Cluster Analysis of Food Service Business in Bangkok, Thailand

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3 November 2020

Introduction

Background

Bangkok is Thailand's capital. It is one of major ASEAN capitals, with population reaching 70 million. Thailand has been a famous for tourist destination for decades. Tourism plays very important role in economic development in Thailand. It's accounted for approximately 18% of GDP. And Bangkok is the most famous tourist destination

Food service industry is a major player in Thailand's tourism industry. Ones can find any kinds of cuisine from any corners of the world in any price ranges in Bangkok only.

Geographically, there are 50 districts in Bangkok. Each district has unique social and cultural characteristics and has their own tourist destination attributes.

Tourism of Thailand (ToT) is responsible for developing programs and campaigns to support and promote tourism in Thailand.

Business Problem

1. How food service clusters in districts of Bangkok?
2. What are the characteristics of food service in districts in Bangkok?
3. If an entrepreneur plans to invest in a food service business, for example, a Thai restaurant, which district is the best location?
4. If a tourist wants to find a good district to visit for a kind of cuisine, which district should they visit?

Data acquisition and cleaning

Data Sources

There are 2 data sources used in this project, as follows:

1. Foursquare Place API to extract food service places in Bangkok.
2. Geo-location data of districts in Thailand from https://github.com/rathpanyowat/Thai-zip-code-latitude-and-longitude/blob/master/data.json

Data Cleaning

The acquired district geo-location data is in JSON format. The coverage is the whole country. The data has been filtered for districts in Bangkok only. And the district names are in Thai language. Google Translator package (googletrans) has been used to translate the district name from Thai into English.

Methodology

1. Process geo-location data
    a. Retrieve Thailand's district geo-location data from
        https://github.com/rathpanyowat/Thai-zip-code-latitude-and-longitude/blob/master/data.json
    b. Convert JSON data into Panda dataframe.
    c. Process the data by creating coordination field using latitude and longitude field.
    d. Filter only district in Bangkok.
    e. Examine the data on the map using folium package to see if the data is ok.
2. Collect Restaurant data using Foursquare Place API
    a. Retrieve venue from Foursquare using Foursquare Place API in the proximity of 5 km. around the district points (the limitation for free account is 50 venues).
    b. Filter the venues that are not food service business out.
    c. Create a crosstab of numbers of each kind of food service business by district
3. Cluster Analysis
    a. Perform K-mean Cluster Analysis with k = 6 to identify cluster of district with the same characteristic of food service business using the data from crosstab created earlier.
    b. Create bar charts for each cluster to examine the characteristic of food service business in each cluster.

Results

Figure 1 demonstrates the clusters of food service business in Bangkok, Thailand. The clusters seem not to adhere to any geographic area of Bangkok.

Figure 2 suggests that, according to the Foursquare data, there are dominated characteristics of food service business in each clusters.

- Cluster 0 seems to consist of most kinds of food services.
- Cluster 1 is where noodle houses are clustered
- Cluster 2 is dominated by coffee shop
- Cluster 3 is good for Chinese restaurant
- Cluster 4 is clustered with Thai restaurant
- Cluster 5 is a good place to find icecream shop

Figure 1: Cluster Analysis of Food Service Business in Bangkok, Thailand
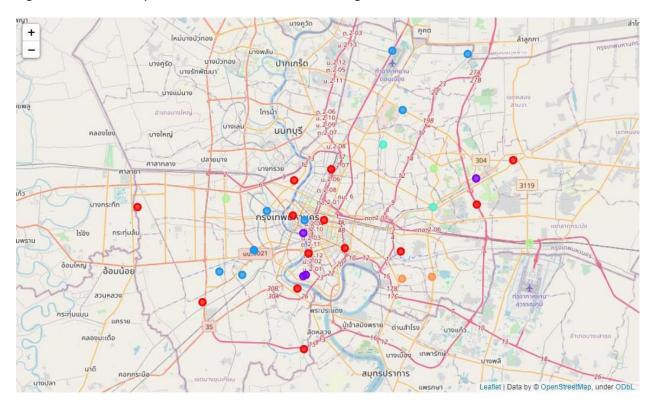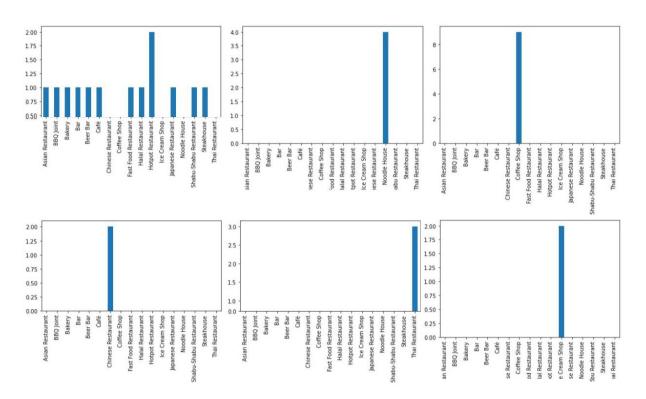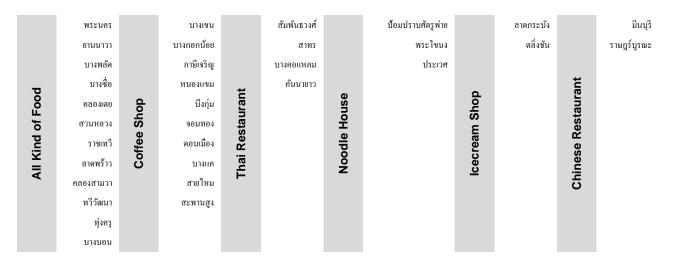

Figure 2: Characteristics of Food Service Business in Clusters

According to Table 1,

- 12 districts are in Cluster 0 (All Kind of Food),
- 10 districts are in Cluster 2 (Coffee Shop),
- 4 districts are in Cluster 4 (Thai Restaurant,
- 3 districts are in Cluster 1 (Noodle House),
- 2 districts are in Cluster 3 and 5 (Chinese Restaurant, and Icecream Shop),

Table 1: List of Districts in Clusters

All Kind of Food	Coffee Shop	Thai Restaurant	Noodle House	Icecream Shop	Chinese Restaurant
พระนคร	บางเขน	สัมพันธวงศ์	ป้อมปราบศัตรูพ่าย	ลาดกระบัง	มีนบุรี
ยานนาวา	บางกอกน้อย	สาทร	พระโขนง	ตลิ่งชัน	ราษฎร์บูรณะ
บางพลัด	ภาษีเจริญ	บางคอแหลม	ประเวศ		
บางซื่อ	หนองแขม	คันนายาว			
คลองเตย	บึงกุ่ม				
สวนหลวง	จอมทอง				
ราชเทวี	ดอนเมือง				
ลาดพร้าว	บางแค				
คลองสามวา	สายไหม				
ทวีวัฒนา	สะพานสูง				
ทุ่งครุ					
บางบอน					

Discussion

According to the results, if ToT were to develop campaigns to promote food tourism in Bangkok, here are some suggestions extracted from the analysis:

1. Bangkok - The City of World Cuisine. This campaign is to promote variety of food cultures in Bangkok. The campaign can be implemented in the district in cluster 0.
2. Good Morning Coffee. This campaign is to promote coffee shop, café, roaster house in Bangkok in the district in cluster 2.
3. Experience Authentic Thai Cuisine. This campaign will be implemented in cluster 4 to promote authentic Thai cuisine.

However, there is room for improvement. First of all, the data acquired via Foursquare Place API is limited to 50 venues for free account. The analysis would perform much better if there is no limitation. Qualitative data should be included in the analysis.