Capstone Project - The Battle of Neighborhoods (Week 2)

Restaurant guide information for sightseers

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1.Introduction where you discuss the business problem and who would be interested in this project.

National Chi Nan University is a research-intensive university in Pu Li, Taiwan. The university nearly famous attraction “Sun Moon Lake” and a lot of foreign sightseers visiting. Chi Nan University has the beautiful campus and opens to visit the general Public.

The school side hope that more public and foreign sightseers visit campus, but campus have not enough restaurant, sightseers must go to Pu Li town look for restaurant, The school side want to make restaurant guide information for foreign sightseers and want to know restaurant style, address, telephone number on school around, of course, foreign sightseers don’t want to eat McDonald's or fast food restaurant, so the school side hope collect Taiwanese cuisine restaurant, Chinese cuisine restaurant and Taiwan tea restaurant information, the information will help sightseers looking for own interested restaurant style and improve visit willingness.

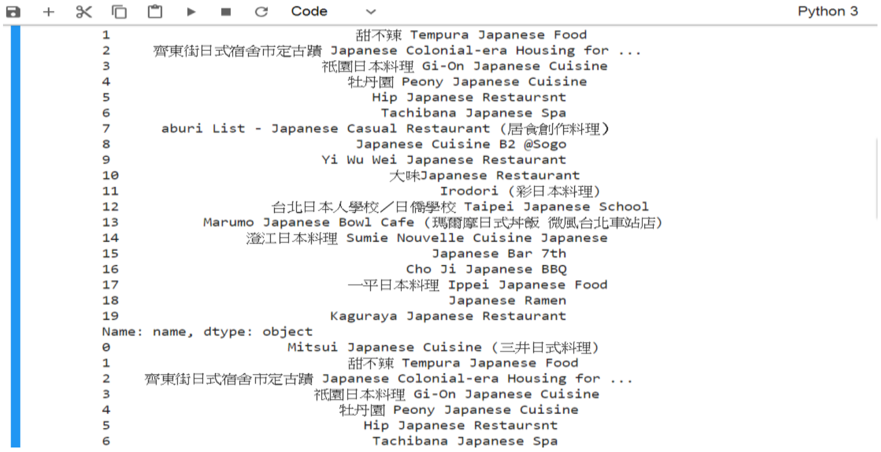
2.describe the data

In the project, I will use Foursquare API to search for venues and make the call to the Foursquare database and in return, I use K-means clustering to do classification restaurant style and distance, the data form:
'https://api.foursquare.com/v2/venues/search?client_id={}&client_secret={}&ll={},{}&v={}&query={}&radius={}&limit={}'.format(CLIENT_ID, CLIENT_SECRET, latitude, longitude, VERSION, ***_query, radius, LIMIT).
And I must analysis distance for venues, sightseers will understand how many restaurant style, address, telephone number and distance, the school side will can make restaurant guide information for sightseers.

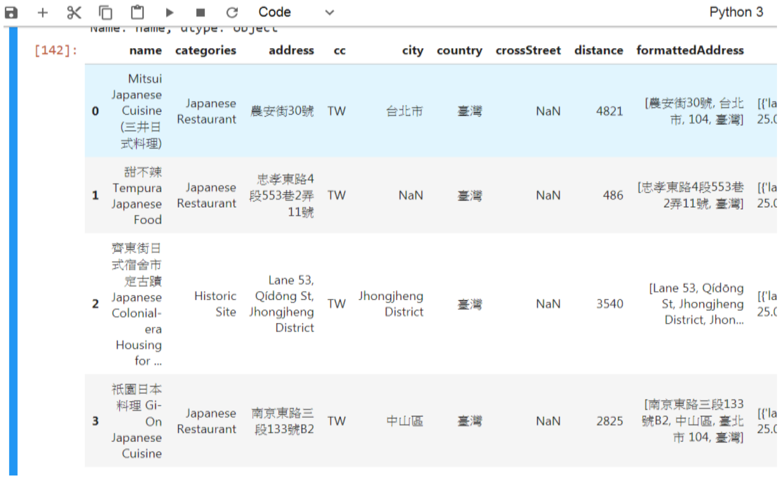
machine learnings

In case, I will use Foursquare API to search for venues and make the call to the

Foursquare database and in return, I use K-means clustering to do classification restaurant style and distance, the data form: 'https://api.foursquare.com/v2/venues/search?client_id={}&client_secret={}&ll={},{}&v={}&query={}&radius={}&limit={}'.format(CLIENT_ID, CLIENT_SECRET, latitude, longitude, VERSION, ***_query, radius, LIMIT)



```
1                  甜不辣 Tempura Japanese Food
2     齊東街日式宿舍市定古蹟 Japanese Colonial-era Housing for ...
3              祇園日本料理 Gi-On Japanese Cuisine
4                 牡丹園 Peony Japanese Cuisine
5                   Hip Japanese Restaursnt
6                    Tachibana Japanese Spa
7      aburi List - Japanese Casual Restaurant (居食創作料理)
8                   Japanese Cuisine B2 @Sogo
9                Yi Wu Wei Japanese Restaurant
10                     大味Japanese Restaurant
11                         Irodori (彩日本料理)
12          台北日本人學校／日僑學校 Taipei Japanese School
13      Marumo Japanese Bowl Cafe (瑪爾摩日式丼飯 微風台北車站店)
14          澄江日本料理 Sumie Nouvelle Cuisine Japanese
15                         Japanese Bar 7th
16                       Cho Ji Japanese BBQ
17             一平日本料理 Ippei Japanese Food
18                          Japanese Ramen
19              Kaguraya Japanese Restaurant
Name: name, dtype: object
0             Mitsui Japanese Cuisine (三井日式料理)
1                 甜不辣 Tempura Japanese Food
2     齊東街日式宿舍市定古蹟 Japanese Colonial-era Housing for ...
3              祇園日本料理 Gi-On Japanese Cuisine
4                 牡丹園 Peony Japanese Cuisine
5                   Hip Japanese Restaursnt
6                    Tachibana Japanese Spa
```



```
Name: name, dtype: object
[142]:
```

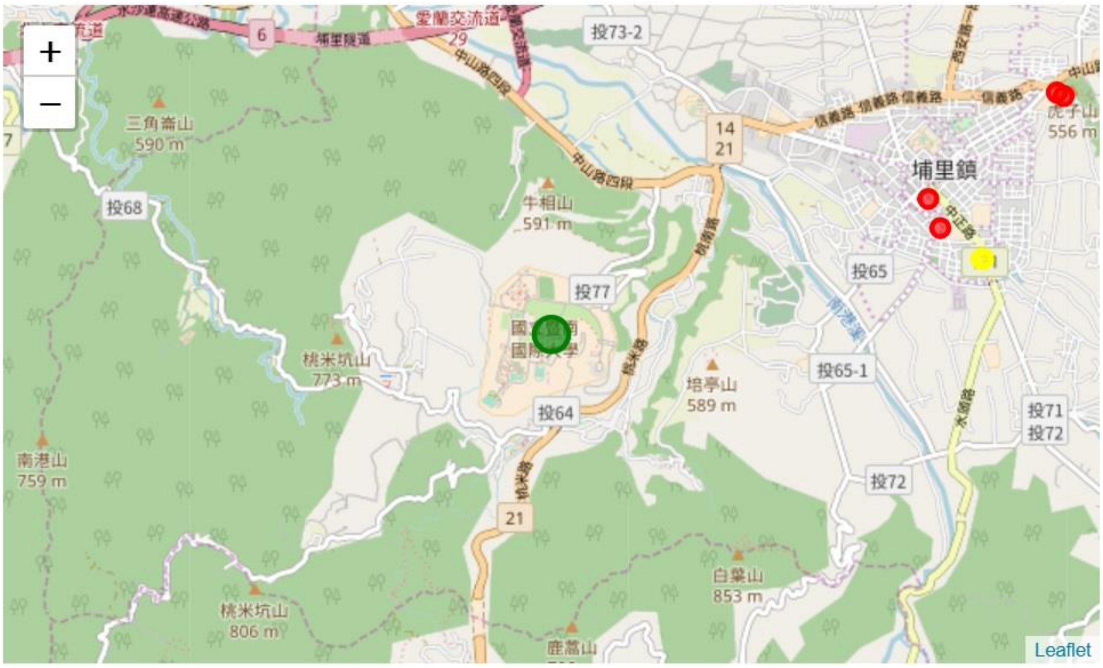
	name	categories	address	cc	city	country	crossStreet	distance	formattedAddress	
0	Mitsui Japanese Cuisine (三井日式料理)	Japanese Restaurant	農安街30號	TW	台北市	臺灣	NaN	4821	[農安街30號, 台北市, 104, 臺灣]	[{'la 25.(
1	甜不辣 Tempura Japanese Food	Japanese Restaurant	忠孝東路4段553巷2弄11號	TW	NaN	臺灣	NaN	486	[忠孝東路4段553巷2弄11號, 臺灣]	[{'la 25.(
2	齊東街日式宿舍市定古蹟 Japanese Colonial-era Housing for ...	Historic Site	Lane 53, Qídōng St, Jhongjheng District	TW	Jhongjheng District	臺灣	NaN	3540	[Lane 53, Qídōng St, Jhongjheng District, Jhon...	[{'la 25.(
3	祇園日本料理 Gi-On Japanese Cuisine	Japanese Restaurant	南京東路三段133號B2	TW	中山區	臺灣	NaN	2825	[南京東路三段133號B2, 中山區, 臺北市 104, 臺灣]	[{'la 25.(

K-means clustering is a method of vector quantization, originally from signal processing, that is popular for cluster analysis in data mining. *k*-means clustering aims to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster. This results in a partitioning of the data space into Voronoi cells.

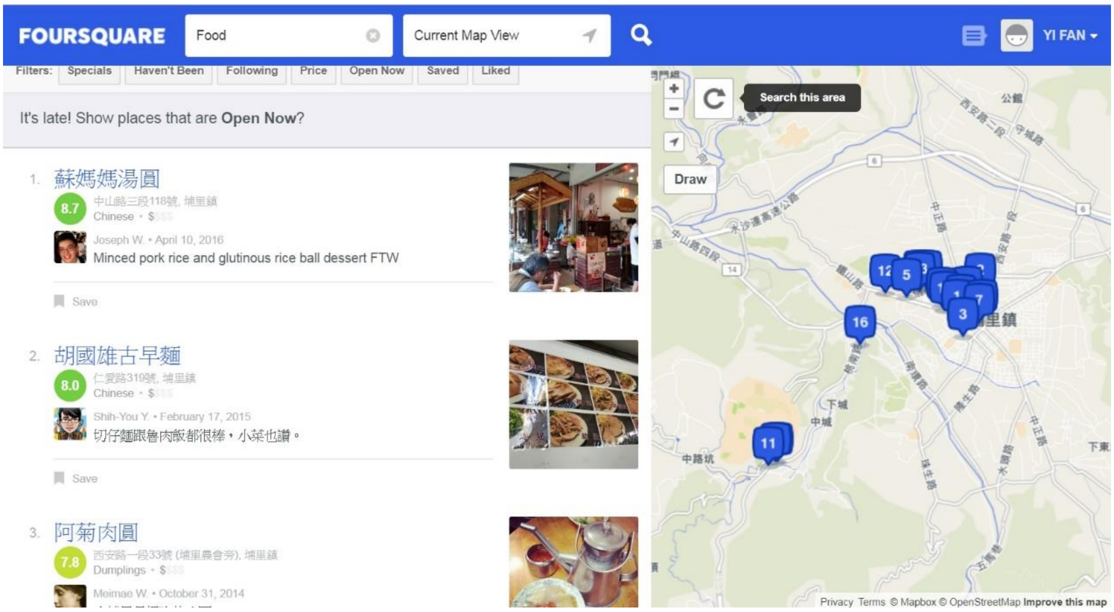
k-means clustering tends to find clusters of comparable spatial extent, while the expectation-maximization mechanism allows clusters to have different shapes.

3.Conclusion

First, we see the map center on National chi nan university:


三角崙山
590 m
投68
牛相山
591 m
投73-2
埔里鎮
投65
投77
桃米坑山
773 m
投64
培亭山
589 m
投65-1
南港山
759 m
投71
投72
投72
21
桃米坑山
806 m
白葉山
853 m
Leaflet

We can see restaurant mark very few, it is unusual, so we open Foursquare website to research pu li restaurant information, the conclusion as follows:


FOURSQUARE
Food
Current Map View
YI FAN
Filters: Specials Haven't Been Following Price Open Now Saved Liked
Search this area
Draw

It's late! Show places that are **Open Now**?

1. 蘇媽媽湯圓
8.7 中山路三段118號, 埔里鎮
Chinese • $$$$
Joseph W. • April 10, 2016
Minced pork rice and glutinous rice ball dessert FTW
Save

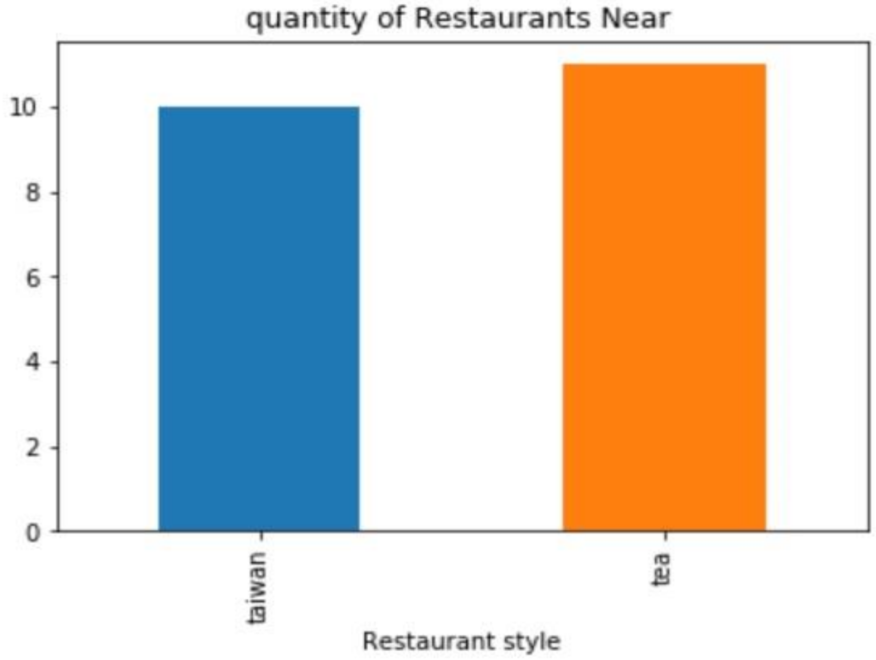
2. 胡國雄古早麵
8.0 仁愛路319號, 埔里鎮
Chinese • $$$$
Shih-You Y. • February 17, 2015
切仔麵跟魯肉飯都很棒，小菜也讚。
Save

3. 阿菊肉圓
7.8 西安路一段33號 (埔里農會旁), 埔里鎮
Dumplings • $$$$
Meimae W. • October 31, 2014

These restaurant name marked not use English, it is use Chinese that a troubled for foreign sightseers, the school side hope have enough restaurant information provide to foreign sightseers, but the conclusion not achieve the school side's claim.

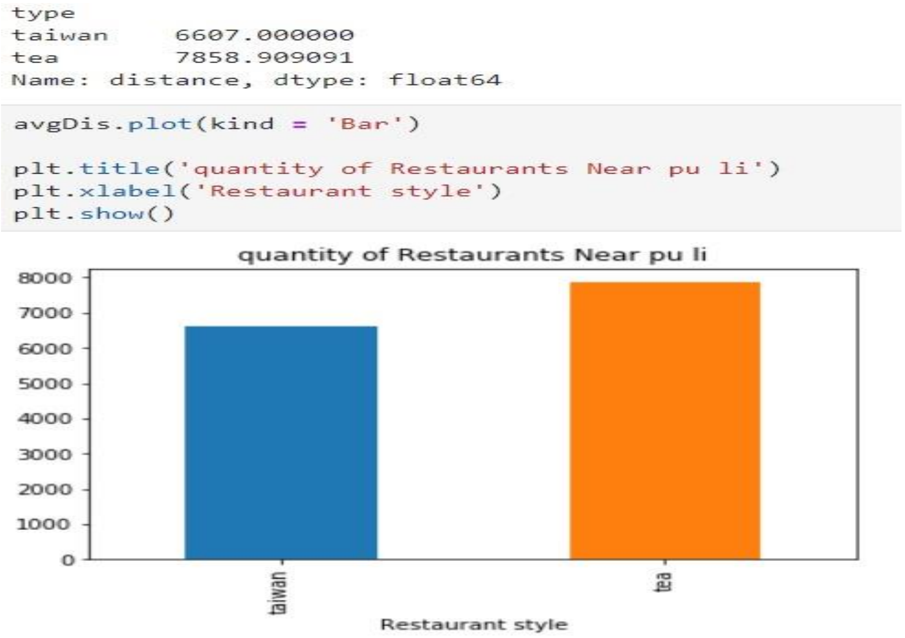
4.What is problem?

We know pu li town is historic spot, why restaurant information so few, even a lot of foreign sightseers visited but have not enough restaurant information in Foursquare database, form analysis conclusion as follows:



Taiwanese cuisine restaurant quantity is 10, Taiwan tea restaurant is 11, and I can't find any Chinese restaurant mark in Chinese key word, we think foreign sightseers may be can't identify difference of Taiwanese cuisine and Chinese cuisine or they do not know how to mark restaurant information in Romanization.

Restaurant quantity and distance as follows:



```
type
taiwan     6607.000000
tea        7858.909091
Name: distance, dtype: float64
```

```
avgDis.plot(kind = 'Bar')

plt.title('quantity of Restaurants Near pu li')
plt.xlabel('Restaurant style')
plt.show()
```

quantity of Restaurants Near pu li
8000
7000
6000
5000
4000
3000
2000
1000
0
taiwan
tea
Restaurant style

Chart show Taiwan tea restaurant quantity than more Taiwanese cuisine restaurant and distance too far, obviously the school side must collect more restaurant information from different source of information.

5.How to solve the problem.
The school side can help restaurant set up Romanization, it will help provide enough restaurant information, National Chi Nan University is a research-intensive university and have enough ability to do the thing, if the school side hope more foreign sightseers visit campus, enough restaurant information is required, of course contain traffic information that how to go to the school.