Data

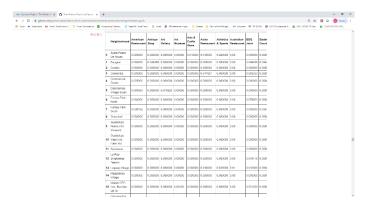
To start, a list of Zip Codes of Makati is needed. A complete list of the Zip Codes of Philippine cities appears on Wikipedia (https://en.wikipedia.org/wiki/List of ZIP codes in the Philippines). Using Makati's Neighborhood Zip Codes, we can lookup their corresponding geo coordinates.

| | City | ZipCode | Neighborhood | Latitude | Longitude |
|---|-------------|---------|---------------------------------|-----------|------------|
| 0 | Makati City | 1200 | Makati CPO (Inc, Buendia Up To | 14.561608 | 121.014653 |
| 1 | Makati City | 1203 | San Antonio Village (Inc. Malu) | 14.563281 | 121.012607 |
| 2 | Makati City | 1204 | La Paz-Singkamas-Tejeros | 14.568549 | 121.008594 |
| 3 | Makati City | 1205 | Sta. Cruz | 14.567455 | 121.015539 |
| 4 | Makati City | 1206 | Kasilawan | 14.576348 | 121.014462 |

With these, nearby venues can be gathered from Foursquare.com.

| | name | categories | lat | Ing |
|---|-----------------------------|---------------------|-----------|------------|
| 0 | Ayala Triangle Gardens | Park | 14.556471 | 121.023204 |
| 1 | Banapple Pies & Cheesecakes | Restaurant | 14.556634 | 121.023619 |
| 2 | The Peninsula Manila | Hotel | 14.555066 | 121.025466 |
| 3 | Escolta | Filipino Restaurant | 14.555485 | 121.025509 |
| 4 | Little Flour Café | Café | 14.557978 | 121.021919 |

Grouping these by Neighborhood and getting the frequency of each venue type gives the following table which can be used for K-Means clustering.



To add Subway proximity as a factor, we need the subway stations identified on this page (https://businessmirror.com.ph/2019/10/30/makati-subway-project-gets-additional-332-million-initial-funding/). Their geo coordinates can be obtained using Google Maps.

| _ | | | |
|---|----------------------|----------|-----------|
| | Station | Latitude | Longitude |
| 0 | EDSA-Ayala | 14.55093 | 121.02883 |
| 1 | Ayala Triangle | 14.55671 | 121.02281 |
| 2 | Makati Central Park | 14.56215 | 121.01494 |
| 3 | Police Headquarters | 14.56356 | 121.01524 |
| 4 | Circuit City | 14.57305 | 121.01946 |
| 5 | Makati City Hall | 14.57081 | 121.02728 |
| 6 | Rockwell | 14.56324 | 121.03580 |
| 7 | Guadalupe | 14.56741 | 121.04542 |
| 8 | University of Makati | 14.56397 | 121.05575 |
| 9 | Ospital ng Makati | 14.54681 | 121.06176 |

Using these coordinates, we can compute the shortest distances of each neighborhood to any of the stations to get this:

| Neighborhood | Distance |
|---------------------------------|------------|
| Makati CPO (Inc, Buendia Up To | 67.475320 |
| San Antonio Village (Inc. Malu) | 280.839332 |
| La Paz-Singkamas-Tejeros | 904.242772 |
| Sta. Cruz | 432.163349 |
| Kasilawan | 650.561473 |

Adding the Distance as a column to the frequency table produced earlier, a second clustering can be generated and compared to the previous one.