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Coursera Capstone Project

The Battle of Neighborhoods - Final Report (w2)
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I.   Introduction
1.1 Cambodia

Cambodia, officially the **Kingdom of Cambodia** is a country located in the southern portion of the Indochina peninsula in Southeast Asia. It is 181,035 square kilometres (69,898 square miles) in area, bordered by Thailand to the northwest, Laos to the northeast, Vietnam to the east and the Gulf of Thailand to the southwest.

The sovereign state of Cambodia has a population of over 16 million. The official religion is Theravada Buddhism, practised by approximately 95 percent of the population. The country's minority groups include Vietnamese, Chinese, Chams and 30 hill tribes. The capital and largest city is Phnom Penh, the political, economic and cultural centre of Cambodia. The kingdom is an elective constitutional monarchy with a monarch, currently Norodom Sihamoni, chosen by the Royal Throne Council as head of state. The head of government is the Prime Minister, currently Hun Sen, the longest serving non-royal leader in Southeast Asia, ruling Cambodia since 1985. (https://en.wikipedia.org/wiki/Cambodia)
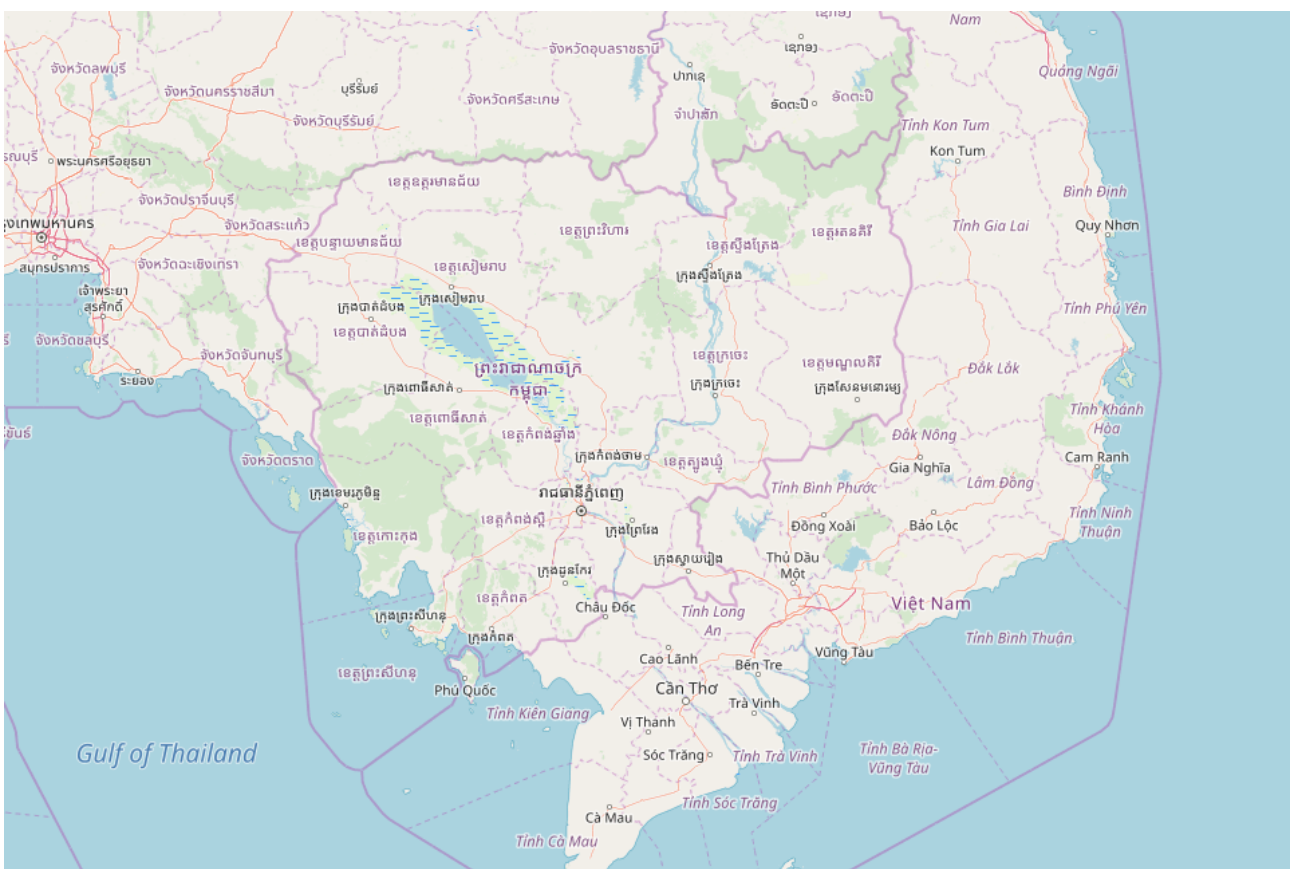

Figure 1: Cambodia Map

1.2 Phnom Penh City

Phnom Penh, the biggest city in Cambodia and also its wealthiest, is the cultural, commercial and political centre of the country. It is also home to more than a million of Cambodia's population of over 16 million. Covering an area of 345 sq km, Phnom Penh is located in the south-central region of Cambodia, at the confluence of the Tonle Sap, Mekong and Bassac rivers. The city offers extensive cultural and historical attractions, including temples, museums, the Royal Palace and also has accommodation from simple guesthouses to 5-star hotels. Phnom Penh also features good dining facilities as well as a vibrant and varied nightlife.

Figure 2: Phnom Penh City Map

II.   Business Problem

I am a data scientist residing in Riihimäki, Finland but i am Cambodian. I would like to introduce my Finnish friend to find a good location to start up a restaurant in Phnom Penh City. I am very excited and i want to use this opportunity to practice my learnings in Coursera in order to answer relevant questions arisen. Some questions always append when we stay in one hotel: how can we find a convenient and enjoyable place like coffee, foods,

shops, wine stores,… in Phnom Penh? Surely, we can use available real estate apps and Google Map but the idea is to use and apply myself the learned tools during the course.

2.1 Solving Problem

The first we should understand about Cambodia economy. Actually i found a table of fluctuation in Cambodia's economy over the period from 2004-2011, unfortunately the data from 2012 is not yet available. (https://en.wikipedia.org/wiki/Economy_of_Cambodia)

Category	2004	2005	2006	2007	2008	2009	2010	2011
GNI per capita, PPP(current international $)	1,250	1,440	1,630	1,830	1,960	1,970	2,080	2,230
Total Population (Millions)	13.19	13.36	13.52	13.67	13.82	13.98	14.14	14.31
GDP (Millions US$)	5,337.83	6,293.05	7,274.42	8,639.16	10,351.83	10,401.94	11,242.27	12,829.54
GDP Growth (annual %)	10.34	13.25	10.77	10.21	6.69	0.09	5.96	7.07

Table 1: Cambodia's Economy trend from 2004-2011

We need to know how many hotels are in Phnom Penh city and how many restaurants are closet from the staying hotel. Furthermore, the restaurant should me similar characteristics European food. Therefore, the problem i need to be solved are:

- View histogram to show the economy trend
- View hotels in Phnom Penh city within walking distance (1.5 Km)
- Find the closet restaurants from the staying hotel by Foursqure API

2.2 Methodology section

This project will help a person or entity consider moving to invest in Cambodia. Since the approach and methodologies used there are applicable in all cases. The use of bar chat, Foursquare data and mapping techniques combined with data analysis will help to solve above problem.

III. Result Section
3.1 Tend of Cambodia's economy

I got the original table from wikipedia. After cleaning data, then i transposed it for bar chart

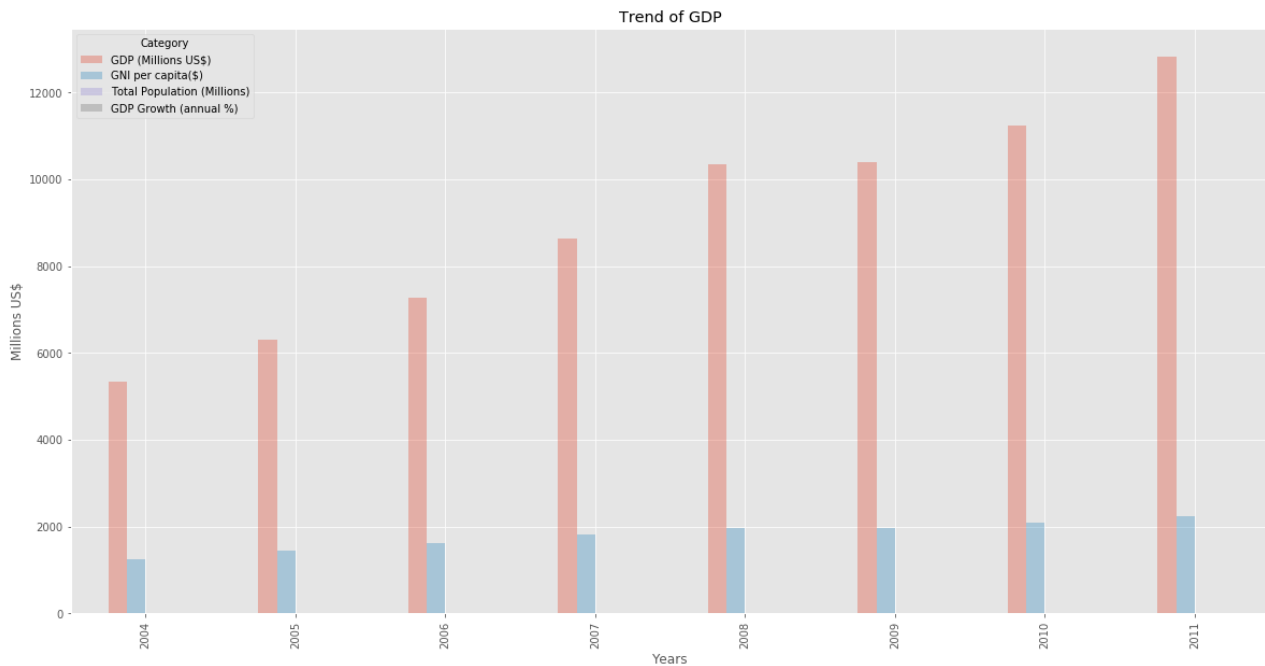| Category	GDP (Millions US$)	GNI per capita($)	Total Population (Millions)	GDP Growth (annual %)
2004	5337.83	1250.0	13.19	10.34
2005	6293.05	1440.0	13.36	13.25
2006	7274.42	1630.0	13.52	10.77
2007	8639.16	1830.0	13.67	10.21
2008	10351.83	1960.0	13.82	6.69
2009	10401.94	1970.0	13.98	0.09
2010	11242.27	2080.0	14.14	5.96
2011	12829.54	2230.0	14.31	7.07

Table 2: Transposing data for bar chart

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Figure 3: GDP and GNI per capita

The value of Total Population and GDP Growth is too small camparing to GDP and GNI per capita, it can not be showed in bar chart. I separated fields Total Population and GDP Growth as below:

Category	Total Population (Millions)	GDP Growth (annual %)
2004	13.19	10.34
2005	13.36	13.25
2006	13.52	10.77
2007	13.67	10.21
2008	13.82	6.69
2009	13.98	0.09
2010	14.14	5.96
2011	14.31	7.07

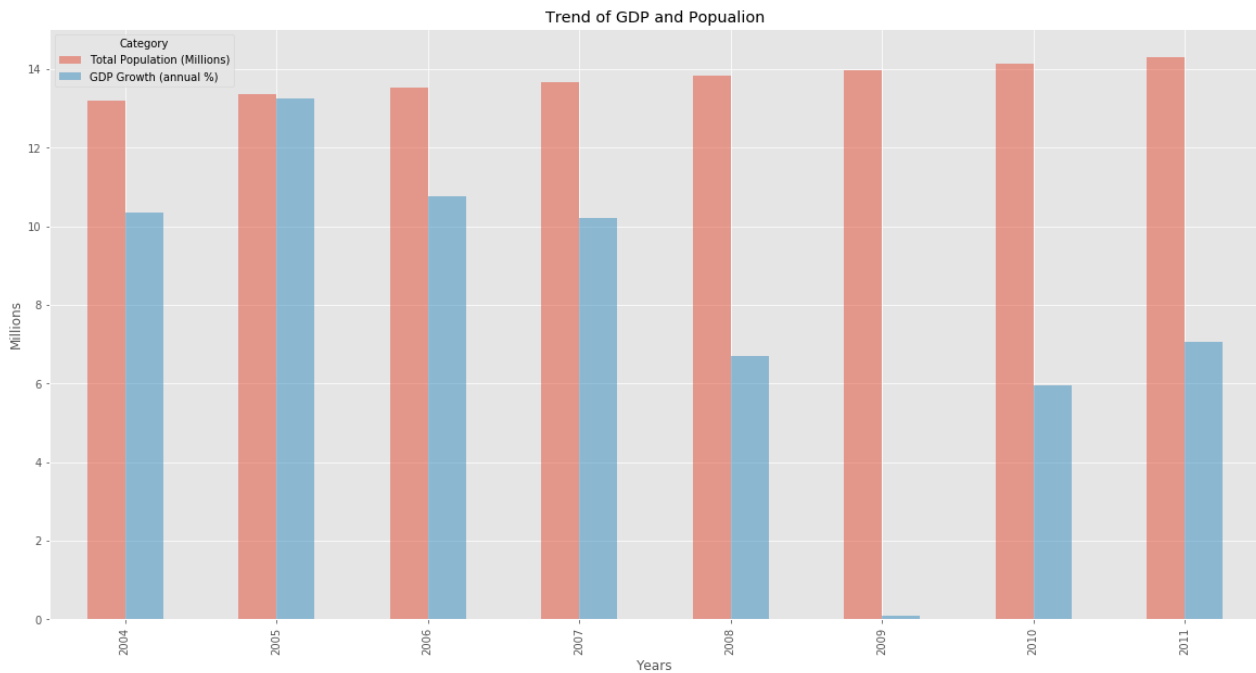Table 3: Transposing 2 field of data, Total Population and GDP Growth

Figure 4: Total Population and GDP Growth

3.2. Search for a specific venue category

Let's again assume that we come to Phnom Penh and staying at Quay hotel in the center of Phnom Penh. So let's start converting the Quay hotel address to its latitude and longitude coordinates. In order to define an instance of the geocoder, we need to define a user_agent. We will name our agent *foursquare_agent*, as shown below.

```
address = 'Sisowath Quay, Phnom Penh, Cambodia'

geolocator = Nominatim(user_agent="foursquare_agent")

location = geolocator.geocode(address)

latitude = location.latitude

longitude = location.longitude

print(latitude, longitude)
```

Then we got latitude= 11.5729662 and longitude = 104.9292037

From this location we start to search hotels around Quay hotel. After cleaning data we got 40 hotels around Quay hotel distance is 1.5Km

	id	Address	location.cc	Country	Distance	Latitude	Longtitude	City	name	referralId
0	566444ae498e3f71fdff1afb	Preah Mohaksat Treiyani Kossamak	KH	Cambodia	286	11.574328	104.926976	NaN	De Art Boutique Hotel	v-1561710059
1	4d12b87bd1848cfab365be71	No. 1, Street 92, Sangkat Wat Phnom	KH	Cambodia	918	11.576289	104.921491	Phnom Penh	Sunway Hotel	v-1561710059
2	533550f5498ee52eacefc6ca	St Keo Chenda, Phume 1, Sangkat Chroy Changvar	KH	Cambodia	1036	11.568674	104.937639	Phnom Penh	Sokha Phnom Penh Hotel & Residence	v-1561710059
3	4e5c9532183883e00c0ab90c	No. 28-30 | ST 130	KH	Cambodia	172	11.571576	104.928505	Phnom Penh	Indochine II Hotel	v-1561710059
4	4bd857a92ecdce7233bad0f2	No 63, Preah Norodom Blvd	KH	Cambodia	720	11.568262	104.924664	Phnom Penh	Sokha Club Hotel	v-1561710059

```
dfHotel.shape
```

```
(40, 10)
```

Table 4: Amount of hotels locate in Phnom Penh City

Based on the latitude and longitude of each hotel we can view its location in Phnom Penh City
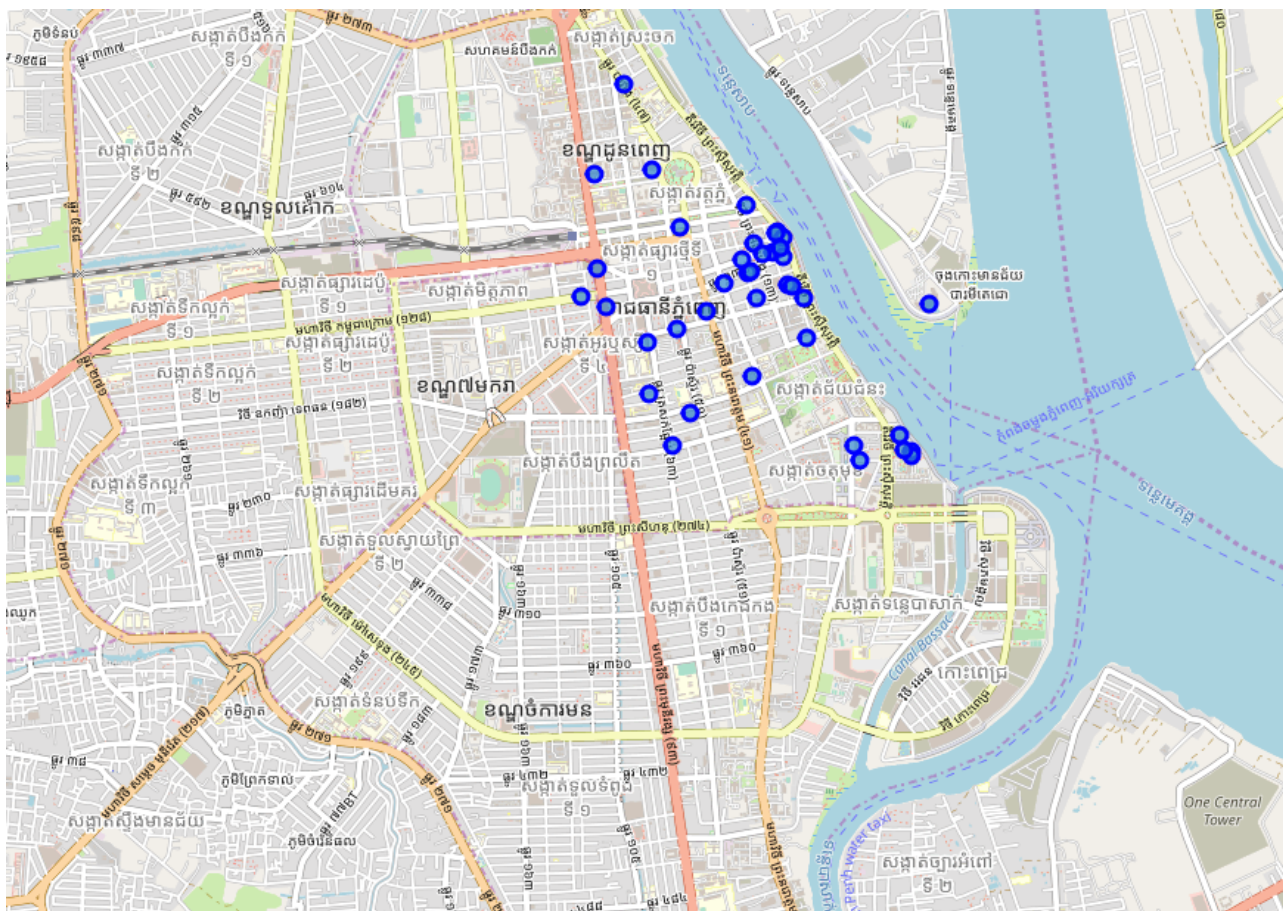

Fiqure 5: Hotels locate in Phnom Penh City

Now, let's assume that it is lunch time, and we are craving Europeans food. So, let's define a query to search for KFC food that is within 500 meters from the Quay Hotel.

search_query = 'KFC'

radius = 500

print(search_query + ' .... OK!')

	name	categories	address	country	distance	lat	lng	postalCode	state	id
0	KFC	Fast Food Restaurant	No. 170, Preah Monivong	Cambodia	407	11.568650	104.918729	855	Phnom Penh	4c297048e19720a10198f958
1	KFC next to Diamond hotel	None	NaN	Cambodia	412	11.568682	104.918682	NaN	NaN	4c9c4790031337040e1654d5

Table 5: Closest restaurants from Quay Hotel

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There are 2 KFCs restaurant from Quay hotel. Once again we explore the closest KFC
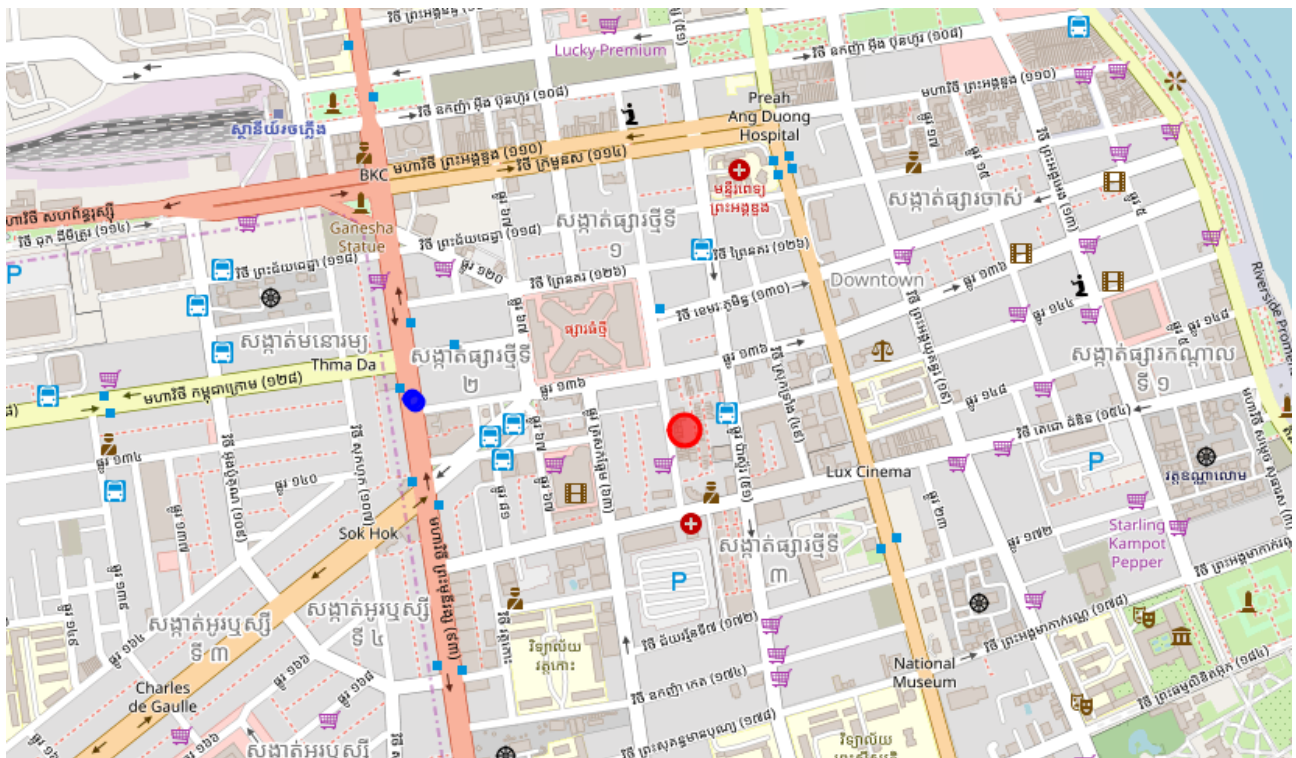

Figure 6: The KFC close to Quay Hotel

We got venue's overall rating is 5.3 and get the number of Tip is 13

From this KFC location we found 18 restaurants that food is similar to European foods.

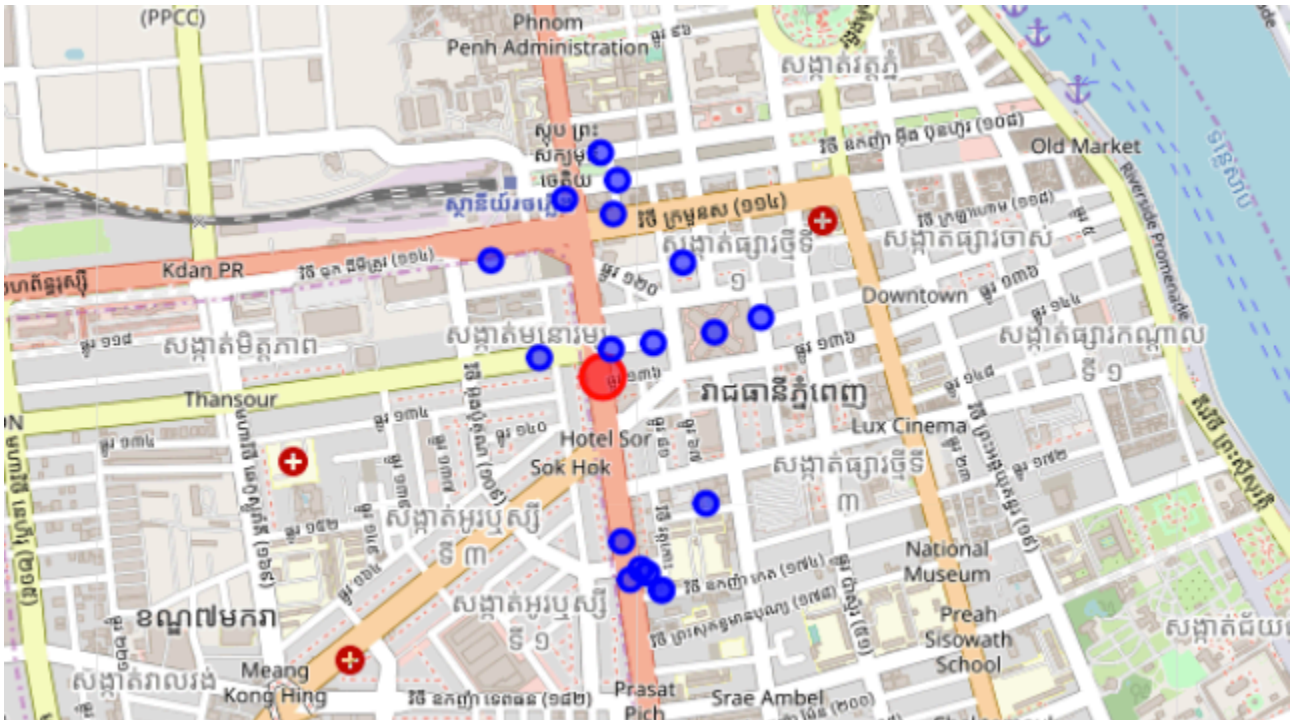| name	categories	country	distance	Address	lat	lng	state	id
Thmorda Restaurant | ភោជនីយដ្ឋាន ថ្មដា (ថ្មដា)	Cambodian Restaurant	Cambodia	144	[90, Kampuchear Krom St., Toul Kork, កម្ពុជា]	11.569060	104.917477	Phnom Penh	4bcd3ff88920b71320929fdc
Brown Coffee Raintree	Coffee Shop	Cambodia	361	[កម្ពុជា]	11.571886	104.918969	Phnom Penh	578738d3498edeb6a9b4c2f2
ភោជនីយដ្ឋាន ល្ហោប	Cambodian Restaurant	Cambodia	406	[Monivong Blvd, Phnum Pénh, កម្ពុជា]	11.572219	104.917962	Phnom Penh	593f75212347241900f78403
Sam Doo Chinese Restaurant	Chinese Restaurant	Cambodia	68	[កម្ពុជា]	11.569232	104.918934	NaN	4c2c2ae357a9c9b6a720f767
The Billabong Hotel	Hotel	Cambodia	361	[#5 Street 158, Phnum Pénh, កម្ពុជា]	11.566158	104.920861	Phnom Penh	4b8ba134f964a520fca432e3

Table 6: Amount of restaurant around of KFC

Fiqure 7: Restaurants around KFC

3.3 Explore the trending venue

No trending venue are available at the moment

IV. Discussion section

Throw this project, i have done with folium mapping to view Cambodia map and Phnom Penh map. I coded Python to created bar chart for viewing Cambodia's economy trend. Furthermore, i used Foursquare technic to find closest restaurant in Phnom Penh city.

V.   CONCLUSIONS

In general, i am interesting with overall Coursera project organization, content, explanation, and lab works during the Coursera IBM Certification Course. This Capstone project provided me a great experience and opportunity to practice and apply the Data Science tools with Python.
I have created a good project that i can present what i have done to show my potential.
I fell i am becoming a professional Data Scientist. Even some time i am not yet to apply at all but i will continue to explore and create more examples for real practice.
The end of project and course, thanks to Coursera Team and students have cooperated to improve our knowledge together.