Analysis of Place for Opening Coto Makassar Restaurant in Makassar, Indonesia

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Introduction

This project will look for the optimal location to open an Makassar indigenous food restaurant, i.e. Coto Makassar. This analysis will be helpful for business people or stakeholders who are interested in opening a Coto Makassar restaurant in Makassar, Indonesia.

Based on information on the website of the South Sulawes Provincial Government, Makassar is the capital of South Sulawesi province and one of the metropolitan cities in Indonesia. Makassar is the fourth largest city in Indonesia and the largest in Eastern Indonesia.[1]

Makassar is also famous for having many indigenous foods. One of the most popular is Coto Makassar. Through this project, we will visualize which areas in Makassar where are the existing Coto Makassar restaurant. Then, we will determine which areas are rarely found Coto Makassar restaurants. This area would be suitable for opening a Coto Makassar restaurant with little competition. We will also map areas that have the same characteristics using a cluster model based on demographic data from each region. Through this analysis, we hope that it can help business people or stakeholders in making decisions to open a Coto Makassar restaurant.

Data

Based on the business problems, the data we need are:

- The latitude and longitude of city, borough, and particular venues.
- List of Competitor Venues. especially Coto Makassar restaurants, Soup Place, and Indonesian Restaurants.
- List of Complementary Venues. tourism and related places.

We can find the coordinates of each sub-district from the Geographic Information System Portal, Directorate General of Population and Civil Registration. This portal is a government

owned page, under the Ministry of Home Affairs of the Republic of Indonesia. Furthermore, we can find the central coordinates of Makassar from the Opencage API.

We can find a list of Competitor Venues and Complementary Venues through the Foursquare API. We'll be looking for a category that matches the venues category provided by the foursquare API. A list of venue categories provided by the Foursqare API can be seen here: https://developer.foursquare.com/docs/build-with-foursquare/categories/

Coto Makassar is a indigenous food from Makassar. If we want to open a Coto Makassar restaurant, then Indonesian restaurants and other Coto Makassar restaurants will be our competitors. Coto Makassar is a type of soup food, so places that sell other soup foods will also be competitors. Based on that, we can search for categories that match the above criteria in the foursquare API. These categories are as follows:

- Indonesian Restaurant (4deefc054765f83613cdba6f)
- Soup Place (4bf58dd8d48988d1dd931735)

There is no category for Coto Restaurant, but most restaurants that sell Coto Makassar will embed the word 'coto' in the name of the restaurant. So we will use the query 'coto' to find the Coto Makassar restaurant.

Places to sell indigenous food are also a destination for tourists to find out the uniqueness of the places they visit. So, many tourists make Coto Makassar a culinary tour. So, the area around tourist destinations can be a profitable place for the Coto Makassar restaurant. Here are the categories in the foursquare API that fit these criteria:

- Event (4d4b7105d754a06373d81259
- Travel & Transport (4d4b7105d754a06379d81259)
- Outdoors & Recreation (4d4b7105d754a06377d81259)

Methodology

The geospatial data found in the Geographic Information System Portal contains all the coordinates of boroughs in Indonesia. We only need data from boroughs in Makassar, so we sort the data and only take boroughs in Makassar.

Table 1. The coordinates of longitude lines per borough in Makassar

No.	Borough	Latitude	Longitude
0	MARISO	-5.159093	119.409226
1	MAMAJANG	-5.164346	119.419383
2	TAMALATE	-5.183735	119.423737
3	RAPPOCINI	-5.173330	119.446951
4	MAKASSAR	-5.147665	119.432731
5	UJUNG PANDANG	-5.147665	119.432731
6	WAJO	-5.125586	119.410677
7	BONTOALA	-5.130839	119.420834

8	UJUNG TANAH	-5.047907	119.327939
9	TALLO	-5.118588	119.435344
10	PANAKKUKANG	-5.145660	119.446951
11	MANGGALA	-5.167247	119.475963
12	BIRING KANAYA	-5.091202	119.522372
13	TAMALANREA	-5.093523	119.475963
	MAKASSAR	**-5.134296**	**119.412428**

Next, we collect 100 competitor and tourist and related venues that are in the vicinity of each borough with a radius of 2 km. We collect all venues from the Foursquare API. We visualize all these venues using Folium to see the distribution of all locations..

Picture 1. Visualize Area of Competitor Venues and Tourism and Related Places

Some of the competitors' venues appear to be crowded around tourist areas. However, it seems that there are still some areas where there are few business competitors in the tourist area. Some of these places can be a great choice to open a Coto Makassar restaurant.

Next, we will analyze the clusters that can be used as supporting data to determine the choice of clusters according to the decisions of business people and stakeholders.

Cluster

Before classifying all venues, we first combine them in one dataframe and then apply One-Hot Encode to each venue category. Then, we grouped each venue by borough and took the average of the frequency of occurrence of each category.

After the dataframe is ready, we begin to classify it using the K-Means method by dividing it into 7 clusters. Based on the elbhow method, we know that 7 clusters are the optimum clusters of K-Means.

Graph 1. The Elbow Method Showing The Optimal K
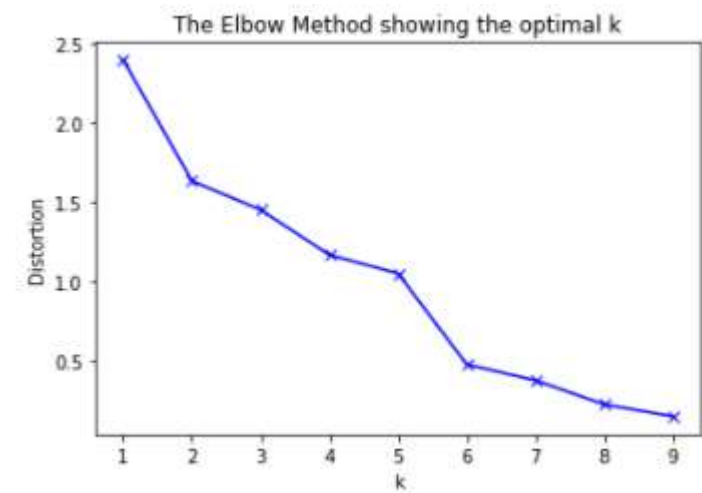
Next, we visualize the top five most venue categories in each borough and cluster label through folium.

Picture 2. Visualize the resulting clusters
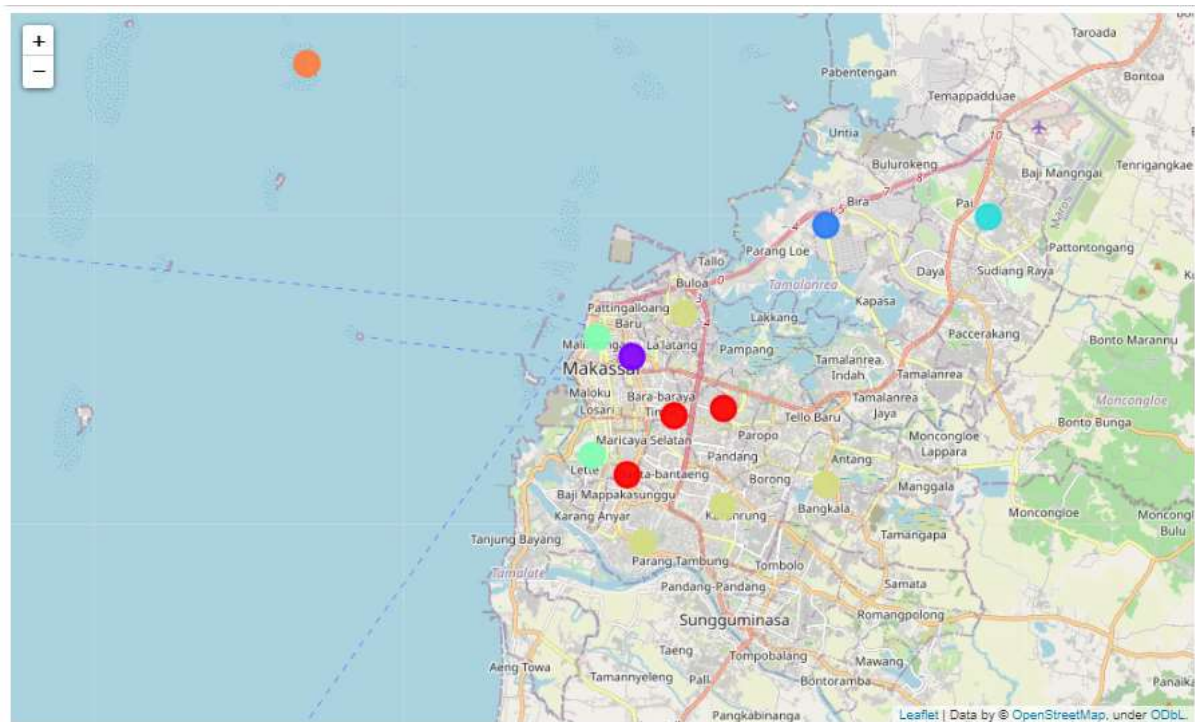
Examine Clusters

Table 2. Cluster 0.0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
2	TAMALATE	0.0	Coto Restaurant	Indonesian Restaurant	Outdoors and Recreation	Travel and Transport	Soup Place
3	RAPPOCINI	0.0	Coto Restaurant	Indonesian Restaurant	Soup Place	Outdoors and Recreation	Travel and Transport
9	TALLO	0.0	Coto Restaurant	Indonesian Restaurant	Outdoors and Recreation	Travel and Transport	Soup Place
11	MANGGALA	0.0	Coto Restaurant	Indonesian Restaurant	Outdoors and Recreation	Travel and Transport	Soup Place

Table 3. Cluster 1.0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
8	UJUNG TANAH	1.0	Outdoors and Recreation	Travel and Transport	Soup Place	Indonesian Restaurant	Event Place

Table 4. Cluster 2.0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	MAMAJANG	2.0	Coto Restaurant	Outdoors and Recreation	Travel and Transport	Indonesian Restaurant	Soup Place
4	MAKASSAR	2.0	Coto Restaurant	Outdoors and Recreation	Travel and Transport	Indonesian Restaurant	Soup Place
10	PANAKKUKANG	2.0	Coto Restaurant	Outdoors and Recreation	Soup Place	Indonesian Restaurant	Travel and Transport

Table 5. Cluster 3.0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
7	BONTOALA	3.0	Coto Restaurant	Travel and Transport	Soup Place	Outdoors and Recreation	Indonesian Restaurant

Table 6. Cluster 4.0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
13	TAMALANREA	4.0	Travel and Transport	Outdoors and Recreation	Coto Restaurant	Indonesian Restaurant	Soup Place

Table 7. Cluster 5.0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
12	BIRING KANAYA	5.0	Indonesian Restaurant	Outdoors and Recreation	Coto Restaurant	Travel and Transport	Soup Place

Table 8. Cluster 6.0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	MARISO	6.0	Coto Restaurant	Travel and Transport	Outdoors and Recreation	Soup Place	Indonesian Restaurant
6	WAJO	6.0	Coto Restaurant	Travel and Transport	Outdoors and Recreation	Soup Place	Indonesian Restaurant

Results

Previously, we had determined that the Coto Makassar restaurant, soup place, and Indonesian restaurant were competitors' businesses, so we did not open a Coto restaurant close to them. Instead, we should open a coto restaurant near tourist areas and related places because it is an advantage for the coto restaurant business.

Of the 14 borough, there are many tourist areas and related venues. Most of them are already busy with Indonesian restaurants, including Coto Makassar restaurant. However, it seems that there are still some quiet tourist areas with Coto Makassar restaurants and even Indonesian restaurants.

After we carried out the classification method using the k-mean method, the sub-districts were divided into 7 clusters.

Discussion

Through map visualization and classification methods, we can see that there are 2 clusters that are still quiet with competitors' businesses. This cluster is the most optimal for opening a Coto Makassar restaurant, namely clusters 0 and 3.

Furthermore, there are 2 clusters that must be avoided to open a Coto restaurant, because in this cluster there are already many Coto Makassar restaurants and Indonesian restaurants. The clusters are clusters 1 and 5.

The remaining clusters, namely clusters 2, 4, and 6 can still be considered for opening a coto restaurant, because it can be seen that in this cluster there are many tourist areas and there are still competitor businesses, but not many.

Conclusion

For business people and stakeholders who are interested in opening a coto restaurant in Makassar, we can recommend clusters 0 and 3. This cluster has little competition and has many tourist areas and related places, so this cluster is the optimal place to open a coto restaurant.