Introduction

Lebanon is one of the most culturally diverse countries in the Middle East having over 300 breathtaking touristic sites just within a 10452 km^2 area. Today, Lebanon is facing a very challenging economic crisis, and obviously there is no better way to aid this crisis than by investing in tourism, what was once one of the main sources of income in the country. Whether it is museums, old towns, castles, night-clubs, restaurants or even ecotourism, a tourist can only wonder where to begin in order to enjoy the Lebanese experience to the fullest during his short stay.

Roads in Lebanon are poorly maintained to the extent where traffic is part of the population's daily lives. So a tourist that is unfamiliar with the country could waste a lot of time just to find a place to drink a simple cup of coffee. Nevertheless, the tourist can use some guidance based on their preferences and can be the judge of where to start or stop if a map that states what every town in the country is famous for was provided to them and therefore save time to explore even more places which would be an enjoyable experience for the tourist and a profitable one for Lebanon.

Our project aims to give tourists a better idea about Lebanon and where to go for specific preferences using Data science and machine learning tools by clustering areas based on what are the most common venues. This way a tourist can immediately know where to go for a drink, or for a hike based on his current location.

Data

- The resource from where I got my Data Set is the following:

https://data2.unhcr.org/en/documents/details/45209

- Lebanon is a small country so there is no Boroughs. It is rather divided into 8 Governorates (like states in the USA) and those Governorates are then divided into 26 Districts (like Boroughs in the USA) and in each district are many Municipalities (1005 in total). So I cleaned the data accordingly

Figure 1: Raw Data

	Municipality_ID	Municipality Name_EN	UNION_ID	Union_Full	UOM_Name	Pcode	Location_Name_En	Latitude	Longitude	Governorate	UN_AreaOfOperation	District	CAS_CODE	CAD_CODE	CAS_NAME	Cadastral_Type	Google_M
0	M1	Beirut	NaN	NaN	NaN	LBN11081	Marfaa	33.89880	35.51240	Beirut	Beirut & Mount Lebanon	Beirut	10450	10004	Marfaa	CF	http://maps.google.com q=33.8989,
1	M2	Jbail	261.0	Union of Municipalities Caza Jbeil	UOM Caza Jbeil	LBN34120	Jbail	34.12042	35.64711	Mount Lebanon	Beirut & Mount Lebanon	Jbeil	26111	26020	Jbayl	CF	http://maps.google.com q=34.12042,3
2	M3	Edde	NaN	NaN	NaN	LBN34065	Edde	34.13981	35.66345	Mount Lebanon	Beirut & Mount Lebanon	Jbeil	26135	26046	Eddeh Jbayl	CF	http://maps.google.com q=34.13981,3
3	M4	Ehmej	261.0	Union of Municipalities Caza Jbeil	UOM Caza Jbeil	LBN34066	Ehmej	34.12178	35.78399	Mount Lebanon	Beirut & Mount Lebanon	Jbeil	26211	26030	Ehmej	CF	http://maps.google.com q=34.12178,3
4	M5	Bejje	NaN	NaN	NaN	LBN34035	Bejje	34.18018	35.71356	Mount Lebanon	Beirut & Mount Lebanon	Jbeil	26276	26068	Bejjeh	CF	http://maps.google.com q=34.18018,3

Figure 2: I narrowed down the interest of the data set to the following 5 columns

	Municipality Name_EN	Latitude	Longitude	Governorate	District
0	Beirut	33.89890	35.51240	Beirut	Beirut
1	Jbail	34.12042	35.64711	Mount Lebanon	Jbeil
2	Edde	34.13981	35.66345	Mount Lebanon	Jbeil
3	Ehmej	34.12178	35.78399	Mount Lebanon	Jbeil
4	Bejje	34.18018	35.71356	Mount Lebanon	Jbeil

Figure 3: Municipalities on the map of Lebanon

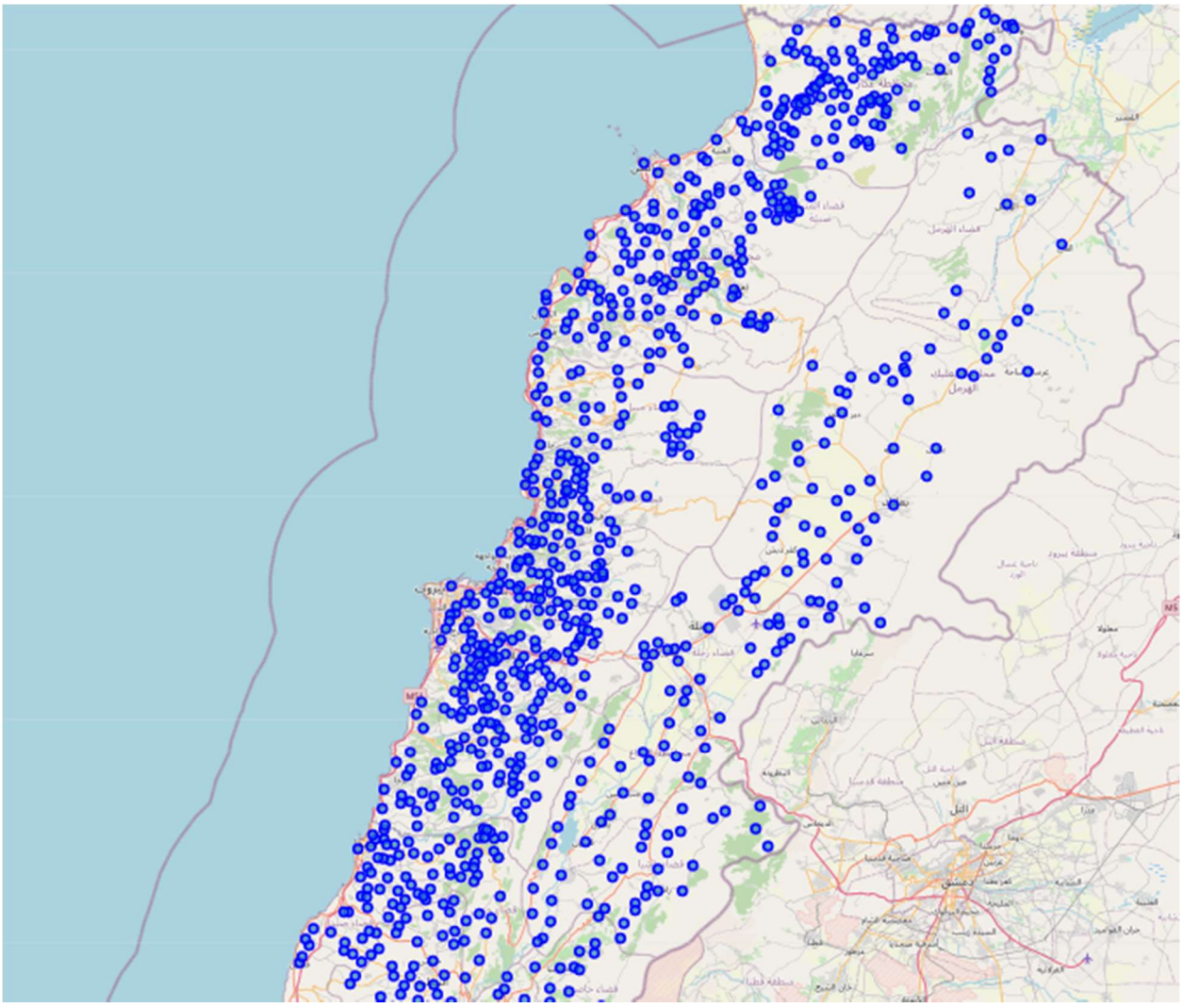


Figure 4: Visualization of the number of municipalities per Governorate (States in the USA)

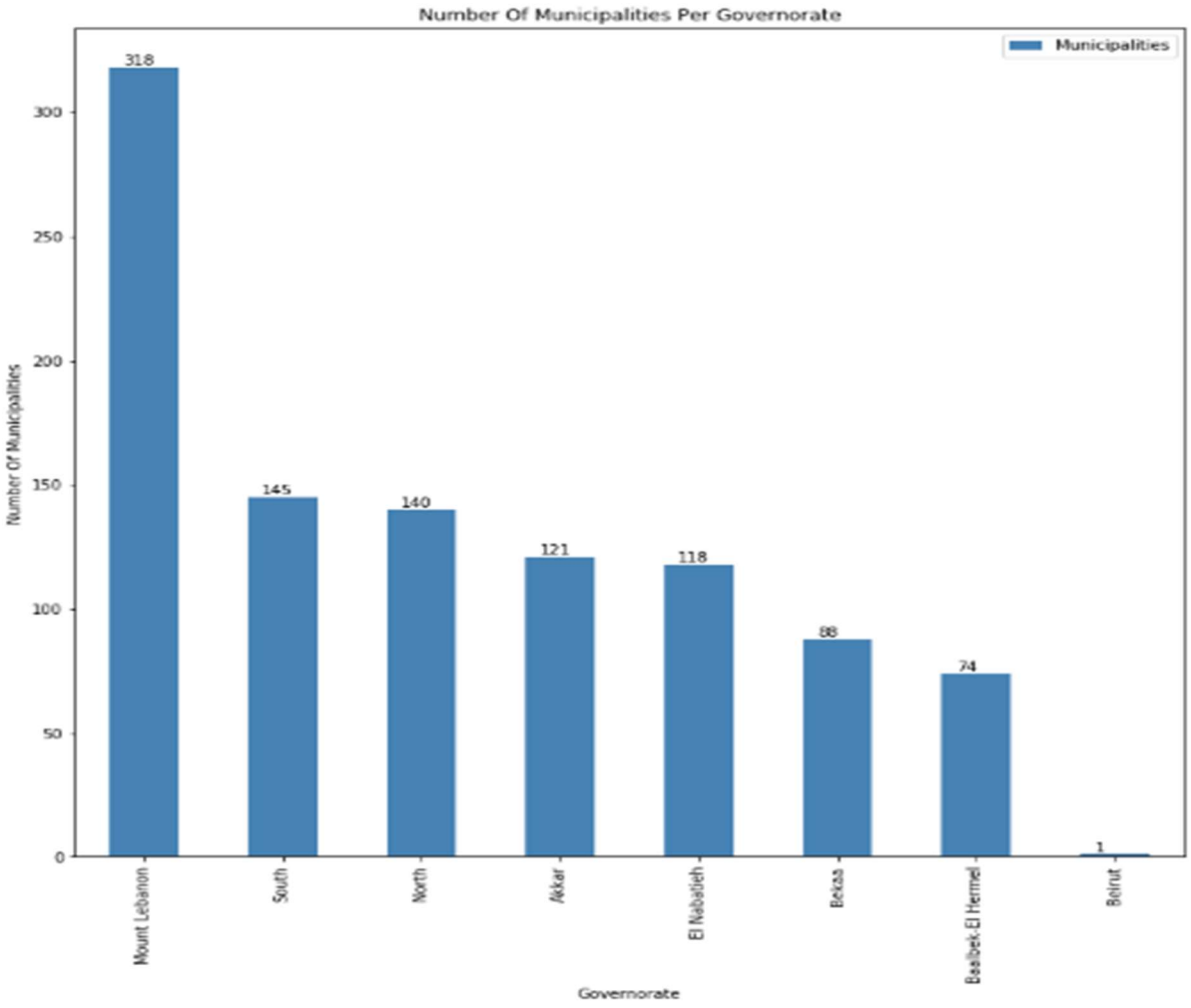
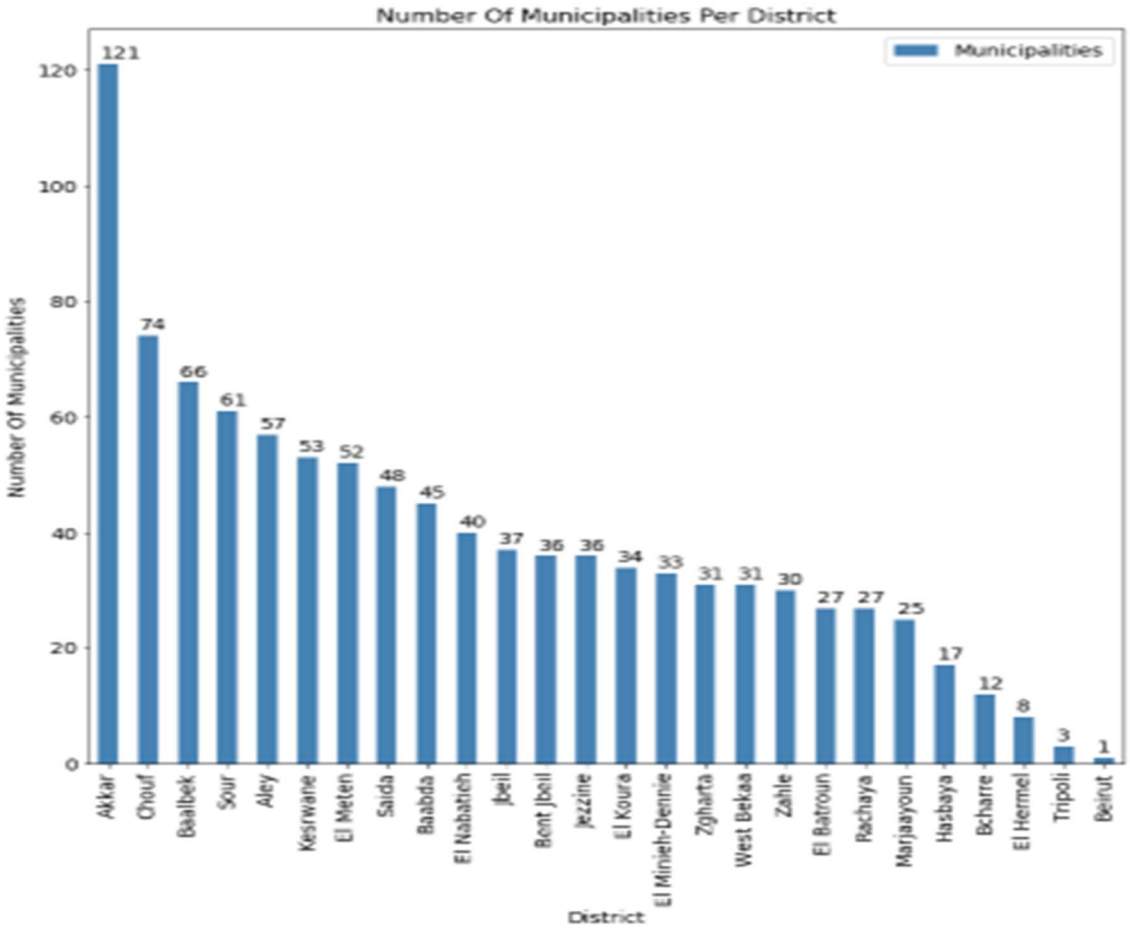


Figure 5: Visualization of the number of municipalities per District (Boroughs in the USA)



- Mount Lebanon turned out to be the biggest governorate and Beirut the capital of Lebanon so I narrowed down my data set into those 2 Governorates because of the 500 API calls per day limit. Then used Foursquare API to extract the venues for each neighborhood (municipality in that case) and obtained the following data set

Figure 6: Venues data set

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Beirut	33.8989	35.5124	Lux	33.898216	35.511064	Diner
1	Beirut	33.8989	35.5124	La Mezcaleria	33.897481	35.511032	Mexican Restaurant
2	Beirut	33.8989	35.5124	Freddy's Hotdog	33.897188	35.511741	Hot Dog Joint
3	Beirut	33.8989	35.5124	Le Petit Gris	33.896019	35.510799	French Restaurant
4	Beirut	33.8989	35.5124	4:29	33.896833	35.509955	Pub

Figure 7: Number of venues per Neighborhood

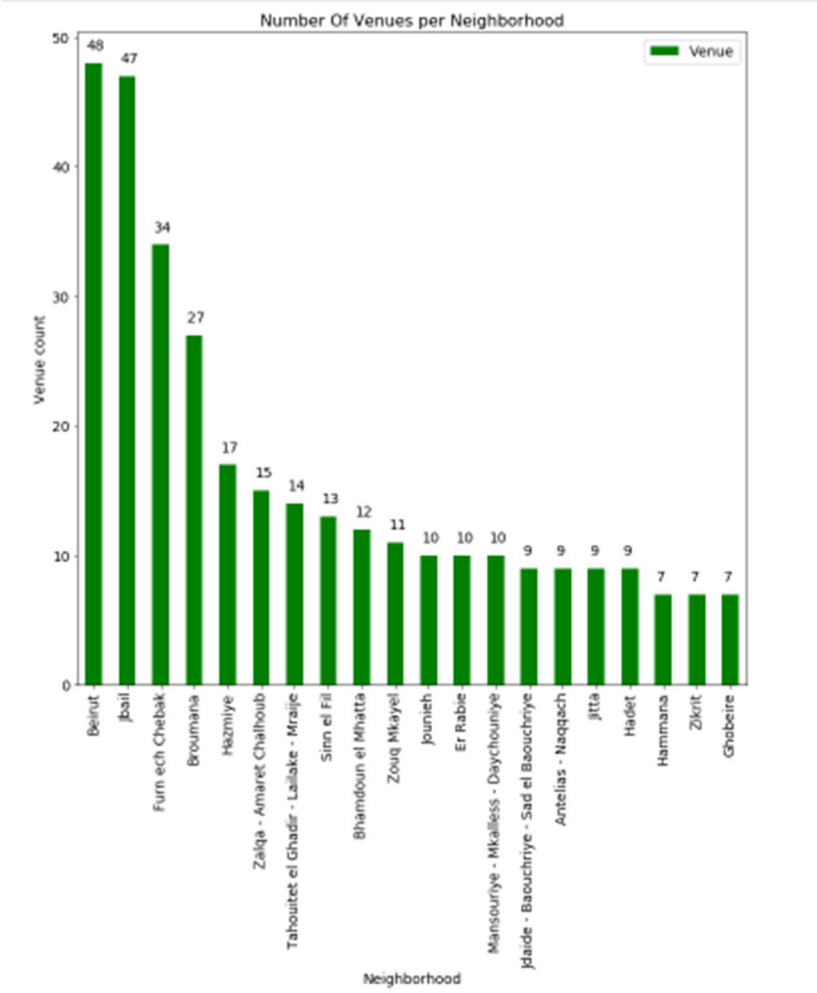


Figure 8: 5 most common venues per Neighborhood

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Antelias - Naqqach	Gourmet Shop	Mediterranean Restaurant	Road	Karaoke Bar	Bakery
1	Arayia	Campground	Gym	Japanese Restaurant	Mountain	Diner
2	Baaqline	Bakery	Burger Joint	Department Store	Bookstore	Women's Store
3	Baissour	Gift Shop	Tourist Information Center	American Restaurant	Athletics & Sports	Arts & Crafts Store
4	Balloune	Sandwich Place	Pizza Place	Gift Shop	Sushi Restaurant	Pharmacy