Coursera Capston

Opening a new parking lot in Taipei

Chia-Ling Hsu

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Introduction

Taipei, officially Taipei City, is the capital of Taiwan. Located in northern Taiwan, with a total population of about 2,646,204 and density of 9,700/km². In term of transportation, Private transport consists of motor scooters, private cars, taxi cabs, and bicycles. According to the statistics of Environmental Protection Administration, Executive Yuan. The quantity of Moto-scooters and vehicles in Taipei totaled 1,762,262 unit in 2017 and car sales totaled 435,135 units in 2018, sale of imported cars increased by an annual 6.3 percent to 197,281 units, accounting for 45.3 percent of the total. Most of the people who lives in Taipei is hard to find a parking spot when they go for a ride. Therefore, Open a new parking lot become one of the way to solve the pain spot. As with any business decision, opening a new parking lot requires serious consideration, rule out the factors of competitors or analysis of economic conditions, the location of the parking lot is one of the most important decision that may determine the success or failure.

Business Problem

The objective of the capstone project is to analysis and find a best locations in Taipei city, Taiwan to open a new parking lot. The business problem would be : in the Taipei city, which area would you recommend if you want to open a new parking spot.

Target Audience

The project is particularly useful to property developers and investors who are looking for new investment target or long-term investment.

Downloading and prepping Data

To provide the stakeholders the necessary information, we will need the following data:

- List of district in Taipei City. This information help us to know the whole picture of the Taipei in geographical way, at last, select a best location.

	區名	面積（km²）	下轄里數	下轄鄰數	人口數	人口消長	人口密度（人/km²）	郵遞區號	區花	0
0	中正區	7.6071	31	580	157,743	-271	20,736	100	木棉花	Zhongzheng
1	大同區	5.6815	25	521	125,909	-134	22,161	103	茶花	Datong
2	中山區	13.6821	42	869	227,266	-121	16,610	104	蝴蝶蘭	Zhongshan
3	松山區	9.2878	33	763	204,043	-150	21,969	105	朱槿	Songshan
4	大安區	11.3614	53	1,022	307,526	-105	27,068	106	波斯菊	Daan
5	萬華區	8.8522	36	723	186,848	-228	21,108	108	白牡丹	Wanhua
6	信義區	11.2077	41	904	219,744	-277	19,607	110	野牡丹	Xinyi
7	士林區	62.3682	51	995	283,282	-177	4,542	111	玫瑰花	Shilin
8	北投區	56.8216	42	827	253,155	-164	4,455	112	櫻花	Beitou
9	內湖區	31.5787	39	906	285,526	-269	9,042	114	九重葛	Neihu
10	南港區	21.8424	20	452	120,161	-136	5,501	115	桂花	Nangang
11	文山區	31.5090	43	1,002	271,674	-132	8,622	116	杏花	Wenshan

- Latitude and longitude coordinates of those neighbourhoods which help us to find the accurate location in the map. (Foursquare API)

	District	Latitude	Longitude	VenueName	VenueLatitude	VenueLongitude	VenueCategory
0	Zhongzheng	25.094625	121.522533	華榮街菜市場	25.094891	121.523713	Farmers Market
1	Zhongzheng	25.094625	121.522533	以利泡泡冰（士林本店）	25.094873	121.523737	Ice Cream Shop
2	Zhongzheng	25.094625	121.522533	Cha for Tea (喫茶趣)	25.094877	121.528528	Tea Room
3	Zhongzheng	25.094625	121.522533	誠品士林店 Eslite Bookstore	25.092952	121.525952	Bookstore
4	Zhongzheng	25.094625	121.522533	Taipei Children's Amusement Park (台北市立兒童新樂園)	25.097059	121.515427	Theme Park

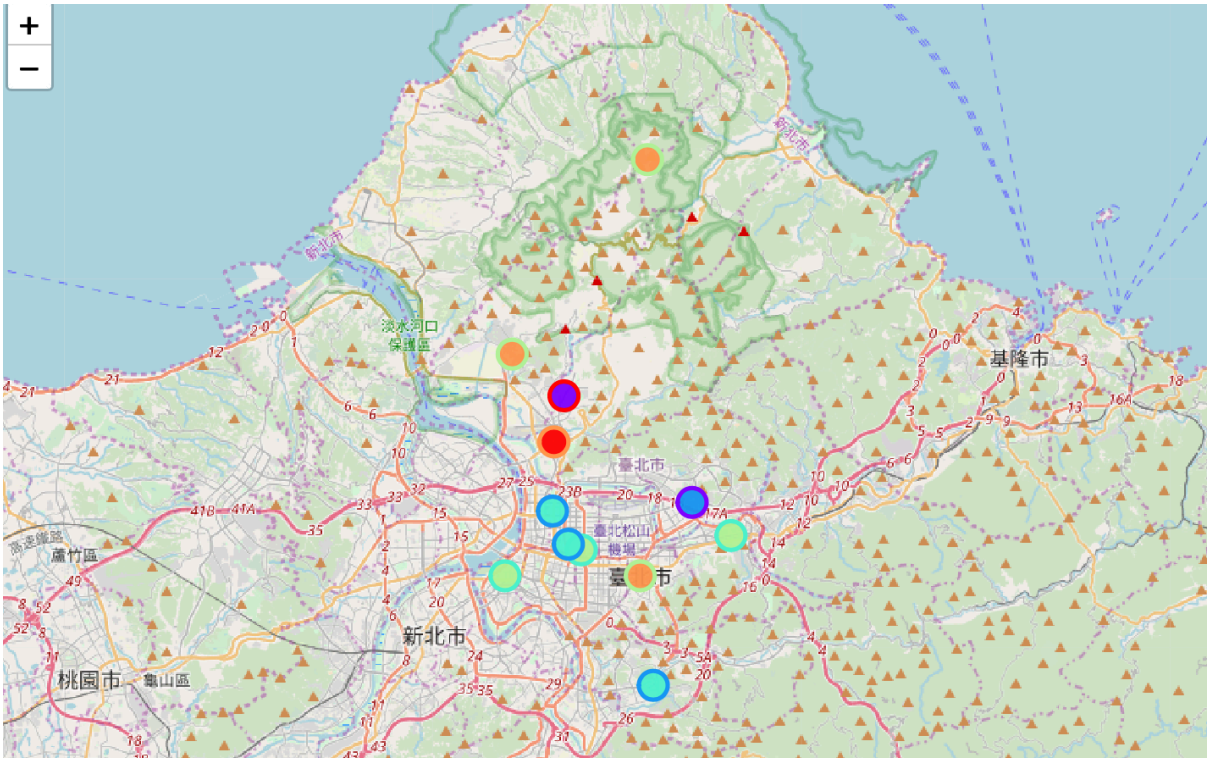
- Venue data, latitude and longitude coordinates of parking lot in Taipei.

	name	Latitude	longitude	address	area	area_eng	area_latitude	area_Longitude	parking_lot
0	府前廣場地下停車場	25.03648987	121.5621068	松壽路1號地下	信義區	Xinyi	25.11477	121.52752	parking_lot
1	松壽廣場地下停車場	25.036966	121.565523	松智路75號地下	信義區	Xinyi	25.11477	121.52752	parking_lot
2	臺北市災害應變中心地下停車場	25.028728	121.566111	莊敬路391巷11弄2號地下	信義區	Xinyi	25.11477	121.52752	parking_lot
3	雅祥公園地下停車場	25.04754574	121.5716298	松隆路123巷7號地下	信義區	Xinyi	25.11477	121.52752	parking_lot
4	立農公園地下停車場	25.118127	121.502995	承德路7段372號地下	北投區	Beitou	25.13289	121.50253	parking_lot

Sources of data

latitude and longitude coordinates of parking lot in Taipei : https://taipeicity.github.io/traffic_realtime/

Taipei Neighborhoods' is publicly available at this website: https://en.wikipedia.org/wiki/Taipei



Results and Discussion

A visual analysis of the clusters shows that cluster 0 has one districts with high population density. In addition, Zhongzheng district do not have parking lot in the top ten most common venues.

It would be my advice to target these areas for opening a new parking slot. As

Cluster 0

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面積 (km²)	District	面積 (km²)	下轄里數	下轄鄰數	人口數	人口消長	人口密度 (人/km²)	郵遞區號	區花	area_latitude	area_Longitude	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
i071	Zhongzheng	7.6071	31	580	157,743	-271	20,736	100	木棉花	25.094625	121.522533	Café	parking_lot	Breakfast Spot	Chinese Restaurant	Ice Cream Shop	Hotel	Hotpot Restaurant	Food Truck	Supermarket	Taiwanese Restaurant

we can see, market of parking lot has already almost saturated. high density, small area are to key to expand market of parking lot, but seem most of the district got top one in the top most common venues.

	District	面積 (km²)	下轄里數	下轄鄰數	人口數	人口消長	人口密度 (人/km²)	郵遞區號	區花	area_latitude	area_Longitude	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
0	Zhongzheng	7.6071	31	580	157,743	-271	20,736	100	木棉花	25.094625	121.522533	Café	parking_lot	Breakfast Spot	Chinese Restaurant	Ice Cream Shop	Hotel	Hotpot Restaurant	Food Truck	Supermarket
1	Datong	5.6815	25	521	125,909	-134	22,161	103	茶花	25.065320	121.521500	Hotel	parking_lot	Taiwanese Restaurant	Hotpot Restaurant	Dessert Shop	Coffee Shop	Japanese Restaurant	Chinese Restaurant	Café
2	Zhongshan	13.6821	42	869	227,266	-121	16,610	104	蝴蝶蘭	25.048410	121.535640	parking_lot	Chinese Restaurant	Hotel	Japanese Restaurant	Taiwanese Restaurant	Noodle House	Coffee Shop	Seafood Restaurant	Bakery
3	Songshan	9.2878	33	763	204,043	-150	21,969	105	朱槿	25.216750	121.567200	parking_lot	Farmers Market	French Restaurant	Food Truck	Food Stand	Food Court	Flower Shop	Fish Market	Fast Food Restaura
4	Daan	11.3614	53	1,022	307,526	-105	27,068	106	波斯菊	25.037370	121.563550	parking_lot	Department Store	Café	Dessert Shop	Cocktail Bar	Hotel	Hotpot Restaurant	Bakery	Chine Restaura
5	Wanhua	8.8522	36	723	186,848	-228	21,108	108	白牡丹	25.036940	121.499440	parking_lot	Taiwanese Restaurant	Noodle House	Café	Coffee Shop	Hotpot Restaurant	Hostel	Historic Site	Hotel
6	Xinyi	11.2077	41	904	219,744	-277	19,607	110	野牡丹	25.114770	121.527520	parking_lot	Convenience Store	Chinese Restaurant	Coffee Shop	Café	Park	Supermarket	Thai Restaurant	Pizza Place
7	Shilin	62.3682	51	995	283,282	-177	4,542	111	玫瑰花	25.050510	121.529290	parking_lot	Hotel	Chinese Restaurant	Japanese Restaurant	Coffee Shop	Taiwanese Restaurant	Café	Hotpot Restaurant	Breakfast Spot
8	Beitou	56.8216	42	827	253,155	-164	4,455	112	櫻花	25.132890	121.502530	parking_lot	Hotel	Hot Spring	Convenience Store	Noodle House	Park	Coffee Shop	Resort	Café
9	Neihu	31.5787	39	906	285,526	-269	9,042	114	九重葛	25.069090	121.588470	Convenience Store	parking_lot	Coffee Shop	Japanese Restaurant	Café	Chinese Restaurant	Noodle House	Supermarket	Sushi Restaurant
10	Nangang	21.8424	20	452	120,161	-136	5,501	115	桂花	25.054370	121.606810	Convenience Store	Coffee Shop	parking_lot	Fast Food Restaurant	Noodle House	Hotel	Bakery	Café	Park
11	Wenshan	31.5090	43	1,002	271,674	-132	8,622	116	杏花	24.989740	121.569630	Convenience Store	parking_lot	Coffee Shop	Zoo Exhibit	Chinese Restaurant	Café	Bus Stop	Cable Car	Japanese Restaurant

Room for Improvement

in this project, we only see feature like district area, population or top common venue to decide which area is best place to open new parking lot, but the truth is that it needs to look through more feature to determine which place is the best. if we really need to find out more possibility, we should find more venue data, and sales volumn of car in every month with differnet district, then we can use those data to predict which place will need more parking lot in futre 3 years.