
- 3 Hainan Restaurant 0.08
- 4 Steakhouse 0.08

----MARYMOUNT MRT STATION (CC16)----

venue freq

- O Chinese Restaurant 0.33
- 1 Bakery 0.17
- 2 Thai Restaurant 0.17
- 3 Outdoors & Recreation 0.17
- 4 Food Court 0.17

----MATTAR MRT STATION (DT25)----

venue freq

- 0 Food Court 0.18
- 1 Bus Station 0.12
- 2 Coffee Shop 0.12
- 3 Vegetarian / Vegan Restaurant 0.12
- 4 Japanese Restaurant 0.06

----MERIDIAN LRT STATION (PE2)----

venue freq

- 0 Chinese Restaurant 0.25
- 1 Coffee Shop 0.25
- 2 Casino 0.25
- 3 Garden 0.25
- 4 Noodle House 0.00

----MOUNTBATTEN MRT STATION (CC7)----

venue freq

- 0 Noodle House 0.16
- 1 Chinese Restaurant 0.08
- 2 Food Court 0.08
- 3 Fast Food Restaurant 0.06
- 4 Dessert Shop 0.06

----NEWTON MRT STATION (DT11)----

venue freq

- 0 Chinese Restaurant 0.21
- 1 Seafood Restaurant 0.11
- 2 Hotel Bar 0.07
- 3 Italian Restaurant 0.07
- 4 Japanese Restaurant 0.04

----NEWTON MRT STATION (NS21)----

venue freq

0 Chinese Restaurant 0.21

- 1 Hotel Bar 0.08
- 2 Italian Restaurant 0.08
- 3 Seafood Restaurant 0.08
- 4 Japanese Restaurant 0.04

----NIBONG LRT STATION (PW5)----

venue freq

- 0 Soccer Field 0.12
- 1 Bar 0.12
- 2 Steakhouse 0.06
- 3 BBQ Joint 0.06
- 4 Boat or Ferry 0.06

----NICOLL HIGHWAY MRT STATION (CC5)----

venue freq

- 0 Thai Restaurant 0.11
- 1 Hotel 0.09
- 2 Italian Restaurant 0.07
- 3 Vietnamese Restaurant 0.04
- 4 Food Court 0.04

----NOVENA MRT STATION (NS20)----

venue freq

Café 0.10

0

0

- 1 Coffee Shop 0.08
- 2 Japanese Restaurant 0.08
- 3 Asian Restaurant 0.06
- 4 Chinese Restaurant 0.06

----OASIS LRT STATION (PE6)----

venue freq

- 0 Supermarket 0.15
- 1 Gym 0.10
- 2 Fast Food Restaurant 0.10
- 3 Soup Place 0.05
- 4 Athletics & Sports 0.05

----ONE-NORTH MRT STATION (CC23)----

venue freq

- Café 0.16
- 1 Coffee Shop 0.09
- 2 Food Court 0.07
- 3 Salad Place 0.05
- 4 Sandwich Place 0.05

----ORCHARD MRT STATION (NS22)----

venue freq

- Boutique 0.14
- 1 Sushi Restaurant 0.06
- 2 Chinese Restaurant 0.06
- 3 Bakery 0.06
- 4 Coffee Shop 0.06

----OUTRAM PARK MRT STATION (EW16)----

venue freq

- 0 Italian Restaurant 0.10
- 1 Café 0.06
- 2 Japanese Restaurant 0.06
- 3 French Restaurant 0.04
- 4 Cocktail Bar 0.04

----OUTRAM PARK MRT STATION (NE3)----

venue freq

- 0 Chinese Restaurant 0.08
- 1 Japanese Restaurant 0.08
- 2 Italian Restaurant 0.05
- 3 Australian Restaurant 0.05
- 4 Burger Joint 0.05

----PASIR PANJANG MRT STATION (CC26)----

venue freq

- O Chinese Restaurant 0.18
- 1 Thai Restaurant 0.12
- Food Court 0.12
- 3 Vietnamese Restaurant 0.06
- 4 Gas Station 0.06

----PASIR RIS MRT STATION (EW1)----

venue freq

- 0 Food Court 0.09
- 1 Bus Line 0.06
- 2 Sandwich Place 0.06
- 3 Pharmacy 0.06
- 4 Coffee Shop 0.06

----PAYA LEBAR MRT STATION (CC9)----

venue freq

- 0 Fast Food Restaurant 0.08
- 1 Asian Restaurant 0.06
- 2 Supermarket 0.06
- 3 Snack Place 0.04
- 4 Ramen Restaurant 0.04

----PAYA LEBAR MRT STATION (EW8)----

venue freq

- 0 Fast Food Restaurant 0.08
- 1 Supermarket 0.06
- 2 Asian Restaurant 0.06
- 3 Hotpot Restaurant 0.04
- 4 Steakhouse 0.04

----PENDING LRT STATION (BP8)----

venue freq

- 0 Food Court 0.22
- 1 Market 0.11
- 2 Bus Station 0.11
- 3 Miscellaneous Shop 0.11
- 4 Playground 0.11

----PETIR LRT STATION (BP7)----

venue freq 0 Coffee Shop 0.09
1 Sushi Restaurant 0.09
2 Fast Food Restaurant 0.093 Shopping Mall 0.06
4 Noodle House 0.06
Troodic House 0.00
PHOENIX LRT STATION (BP5)
venue freq
0 Bubble Tea Shop 0.08
1 Asian Restaurant 0.08
2 Chinese Breakfast Place 0.08
Coffee Shop 0.08
4 Trail 0.08
NOVEMBRADE OF A TYON (TWO)
PIONEER MRT STATION (EW28)
venue freq 0 Stadium 0.1
1 Pool 0.1
2 Gym / Fitness Center 0.1
3 Fast Food Restaurant 0.1
4 Golf Course 0.1
POTONG PASIR MRT STATION (NE10)
venue freq 0 Chinese Restaurant 0.26
1 Convenience Store 0.13
2 Fast Food Restaurant 0.09
3 Coffee Shop 0.09
4 Food Court 0.09
PROMENADE MRT STATION (CC4)
venue freq
0 Hotel 0.08
1 Hotel Bar 0.08 2 Japanese Restaurant 0.08
3 Event Space 0.06
4 Buffet 0.06
PROMENADE MRT STATION (DT15)
venue freq
0 Hotel 0.10
1 Japanese Restaurant 0.08
Hotel Bar 0.08 Event Space 0.06
4 Buffet 0.06
. Builde 0.00
PUNGGOL LRT STATION (PTC)
venue freq
0 Snack Place 0.04
1 Ice Cream Shop 0.04
2 Café 0.04

3 Japanese Restaurant 0.04 4 Chinese Restaurant 0.04

venue freq Snack Place 0.04 Ice Cream Shop 0.04 Café 0.04 3 Japanese Restaurant 0.04 4 Chinese Restaurant 0.04 ----PUNGGOL POINT LRT STATION (PW3)---venue freq 0 Light Rail Station 0.5 Campground 0.5 ATM 0.0 3 Pedestrian Plaza 0.0 Park 0.0 ----QUEENSTOWN MRT STATION (EW19)---venue freq 0 Chinese Restaurant 0.23 Food Court 0.15 2 Pool 0.08 3 Seafood Restaurant 0.08 Train Station 0.08 ----RAFFLES PLACE MRT STATION (EW14)---venue freq 0 Japanese Restaurant 0.08 Hotel 0.06 Coffee Shop 0.06 3 Cocktail Bar 0.06 4 Gym / Fitness Center 0.06 ----RAFFLES PLACE MRT STATION (NS26)---venue freq 0 Japanese Restaurant 0.08 Hotel 0.06 2 Coffee Shop 0.06 Cocktail Bar 0.06 4 Gym / Fitness Center 0.06 ----RANGGUNG LRT STATION (SE5)---venue freq Food Court 0.25 1 Fast Food Restaurant 0.17 BBQ Joint 0.08 2 3 Metro Station 0.08 Wings Joint 0.08 ----REDHILL MRT STATION (EW18)---venue freq 0 Chinese Restaurant 0.27 Coffee Shop 0.20 1 Pharmacy 0.07 2 3 Food Court 0.07

4

Park 0.07

----PUNGGOL MRT STATION (NE17)----

Bus Line 0.25 3 Bus Station 0.25 4 ATM 0.00 ----RIVIERA LRT STATION (PE4)---venue freq Fishing Spot 0.10 0 1 Fast Food Restaurant 0.10 Seafood Restaurant 0.10 3 Gastropub 0.10 4 Beer Garden 0.05 ----ROCHOR MRT STATION (DT13)---venue freq Indian Restaurant 0.58 1 Vegetarian / Vegan Restaurant 0.08 General College & University 0.03 2 Hotel 0.03 4 Coffee Shop 0.03 ----RUMBIA LRT STATION (SE2)---venue freq 0 Fast Food Restaurant 0.2 1 Light Rail Station 0.1 2 Chinese Restaurant 0.1 3 Japanese Restaurant 0.1 Bus Station 0.1 ----SAM KEE LRT STATION (PW1)---venue freq 0 Fast Food Restaurant 0.09 Chinese Restaurant 0.04 Japanese Restaurant 0.04 Bridge 0.04 4 Steakhouse 0.04 ----SAMUDERA LRT STATION (PW4)---venue freq 0 Soccer Field 0.13 Bar 0.13 1 Steakhouse 0.07 3 Light Rail Station 0.07 Boat or Ferry 0.07 ----SEGAR LRT STATION (BP11)---venue freq Coffee Shop 0.33 Food Court 0.33 2 Fast Food Restaurant 0.33 Non-Profit 0.00 4 Outdoor Supply Store 0.00

----RENJONG LRT STATION (SW8)----

venue freq 0 Grocery Store 0.25 1 Metro Station 0.25

----SEMBAWANG MRT STATION (NS11)----

venue freq

- 0 Fast Food Restaurant 0.13
- 1 Coffee Shop 0.13
- 2 Chinese Restaurant 0.13
- 3 Asian Restaurant 0.13
- 4 Japanese Restaurant 0.07

----SENGKANG LRT STATION (STC)----

venue freq

- 0 Chinese Restaurant 0.11
 - Food Court 0.08
- 2 Fast Food Restaurant 0.08
- 3 Asian Restaurant 0.06
- 4 Bus Station 0.06

----SENGKANG MRT STATION (NE16)----

venue freq

- 0 Chinese Restaurant 0.11
- 1 Food Court 0.08
- 2 Fast Food Restaurant 0.08
- 3 Asian Restaurant 0.06
- 4 Bus Station 0.06

----SENJA LRT STATION (BP13)----

venue freq

- O Asian Restaurant 0.08
- 1 Fast Food Restaurant 0.08
- 2 Bus Station 0.06
- 3 Café 0.06
- 4 Sushi Restaurant 0.06

----SERANGOON MRT STATION (CC13)----

venue freq

- 0 Chinese Restaurant 0.07
- 1 Asian Restaurant 0.07
- 2 Ice Cream Shop 0.05
- 3 Japanese Restaurant 0.05
- 4 Noodle House 0.05

----SERANGOON MRT STATION (NE12)----

venue freq

- 0 Chinese Restaurant 0.10
- 1 Clothing Store 0.05
- 2 Japanese Restaurant 0.05
- Noodle House 0.05
- 4 Fast Food Restaurant 0.05

----SIMEI MRT STATION (EW3)----

venue freq

- 0 Japanese Restaurant 0.10
- 1 Shopping Mall 0.10
- 2 Chinese Restaurant 0.10
- 3 Coffee Shop 0.10

4 Dim Sum Restaurant 0.05

----SIXTH AVENUE MRT STATION (DT7)---venue freq 0 Indian Restaurant 0.10 Building 0.07 1 2 Bakery 0.07 3 Food Court 0.07 Coffee Shop 0.07 ----SOMERSET MRT STATION (NS23)---venue freq 0 Japanese Restaurant 0.08 Hotel 0.06 Clothing Store 0.06 3 Wine Bar 0.06 Shopping Mall 0.04 ----SOO TECK LRT STATION (PW7)---venue freq 0 Market 0.5 Food Court 0.5 1 2 Other Great Outdoors 0.0 Park 0.0 4 Paper / Office Supplies Store 0.0 ----SOUTH VIEW LRT STATION (BP2)---venue freq 0 Fast Food Restaurant 0.14 Food Court 0.07 1 Lottery Retailer 0.07 3 Furniture / Home Store 0.07 Shoe Store 0.07 ----STADIUM MRT STATION (CC6)---venue freq Stadium 0.06 Coffee Shop 0.04 2 Japanese Restaurant 0.04 3 Frozen Yogurt Shop 0.04 Supermarket 0.04 ----STEVENS MRT STATION (DT10)---venue freq 0 Diner 0.25 1 Italian Restaurant 0.12 Bus Station 0.12 Café 0.12 Sandwich Place 0.12 ----SUMANG LRT STATION (PW6)---venue freq 0 Japanese Restaurant 0.09 Café 0.06

2 Chinese Restaurant 0.06

- Food Court 0.06 3 Market 0.06 ----TAI SENG MRT STATION (CC11)---venue freq 0 Chinese Restaurant 0.14 Café 0.12 1 2 Food Court 0.09 3 Seafood Restaurant 0.07 Coffee Shop 0.07 ----TAMPINES EAST MRT STATION (DT33)---venue freq Coffee Shop 0.15 Optical Shop 0.05 Rock Club 0.05 Betting Shop 0.05 4 Food & Drink Shop 0.05 ----TAMPINES MRT STATION (DT32)---venue freq Café 0.08 0 Bakery 0.08 1 Pharmacy 0.04 3 Bubble Tea Shop 0.04 Gym 0.04 ----TAMPINES MRT STATION (EW2)---venue freq Bakery 0.08 0 Café 0.08 1 Bubble Tea Shop 0.06 2 3 Chinese Restaurant 0.04 Thai Restaurant 0.04 ----TAMPINES WEST MRT STATION (DT31)---venue freq Halal Restaurant 0.11 Coffee Shop 0.11 2 Fast Food Restaurant 0.11 3 Pool 0.06 4 Gym 0.06 ----TAN KAH KEE MRT STATION (DT8)---venue freq Café 0.14 Shopping Mall 0.07 Coffee Shop 0.07 3 Spanish Restaurant 0.07 4 Thai Restaurant 0.07
- ----TANAH MERAH MRT STATION (EW4)----

venue freq

0 Noodle House 0.17

1 Indian Restaurant 0.17

- 2 Coffee Shop 0.08
- 3 Dessert Shop 0.08
- 4 Flower Shop 0.08

----TANJONG PAGAR MRT STATION (EW15)----

venue freq

- 0 Japanese Restaurant 0.12
- 1 Coffee Shop 0.10
- 2 Bakery 0.08
- 3 Ramen Restaurant 0.06
- 4 Hotel 0.06

----TECK LEE LRT STATION (PW2)----

venue freq

- 0 Light Rail Station 0.12
- 1 Fast Food Restaurant 0.12
- 2 Yoga Studio 0.06
- 3 Pool 0.06
- 4 Park 0.06

----TECK WHYE LRT STATION (BP4)----

venue freq

- 0 Bus Station 0.24
- 1 Light Rail Station 0.06
- 2 Hotel 0.06
- 3 Gym 0.06
- 4 Grocery Store 0.06

----TELOK AYER MRT STATION (DT18)----

venue freq

- Restaurant 0.08
- 1 Japanese Restaurant 0.08
- 2 Korean Restaurant 0.08
- 3 Café 0.06
- 4 Wine Bar 0.06

----TELOK BLANGAH MRT STATION (CC28)----

venue freq

- Food Court 0.09
- 1 Chinese Restaurant 0.09
- 2 Yoga Studio 0.04
- 3 Board Shop 0.04
- 4 Market 0.04

----TEN MILE JUNCTION LRT STATION (BP14)----

venue freq

- 0 Café 0.08
- 1 Sushi Restaurant 0.08
- 2 Fast Food Restaurant 0.08
- 3 Shopping Mall 0.05
- 4 Asian Restaurant 0.05

----THANGGAM LRT STATION (SW4)----

venue freq

0 Dessert Shop 0.08

- 1 Coffee Shop 0.08 2 Cupcake Shop 0.08
- 3 Noodle House 0.08
- 4 Steakhouse 0.08

----TIONG BAHRU MRT STATION (EW17)----

venue freq

- 0 Chinese Restaurant 0.25
- 1 Coffee Shop 0.14
- 2 Bakery 0.07
- 3 Japanese Restaurant 0.07
- Food Court 0.07

----TOA PAYOH MRT STATION (NS19)----

venue freq

- 0 Coffee Shop 0.14
- 1 Snack Place 0.11
- 2 Food Court 0.07
- 3 Dessert Shop 0.07
- 4 Steakhouse 0.04

----TONGKANG LRT STATION (SW7)----

venue freq

- 0 Bus Station 0.4
- 1 Basketball Court 0.2
- 2 Bookstore 0.2
- 3 Athletics & Sports 0.2
- 4 ATM 0.0

----TUAS CRESCENT MRT STATION (EW31)----

venue freq

- 0 Business Service 0.25
- 1 Food Truck 0.25
- 2 Cafeteria 0.25
- 3 Harbor / Marina 0.25
- 4 Noodle House 0.00

----TUAS LINK MRT STATION (EW33)----

venue freq

- 0 Sports Club 0.14
- 1 Train Station 0.14
- 2 Gastropub 0.14
- 3 Bus Station 0.14
- 4 Chinese Restaurant 0.14

----TUAS WEST ROAD MRT STATION (EW32)----

venue freq

- 0 Malay Restaurant 1.0
- 1 Other Great Outdoors 0.0
- Park 0.0
- 3 Paper / Office Supplies Store 0.0
- 4 Pakistani Restaurant 0.0

----UBI MRT STATION (DT27)----

venue freq

```
0
     Food Court 0.23
     Bus Station 0.15
2 Asian Restaurant 0.15
     Restaurant 0.08
4 Lighting Store 0.08
----UPPER CHANGI MRT STATION (DT34)----
      venue freq
0
       Pool 0.15
     Bus Stop 0.15
1
2 Bus Station 0.15
3 Metro Station 0.08
4 Coffee Shop 0.08
----WOODLANDS MRT STATION (NS9)----
         venue freq
0 Japanese Restaurant 0.08
      Coffee Shop 0.06
2
          Café 0.06
  Electronics Store 0.04
3
   Mobile Phone Shop 0.04
----WOODLANDS MRT STATION (TE2)----
         venue freq
0 Japanese Restaurant 0.08
          Café 0.06
  Electronics Store 0.04
3
     Shopping Mall 0.04
4
      Coffee Shop 0.04
----WOODLANDS SOUTH MRT STATION (TE3)----
         venue freq
0
       Food Court 0.33
       Video Store 0.17
1
          Trail 0.17
3 Gym / Fitness Center 0.17
          Park 0.17
----WOODLEIGH MRT STATION (NE11)----
       venue freq
      Nightclub 0.09
1 Asian Restaurant 0.09
        Track 0.09
2
3
       Theater 0.09
   Metro Station 0.09
----YEW TEE MRT STATION (NS5)----
         venue freq
```

0 Fast Food Restaurant 0.22

- 1 Sandwich Place 0.11
- 2 Japanese Restaurant 0.11
- 3 Diner 0.11
- 4 Café 0.11

----YIO CHU KANG MRT STATION (NS15)----

- venue freq Food Court 0.14
- 1 Chinese Restaurant 0.14
- 2 Seafood Restaurant 0.073 College Auditorium 0.07
- Gym 0.07 4

----YISHUN MRT STATION (NS13)----

venue freq

- 0 Chinese Restaurant 0.08
- Food Court 0.06
- 2 Italian Restaurant 0.04
- Grocery Store 0.04
- Coffee Shop 0.04