HOMEWORK06 – API

WEATHERPY

GOAL

The main goal of this initial study is to understand the relationship between Latitude and several Weather measurements, like Max Temperature, Humidity, Wind Speed, and Cloudiness.

The second inherent goal associated is to understand the overall mechanism of Openweather API as well as Citipy library (based on another API).

DATA PULL AND CLEANING

The pulling of the information was based on two different steps.

1. **Generate Cities List:** By using Citipy library, we have identified which are the closest cities to a matrix of 1500x1500 points in Latitude (Lat: [-90,90]) and longitude (Lng:[-180,180]).
2. **API OPENWEATHER MAP:** Based on all cities given by Point 1, I created a loop to get all weather's characteristics of each town. To better accommodate all information, we have to change the units of Temperature measures from Kelvin to Fahrenheit (units = "imperial"). The code below shows the processing information of each city. As per state below, 627 were analyzed since OpenWeatherMap API has identified just 576.

```
All Cities being processed:
 ------------------------------
Processing 1 out of 627. City pochutla founded (1 city founded)
Processing 2 out of 627. City bengkulu founded (2 city founded)
Processing 3 out of 627. City sentyabrskiy not founded (1 not city founded)
Processing 4 out of 627. City taolanaro not founded (2 not city founded)
Processing 5 out of 627. City catamarca founded (3 city founded)
Processing 6 out of 627. City rikitea founded (4 city founded)
Processing 7 out of 627. City hilo founded (5 city founded)
Processing 8 out of 627. City lufkin founded (6 city founded)

Processing 619 out of 627. City dunedin founded (569 city founded)
Processing 620 out of 627. City lasa founded (570 city founded)
Processing 621 out of 627. City college founded (571 city founded)
Processing 622 out of 627. City karasjok founded (572 city founded)
Processing 623 out of 627. City mackay founded (573 city founded)
Processing 624 out of 627. City moctezuma founded (574 city founded)
Processing 625 out of 627. City neustadt founded (575 city founded)
Processing 626 out of 627. City mahaicony not founded (51 not city founded)
Processing 627 out of 627. City kabare founded (576 city founded)
All Cities processed:576 cities founded and 51 cities not founded
```

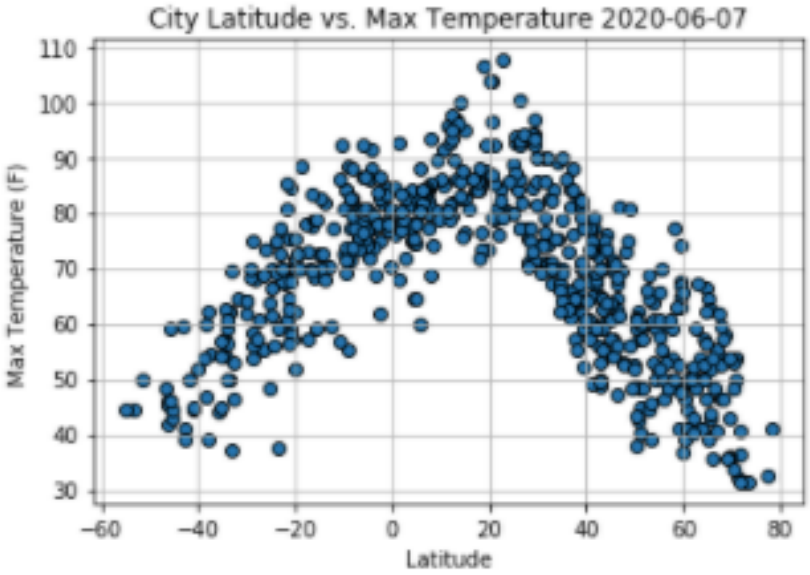
A couple of other cleaning steps were performed, such as make sure we would not have any city with Humidity above 100% or not considering column *Date*.

DATA ANALYSIS

In what concerns Data Analysis, I studied the influence of the Latitude on each of the weather's metrics. Below you can find a summary based on each parameter.

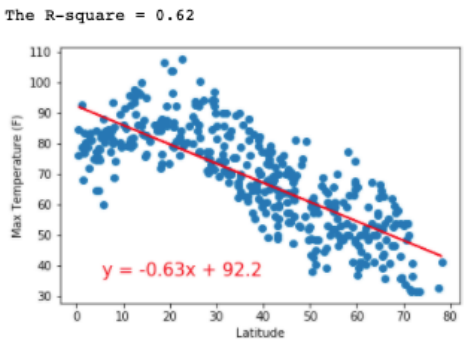
01. MAX TEMPERATURE (F)

As known, near the tropics (latitude closer to 0), the Temperature is higher when compared with Polos (latitude's extremes). This inverted U curve, shown below, illustrates that relationship between distance to Polos and Temperature increases.

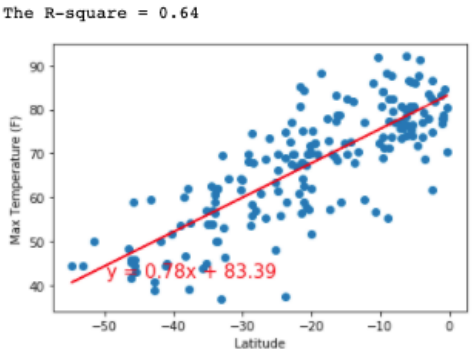


Nonetheless, we cannot get the influence of each Hemisphere on the Temperature. The two figures illustrate that relationship.

Northern Hemisphere



Southern Hemisphere



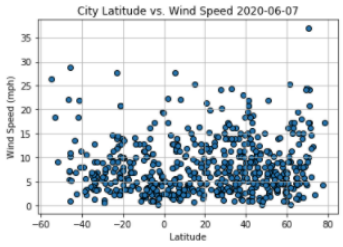
We cannot evaluate the sign of the slope. However, we can look at the intensity of it. Thus, we can see that Southern Hemisphere is a little more impacted by Latitude in what concerns Temperature (higher slope). On the other side

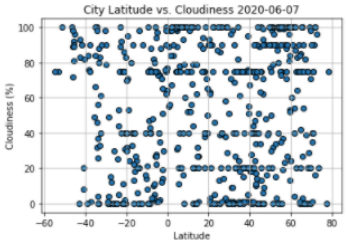
looks like Northern Hemisphere has an initial higher temperature (higher intercept). This last point is harder to define, and maybe it's just connected with the nature of the model.

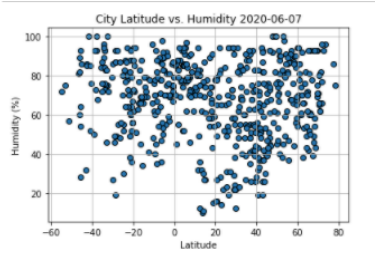
From both, we can see there is a relatively good dependence of the Temperature based on Latitude since R-square in around 0.60.

02. Other Parameters

In what concerns the other metrics, Cloudiness, Wind Speed, and Humidity, I decided to join them since there is no direct influence of Latitude on all these three characteristics.







The same can be identified in the analysis of both Hemisphere. The table below summarizes the R-square for each group.

Hemisphere	Cloudiness	Humidity	Wind Speed
North	0.00	0.00	0.01
South	0.03	0.00	0.05

Conclusion:

From this analysis, it is possible to conclude that only Temperature is dependent on Latitude, being all other weather elements not reliant on it.

On the other hand, we can agree that using API is an original method and help the user a lot to generate data and therefore, analysis. By knowing their functionalities, you can drive a lot of investigation.

VacationPy

Goal

Based on the analysis performed in WeatherPy, the main focus of this work is to select the "better cities" to have vacations based on a couple of weather variables. Then, select and show a Hotel option in each destination in a heatmap of Humidity.

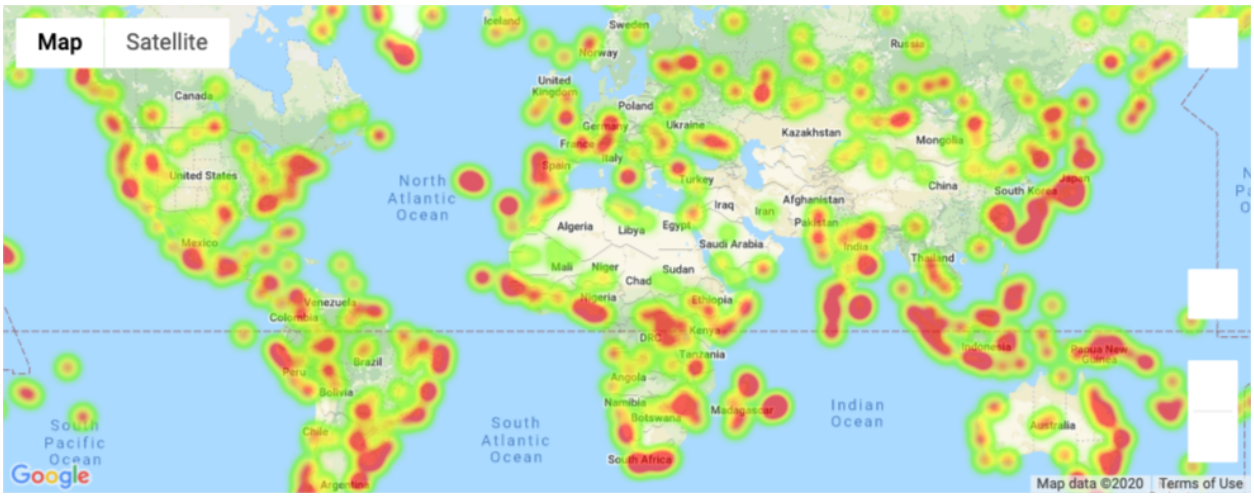
Data Pull & Cleaning

In this case, we have used all analyses performed in exercise WeatherPy, and then use Google Maps API to draw maps and Google Places API to identify the hotels nearby the perfect cities' location.

More details on the use of those can be seen in the Jupyter Notebook associated.

DATA ANALYSIS

Below you can see the world map and how humidity impacts each origin.



From the map, we can induce that regions of the globe nearby oceans are more humid than other areas, what is somehow expected due to the nature of these cities.

01. FIND THE BEST SPOTS

Based on the bibliography, the worldwide best vacations spots can be summarized, in terms of weather condition as follows:

- Max temperature between 70 and 80 degrees Fahrenheit;
- Wind Speed below ten mph; and
- Cloudiness equal to 0.

Based on those characteristics, the data led me to 7 different cities around the globe. The continent most represented was Africa.

With that in mind, and using Google Place as support, I looked for which are the hotels nearby those cities (in a radius of 5km).

The below table summarizes all information about those cities. Moreover, we could not find a hotel in that radius on 2 of the seven places.

City	Lat	Lng	Max Temperature (F)	Humidity	Cloudiness	Wind Speed	Country	Hotel Name
fukue	32.69	128.84	71.04	74	0	6.11	JP	SERENDIP HOTEL GOTO
ambilobe	-13.20	49.05	70.29	69	0	4.90	MG	Hotel National
sile	41.18	29.61	73.00	66	0	1.01	TR	The Sign Sile Hotel & Spa
nchelenge	-9.35	28.73	71.24	60	0	2.01	ZM	CM Guest house
bolshaya dzhalga	45.97	42.70	70.47	51	0	6.53	RU	Hotel Not Found
lucapa	-8.42	20.74	73.80	35	0	3.47	AO	Hotel Not Found
gat	31.61	34.76	79.00	64	0	3.00	IL	Desert Gat

The below picture illustrates the same previous information but, on the MAP, spotting the city location. At the Jupyter notebook, you can also get information about the hotel and the country by clicking on the markers.

CONCLUSION

Similar to the previous exercise, the main conclusion is linked with the fact of using APIs in our favor to drive analysis and data-oriented decisions.

Moreover, as requested, we could find the best vacations spots across the globe and somehow encounter hotels at those locations.