# Capstone Project-The Battle of Neighborhoods (Week 2)

## Muang Chiang Mai District , New Cafe Locations
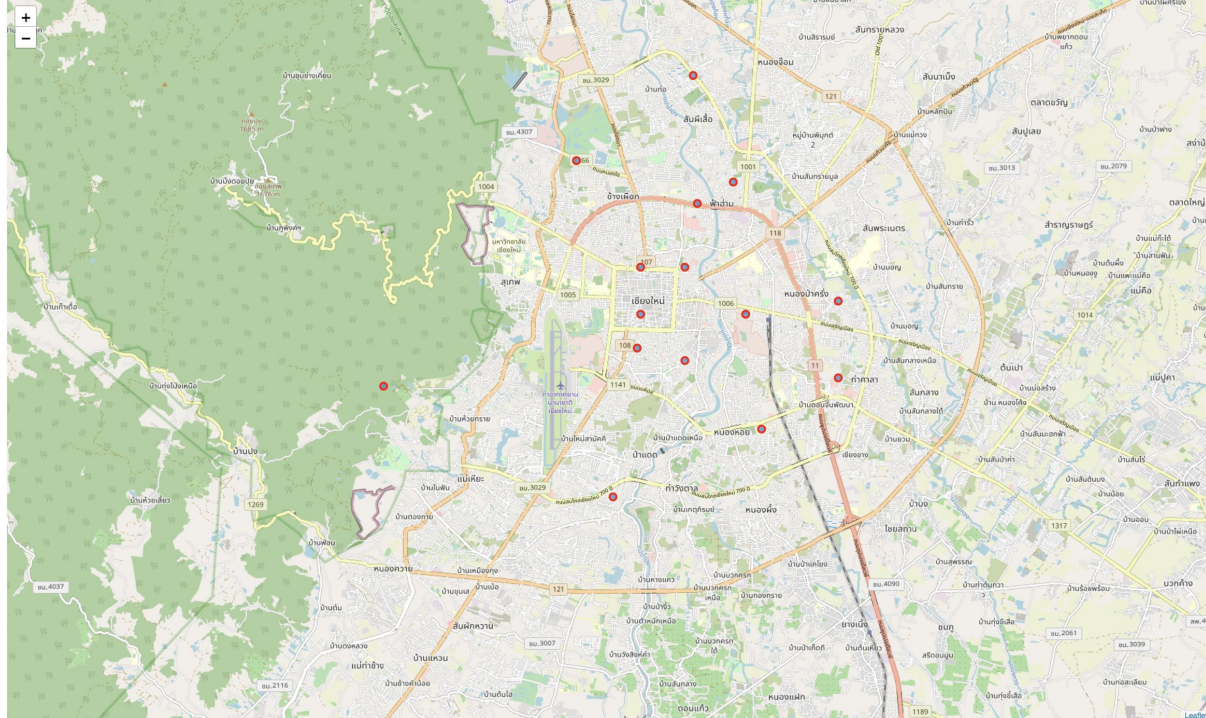
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# Introduction

This study will focus on the location of the café vs the location of the accommodation based on the assumption the main customer of the café is a traveler and they will visit the café that is nearby their hotel. In the real situation might be more features that affect the successions of the café but this part will be the main focus for the location.

# Data sources

The data from the open source for district data included the district of the whole country; the first cleaning was the district in Chiang Mai province. Second, Fitter specifically in the sub-district in Muang Chiang Mai district only the center of Chiang Mai the traveler visits is Muang Chiang Mai district. The database was in the excel file and then imported to the jupyter by CSV form.

*The map illustrate the location of sub district around center of Chiang Mai city show in red dots (Foursquare)*

# Data sources

The data set sub district in Muang Chiang Mai district includes 15 sub districts and others in formation latitude,  longitude and etc. The data display from Jupiter as pandas liberty.

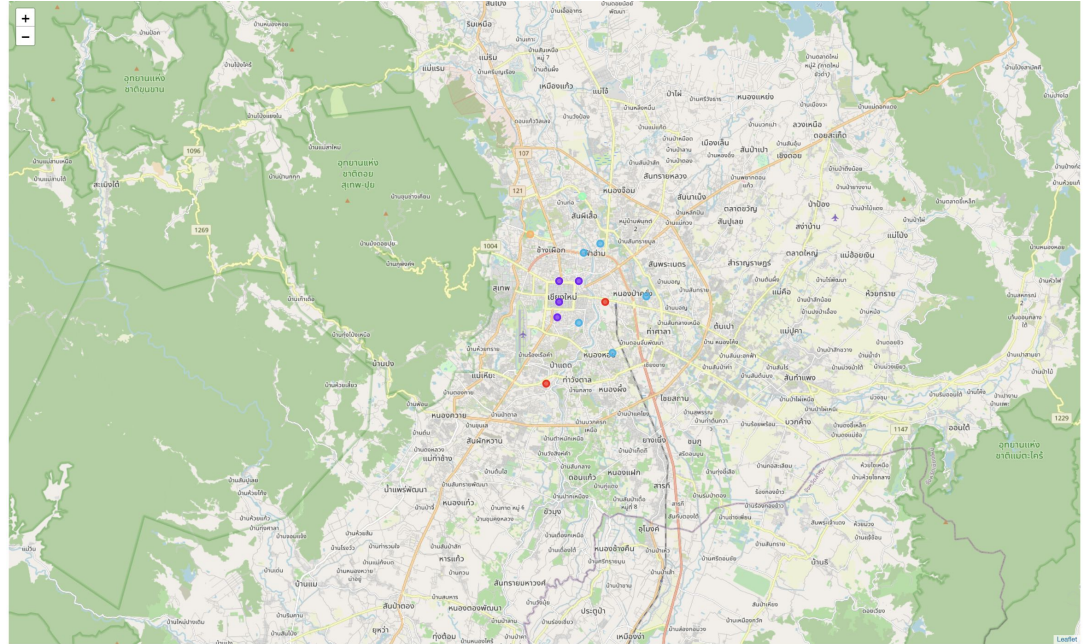| | AD_LEVEL | TA_ID | TAMBON_T | TAMBON_E | AM_ID | AMPHOE_T | AMPHOE_E | CH_ID | CHANGWAT_T | CHANGWAT_E | LAT | LONG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4 | 500102 | ต. พระสิงห์ | Phra Sing | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.785 | 98.985 |
| 1 | 4 | 500103 | ต. หายยา | Hai Ya | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.777 | 98.984 |
| 2 | 4 | 500104 | ต. ช้างม่อย | Chang Moi | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.796 | 98.996 |
| 3 | 4 | 500115 | ต. ป่าตัน | Pa Tan | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.811 | 98.999 |
| 4 | 4 | 500101 | ต. ศรีภูมิ | Si Phum | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.796 | 98.985 |
| 5 | 4 | 500116 | ต. สันผีเสื้อ | San Phisuea | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.841 | 98.998 |
| 6 | 4 | 500113 | ต. หนองป่าครั่ง | Nong Pa Khrang | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.788 | 99.034 |
| 7 | 4 | 500105 | ต. ช้างคลาน | Chang Khlan | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.774 | 98.996 |
| 8 | 4 | 500111 | ต. หนองหอย | Nong Hoi | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.758 | 99.015 |
| 9 | 4 | 500114 | ต. ฟ้าฮ่าม | Fa Ham | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.816 | 99.008 |
| 10 | 4 | 500106 | ต. วัดเกต | Wat Ket | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.785 | 99.011 |
| 11 | 4 | 500112 | ต. ท่าศาลา | Tha Sala | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.770 | 99.034 |
| 12 | 4 | 500110 | ต. ป่าแดด | Pa Daet | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.742 | 98.978 |
| 13 | 4 | 500107 | ต. ช้างเผือก | Chang Phueak | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.821 | 98.969 |
| 14 | 4 | 500109 | ต. สุเทพ | NaN | 5001 | อ. เมืองเชียงใหม่ | Mueang Chiang Mai | 50 | จ. เชียงใหม่ | Chiang Mai | 18.768 | 98.921 |

# Result and Discussion

After using API to search the hotel's location nearby, each sub-district found 155 for all places. The data showed Phra Sing sub district has the most nearby hotels number and is followed by Si Phum. On the other hand Fa Ham, Nong Pa Khrang and San Pri Suea have less nearby cafes

| TAMBON_E | TAMBON_E Latitude | TAMBON_E Longitude | Venue | Venue Latitude | Venue Longitude | Venue Category |
|---|---|---|---|---|---|---|
| Chang Khlan | 7 | 7 | 7 | 7 | 7 | 7 |
| Chang Moi | 30 | 30 | 30 | 30 | 30 | 30 |
| Chang Phueak | 2 | 2 | 2 | 2 | 2 | 2 |
| Fa Ham | 1 | 1 | 1 | 1 | 1 | 1 |
| Hai Ya | 15 | 15 | 15 | 15 | 15 | 15 |
| Nong Hoi | 4 | 4 | 4 | 4 | 4 | 4 |
| Nong Pa Khrang | 1 | 1 | 1 | 1 | 1 | 1 |
| Pa Daet | 2 | 2 | 2 | 2 | 2 | 2 |
| Pa Tan | 3 | 3 | 3 | 3 | 3 | 3 |
| Phra Sing | 47 | 47 | 47 | 47 | 47 | 47 |
| San Phisuea | 1 | 1 | 1 | 1 | 1 | 1 |
| Si Phum | 40 | 40 | 40 | 40 | 40 | 40 |
| Wat Ket | 2 | 2 | 2 | 2 | 2 | 2 |

# Result and Discussion

After run machine learning (K-mean clustering) the separate in 5 clusters. The first cluster includes Wat Ket and Pa Daet sub districts. The second cluster includes Phra Sing, Hai Ya, Chang Moi, and Sri Phum. The third cluster includes  Pa Tan, Nong Pa Khrang, Chang Khlan, Nong Hoi and Fa Ham. The fourth cluster includes San Phi Suea. The last cluster includes Chang Phueak.

# Result and Discussion

**Cluster 1**

```
ChiangMai_merged.loc[ChiangMai_merged['Cluster Labels'] == 0, ChiangMai_merged.columns[[1] + list(range(5, ChiangMai_merged.shape[1]))]]
```

| | TAMBON_E | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | Wat Ket | Resort | Hotel | Spa | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Hostel | Food | Coffee Shop | Café |
| 12 | Pa Daet | Resort | Hotel | Spa | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Hostel | Food | Coffee Shop | Café |

**Cluster 2**

```
ChiangMai_merged.loc[ChiangMai_merged['Cluster Labels'] == 1, ChiangMai_merged.columns[[1] + list(range(5, ChiangMai_merged.shape[1]))]]
```

| | TAMBON_E | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Phra Sing | Hotel | Bed & Breakfast | Hostel | Residential Building (Apartment / Condo) | Café | Motel | Food | Art Gallery | Spa | Resort |
| 1 | Hai Ya | Hotel | Hostel | Resort | Motel | Bed & Breakfast | Spa | Residential Building (Apartment / Condo) | Hotel Pool | Food | Coffee Shop |
| 2 | Chang Moi | Hotel | Hostel | Bed & Breakfast | Motel | Hotel Pool | Bar | Spa | Resort | Residential Building (Apartment / Condo) | Food |
| 4 | Si Phum | Hotel | Hostel | Bed & Breakfast | Spa | Coffee Shop | Resort | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Food |

# Result and Discussion

### Cluster 3

```
ChiangMai_merged.loc[ChiangMai_merged['Cluster Labels'] == 2, ChiangMai_merged.columns[[1] + list(range(5, ChiangMai_merged.shape[1]))]]
```

| | TAMBON_E | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Pa Tan | Hotel | Spa | Resort | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Hostel | Food | Coffee Shop | Café |
| 6 | Nong Pa Khrang | Hotel | Spa | Resort | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Hostel | Food | Coffee Shop | Café |
| 7 | Chang Khlan | Hotel | Hostel | Spa | Resort | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Food | Coffee Shop | Café |
| 8 | Nong Hoi | Hotel | Spa | Resort | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Hostel | Food | Coffee Shop | Café |
| 9 | Fa Ham | Hotel | Spa | Resort | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Hostel | Food | Coffee Shop | Café |

### Cluster 4

```
ChiangMai_merged.loc[ChiangMai_merged['Cluster Labels'] == 3, ChiangMai_merged.columns[[1] + list(range(5, ChiangMai_merged.shape[1]))]]
```

| | TAMBON_E | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | San Phisuea | Resort | Spa | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Hotel | Hostel | Food | Coffee Shop | Café |

### Cluster 5

```
ChiangMai_merged.loc[ChiangMai_merged['Cluster Labels'] == 4, ChiangMai_merged.columns[[1] + list(range(5, ChiangMai_merged.shape[1]))]]
```

| | TAMBON_E | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | Chang Phueak | Hotel | Bed & Breakfast | Spa | Resort | Residential Building (Apartment / Condo) | Motel | Hotel Pool | Hostel | Food | Coffee Shop |

# Conclusion

- The result of the K-mean cluster method can be used to identify Phra Singh, Hai Ya, Chang Moi, and Sri Phum is the best group location for open new coffee shops.
- The data confirmed by these locations was found in a number of hotels nearby.
- By the way there still are more factors for the study have to add in the study for choose the best location which is the precise of renting and the supply of coffee or the comfortable for parking lot.
- In addition the hotel's data that exported from Foursquare might not relate to the real hotel that exists in reality.
- The study should use the location of the center the zoom in to the exact area the might break down to smaller than sub district but the this would involve with  economic area in Chiang Mai