Analyzing the COVID-19 impact for New York City restorans and unemployment rate

Applied Data Science Capstone Project, September 2020, Anna Zhukova

Introduction

New York City is the biggest city of the U.S. with an estimated population of 8,336,817 in 2019 distributed over about 302.6 square miles (784 km^2), New York City is also the most densely populated major city in the United States. NYC is attracting thousands of people for tourism and living every year. In 2019 it brought in about $45 billion in annual spending and supported about 300,000 jobs.

NYC is a bright vibrant city, where you can try cuisines from all over the world. Number of restaurants in 2018 in this city was 27043, but the total number of eating and drinking places was more than 50k. In 2019 Food Services provided 865,800 jobs and covered 9% of the employment in NYC. One hundred and twenty six of NYC's restaurants have been awarded Michelin stars. There are also nine NYC restaurants that made it onto the World's 100 Best Restaurants list.

Officials had been expecting more than 67 million visitors in 2020, about one-fifth of them from outside the country. But the COVID-19 pandemic happened in March 2020. All World had already suffered from the pandemic. NYC was an epicenter in the U.S. in spring 2020 and had a strong damage from COVID-19. Let’s try to find details and to do analysis of its impact on NYC.
This project can be useful for business owners and entrepreneurs who are looking to invest, open a restaurant in NYC.

Data Collection

The data required for this project is as follows has been collected from multiple sources.
The following data is required for the project:
1) Neighborhood data of NYC (borough, neighborhood, geographical coordinates)
2) COVID-19 data in NYC
3) Unemployment rate Data
4) Venue data for neighborhoods in NYC Neighborhoods

Neighborhoods Data

The data of the neighborhoods in NYC was taken from an open json file https://cocl.us/new_york_dataset . The data is added into a pandas dataframe. The geocoder library in python has been used to obtain latitude and longitude data for various neighborhoods in NYC. This data is relevant for plotting the map of NYC using the Folium library in python.

COVID-19 Data

It is open data on site with John Hopkins reported cases for all US: https://www.kaggle.com/headsortails/covid19-us-county-jhu-data-demographics I will take only data for NYC.

Unemployment rate Data

Statistics per month is available on site: https://www.bls.gov/regions/new-york-new-jersey/data/xg-tables/ro2xglausnyc.htm

Venue Data

The venue data has been extracted using the Foursquare API. This data contains venue lists, recommendations for all neighborhoods in NYC and is used to check the popular venues of different neighborhoods.

Methodology

I used the GitHub repository in my study and IBM Watson Studio for this project. I used a python folium library to visualize geographic details of New York City and its boroughs and restaurants.

I chose the Foursquare API to explore venues in the concrete borough of NYC (Midtown) and choose the restaurants with their own latitude and longitude information.

Also I got information about rating and likes from visitors.The table with top-5 restaurants is here.

	index	id	name	categories	lat	lng	rating	likes
0	21	595ebd0aee712007dc5ae215	Sushi By Bou	Sushi Restaurant	40.758679	-73.983045	9.1	83
1	4	5a7e4674da2e00425ee2921d	Málà Project	Szechuan Restaurant	40.756850	-73.980855	9.0	146
2	16	5890c970cc5b6a43d6bf01a0	Omar's Mediterranean Cuisine	Mediterranean Restaurant	40.750943	-73.981020	8.9	61
3	0	5b9fe1ef93bd63002c3bbb7b	CAVA	Mediterranean Restaurant	40.754186	-73.981913	8.9	41
4	1	4ce5648a5fce5481ba5e5baa	Sophie's Cuban Cuisine	Cuban Restaurant	40.755927	-73.980598	8.8	187

Results and Discussion

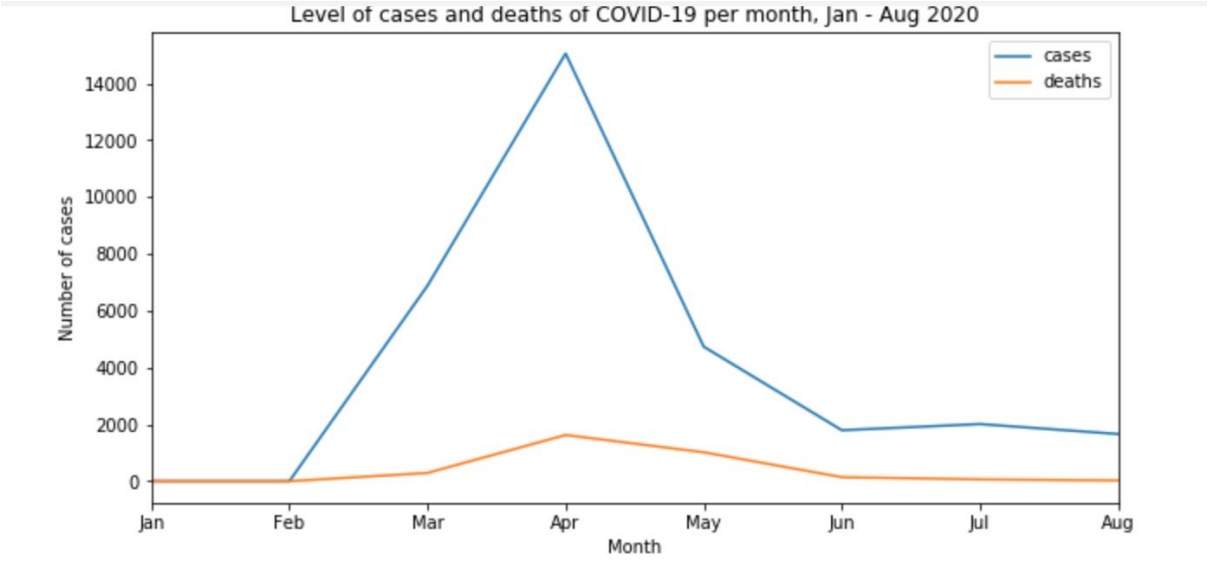
In this project I tried to analyse the situation with COVID-19 in restaurant business in NYC. After the first wave in April unemployment rate highly increased and was the highest in June (20.3) for the last 10 years. Food Services covered 9% of total employment in NYC in 2019. From March 2020 a lot of people lost their jobs in food services. Some restaurants started to offer takeaway options or tables on open air terraces. I checked all the results in Google.maps. Almost all restaurants are still working but some of them temporarily closed (**Ikinari Steak**, **Tony's Di Napoli**, **Sushi By Bou**, **Koi New York**) or closed forever. A lot of places haven't possibility of eating inside a restaurant, only takeaway options. Only in **Gabriel Kreuther**, **STK Steakhouse Midtown NYC** and **Strip House** you still can reserve a table on a terrasse and enjoy your meal in the restaurant.

I checked table reservations for Gabriel Kreuther restaurant for Sat 26th of September, there are no free tables for the whole day. The same time I used a request at Foursquare API for this restaurant for information on how many visitors are in Gabriel Kreuther (hereNow in the results) but it was 0. I think the feature of checking in yourself in the Foursquare app is out of use these days. It was surprising for me that the Foursquare API was out of day: no information about temporarily closing or takeaway option.

The second part of the research shows COVID situation with cases and unemployment rate.

month	cases	deaths	unemployment_rate
Jan	0	0	3.5
Feb	0	0	3.4
Mar	6876	292	4.1
Apr	15044	1626	15.0
May	4733	1019	18.3
Jun	1794	142	20.3
Jul	2011	65	19.9
Aug	1661	26	16.0

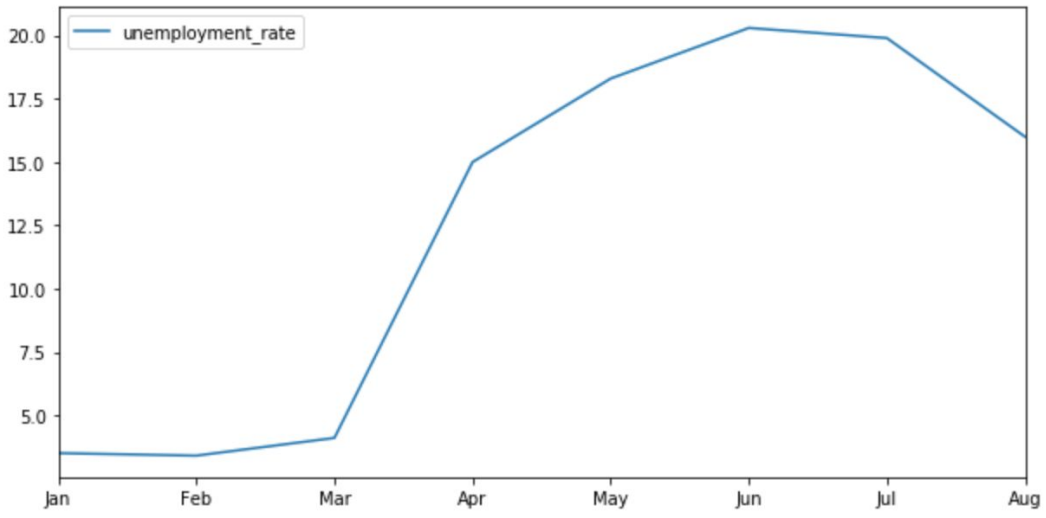
Data with only 8 months is really small data for statistics but anyway let's look at it.




```
unemployment_rate_plot = pd.to_numeric(covid_main['unemployment_rate'])
unemployment_rate_plot = pd.DataFrame(unemployment_rate_plot)
```

```
unemployment_rate_plot.plot(figsize=(10,5))
```

```
]: <matplotlib.axes._subplots.AxesSubplot at 0x7efcc9e50588>
```



So we can see that the unemployment rate goes with tardiness after the first wave of COVID in April and also has a slow trend for decreasing because of fear of the next wave and almost full absence of tourists.

Conclusion

I tried to analyze the situation with COVID-19 in NYC. Close to 1,000 NYC restaurants and bars have permanently closed since March, but more accurate documentation of the pandemic's toll could take months or years. Certainly It is no good time for opening a new restaurant in NYC. But it is good that most part of existing restaurants try to survive. There are takeaway options and

home delivery options because people like to eat outside and will continue to do it. The owners and investors can add new options and save their business and clients. From the news I knew that some famous old restaurants closed forever (https://ny.eater.com/2020/5/8/21248604/nyc-restaurant-closings-coronavirus) I hope that restorans like Gabriel Kreuther which have worked for a long time and have been awarded Michelin stars will survive.

Thank you for your attention.

The gitHub link of research is https://github.com/annzhukova/Coursera_Capstone/blob/master/Capstone%20project%20(final).ipynb

If maps in the link don't work correctly it is available also here: https://eu-de.dataplatform.cloud.ibm.com/analytics/notebooks/v2/32b54f27-d66e-44a8-adad-603a90514921/view?access_token=8506b60dbf33e4d9c2de7ad1f34b093fbdbfd647d0700776643dcbd8b8ff4e0d