Report by
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Investment Decision-Making in Cameroon

Introduction / Problem Statement:

A Chinese investment firm has won a mining contract in Cameroon. Far from being the only activity they want to be engaged with, these investors also have an intention to cash-in on other opportunities within the 15-year period they will be in Cameroon.

To do so, they need to know the 3 top most common business ventures in each of the regional capital cities in Cameroon. While the ministry of trade and industry has some data and has provided the data to the Chinese investors, the investors think this data is largely insufficient to provide the required information. They then approach **Melaine Nsaikila**, a data scientist based in Cameroon's political capital of Yaoundé to help explore and provide the relevant information they need.

Description of the Data

The sole source of data for this project is Foursquare data. For each of the 10 regional headquarters, the foursquare 'explore' option is used to collect data and return venues within 50 km or 50,000 meters from the city center.

For each of the cities, the four variables returned by exploring foursquare within the set radius of the defined latitude and longitude of the city are venue **name, categories, latitude and longitude.** Given that the objective is to count venue categories and rank them based on their frequency in the city, a **City** variable is added to the data of each city when it is scrapped from foursquare. In the end, we have a combined dataset consisting of all the venues scrapped for the 10 regional capitals of Cameroon.

Getting the Venues
  1) Yaoundé: Center Regional Capital
For Yaoundé, the Foursquare explore returns a total of 51 venues. This is shown by the tail of the dataset below, bearing in mind that the index count starts from zero (0).

```
yde_venues.tail()
```

8]:

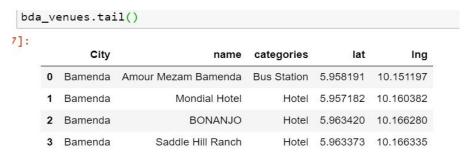|	City	name	categories	lat	lng
46	Yaounde	Odza	Outdoors & Recreation	3.805311	11.533938
47	Yaounde	Carrefour Nsam	Plaza	3.825237	11.508088
48	Yaounde	Marché Etoudi	Department Store	3.916250	11.525102
49	Yaounde	Carrefour Tropicana	Plaza	3.817459	11.526640
50	Yaounde	carrefour lle educative	Plaza	3.926502	11.525925

2) Douala: Littoral Regional Capital

Foursquare returns a total of 51 venues. The tail is shown below bearing in mind that the index count starts at zero (0).

```
dla_venues.tail()
```

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	City	name	categories	lat	lng
46	Douala	Carrefour Ndokoti	Plaza	4.044210	9.744648
47	Douala	Saker Makepe	Bakery	4.083984	9.755711
48	Douala	Makepe Rhône Poulain	Plaza	4.085244	9.757035
49	Douala	MTN Business Lounge	Lounge	4.010630	9.717018
50	Douala	Boulangerie du Rail	Bakery	4.094611	9.647156

3) Bamenda: North West Regional Capital

Foursquare returns a total of 4 venues in Bamenda. The tail is shown below.

```
bda_venues.tail()
```

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	City	name	categories	lat	lng
0	Bamenda	Amour Mezam Bamenda	Bus Station	5.958191	10.151197
1	Bamenda	Mondial Hotel	Hotel	5.957182	10.160382
2	Bamenda	BONANJO	Hotel	5.963420	10.166280
3	Bamenda	Saddle Hill Ranch	Hotel	5.963373	10.166335

4) Bafoussam: West Regional Capital

Foursquare returns a total of 7 venues as show below by the dataset 'tail' end.

```
baf_venues.tail()
```

]:

	City	name	categories	lat	lng
2	Bafoussam	Bouvick	Snack Place	5.464970	10.421075
3	Bafoussam	Sim	Shopping Mall	5.464574	10.424182
4	Bafoussam	General Voyages OUEST	Bus Station	5.454042	10.426440
5	Bafoussam	Supermarché SIM	Convenience Store	5.495442	10.398795
6	Bafoussam	Chenang Superlicious Corner	Asian Restaurant	5.440002	10.492723

5) Buea: South West Regional Capital

A total of 6 venues are returned for the city of Buea as shown below.

```
buea_venues.tail()
```

	City	name	categories	lat	lng
0	Buea	Njeiforbi	Bakery	4.152301	9.241917
1	Buea	Buea Mountain Hotel	Hotel	4.150187	9.228887
2	Buea	CheckPoint	Plaza	4.158753	9.279628
3	Buea	Bonga Juice	Juice Bar	4.155432	9.288848
4	Buea	mont Cameroun	Mountain	4.217369	9.172730

6) Bertoua: Eastern Regional Capital

Three venues are returned for the city of Bertoua. This is shown below.

```
bert_venues
```

	City	name	categories	lat	lng
0	Bertoua	Selfie	Bar	4.575944	13.683056
1	Bertoua	Danay Express (Bertoua)	Bus Station	4.575273	13.676042
2	Bertoua	Hotel Mansa	Resort	4.588497	13.682985

7) Maroua: Extreme North Regional Capital

Two venues are returned for Maroua as shown below.

```
Mar_venues
```

	City	name	categories	lat	lng
0	Maroua	Relais Porte Mayo	Hotel	10.594412	14.318916
1	Maroua	Mizao	Hotel	10.599504	14.310929

8) Garoua: North Regional Capital

Three venues are returned for the city of Garoua as shown below.

```
Gar_venues
```

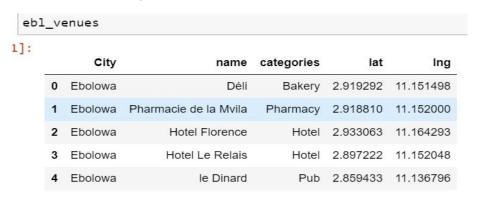|	City	name	categories	lat	lng
0	Garoua	Fast Food	Fast Food Restaurant	9.300114	13.391562
1	Garoua	Hotel La Benoue	Hotel	9.316911	13.396656
2	Garoua	Aeroport International Garoua	Airport	9.324633	13.379129

9) Ngaoundere: Adamawa Regional Capital

Four venues were returned for the city of Ngaoundere as shown below.

ngaoun_venues

	City	name	categories	lat	lng
0	Ngaoundere	SUPER KILICHI	Steakhouse	7.326729	13.591301
1	Ngaoundere	Plazza	Steakhouse	7.321634	13.580221
2	Ngaoundere	Chez Polo	Bar	7.326332	13.581482
3	Ngaoundere	Aeroport de Ngaoundere	Airport	7.371793	13.566302

10) Ebolowa: South Regional Capital

Five venues are returned for the city of Ebolowa.

ebl_venues

	City	name	categories	lat	lng
0	Ebolowa	Déli	Bakery	2.919292	11.151498
1	Ebolowa	Pharmacie de la Mvila	Pharmacy	2.918810	11.152000
2	Ebolowa	Hotel Florence	Hotel	2.933063	11.164293
3	Ebolowa	Hotel Le Relais	Hotel	2.897222	11.152048
4	Ebolowa	le Dinard	Pub	2.859433	11.136796

At every stage of the scrapping the data, we combined the data into one full dataset. At the end, all the collected data was merged into one full dataset with all the cities and the different variables together into one dataset called **cmr_venues_data**

We then grouped the data to return the different categories and realized that a total of **50 venues categories** are returned with the most frequent being **Bakery, Hotel, Hotel, Bar, Plaza, Lounge and Restaurant.**

Discussion

Using onehot encoding, I create dummies for the different categories and then group the data based on the mean frequency of each of the categories across the different cities.

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	City	African Restaurant	Airport	Arepa Restaurant	Asian Restaurant	Athletics & Sports	BBQ Joint	Bakery	Bar	Beer Garden	Big Box Store	Bus Station	Café	C
0	Bafoussam	0.000000	0.000000	0.000000	0.142857	0.000000	0.000000	0.000000	0.142857	0.000000	0.000000	0.142857	0.000000	0.0
1	Bamenda	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.250000	0.000000	0.0
2	Bertoua	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.333333	0.000000	0.000000	0.333333	0.000000	0.0
3	Buea	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.200000	0.000000	0.000000	0.000000	0.000000	0.000000	0.0
4	Douala	0.039216	0.000000	0.019608	0.000000	0.019608	0.000000	0.117647	0.019608	0.019608	0.039216	0.000000	0.019608	0.0
5	Ebolowa	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.200000	0.000000	0.000000	0.000000	0.000000	0.000000	0.0
6	Garoua	0.000000	0.333333	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.0
7	Maroua	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.0
8	Ngaoundere	0.000000	0.250000	0.000000	0.000000	0.000000	0.000000	0.000000	0.250000	0.000000	0.000000	0.000000	0.000000	0.0
9	Yaounde	0.039216	0.000000	0.000000	0.000000	0.000000	0.019608	0.156863	0.058824	0.000000	0.000000	0.000000	0.019608	0.0

Following this step, I then run functions to tabulate in a pandas dataframe the first three most frequent venues in each city as seen below. The data is then handed to the Chinese investors to compare with whatever they have and make their business decisions.

.6]:

	City	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
0	Bafoussam	Snack Place	Shopping Mall	Asian Restaurant
1	Bamenda	Hotel	Bus Station	Turkish Restaurant
2	Bertoua	Bus Station	Resort	Bar
3	Buea	Mountain	Hotel	Bakery
4	Douala	Bakery	Ice Cream Shop	Lounge
5	Ebolowa	Hotel	Bakery	Pub
6	Garoua	Airport	Hotel	Fast Food Restaurant
7	Maroua	Hotel	Turkish Restaurant	Casino
8	Ngaoundere	Steakhouse	Airport	Bar
9	Yaounde	Bakery	Hotel	Bar

Shortcomings

It should be noted however that there are some shortcomings with the information that makes it more risky to base any investment decisions solely on it. These are;

1) Apart from Douala and Yaoundé with 50 venues each, no other city has more than 10 venues reported. As a resident of Cameroon and having lived in Douala and Yaounde, I can attest that there is definitely more than is on Foursquare.
2) Secondly, given that some cities have as low as three venues with different categories and bearing in mind that there could be more not available on foursquare, the ranking of those

three are automatic but in no way should be solely used for investment decisions until ground work has been done. Garoua and Bertoua are such examples.

Takeaways

The unavailability of venue data on Foursquare is indicative or suggests a lot of things which may need further investigation. The use of Foursquare within business premises in Cameroon and the availability and penetration of internet within the country.

The former might be encouraged by business owners through the provision of WiFi within their business premises.

If internet penetration is the issue, then business owners might not have much to do. Rather, public authorities, to boost the business climate and help in marketing the nation's private sector, must step up to provide the relevant infrastructure for internet access.