BATTLE OF THE NEIGHBOURHOODS
San Francisco restaurants during the pandemic

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1. Introduction

1.1. Background

The ongoing COVID pandemic has affected our lives in a tremendous way. Hygiene has become an essential aspect of our households, businesses and public places.

The pandemic will leave many aspects of our day-to-day lives changed, forever. As restaurants start to reopen – families, couples, and out-goers will have to choose wisely before making a decision to go to place risking themselves getting infected.

1.2. Problem

As people start going out, they want to choose a place that puts hygiene first and are facilized with best hygiene practices. We're trying to put forth some of the cleanest restaurants in San Francisco based on the cleanliness of the neighborhood they're situated in.

2. Data

2.1. Sources

The first dataset to be used will consist of a GeoJSON file outlining the names and boundaries of San Francisco's 41 neighborhood. It's based on the 2019 census data.

Foursquare APIs will be later used to explore each neighborhood's restaurants. Foursquare consists of massive datasets that further inoculate the accurate locations of these restaurants that are to be used for our project today.

Finally, the overall data used to perform the restaurant hygiene analysis is provided by the City of San Francisco and the result of Health Department's inspection program.

Based on the restaurants retrieved from the Foursquare APIs, we will determine the health risks of each cluster that these restaurants will be put in. This data was last updated on July 27th, 2020 and is available on the City's web database.

3. Methodology

Each of San Francisco's 41 neighborhoods were analyzed and their restaurants were located using the Foursquare API. The data obtained of the restaurants were then compared with City Health Department's data of restaurant inspection - which is readily available and was updated on July 27th itself.

One of the pros that this procedure brought up was the fact that the City has already labelled restaurants based on what their inspection results was. The labelling was as follows:

- High Risk
- Moderately High Risk
- Moderate Risk
- Moderately Low Risk
- Low Risk

Based on the same, restaurants labelled 'Low risk' would be the safest for customers to go to and therefore were recommended.

	business_id	business_name	business_address	business_city	business_state	business_phone_number	inspection_id	inspection_date	inspection_ty
0	101192	Cochinita #2	2 Marina Blvd Fort Mason	San Francisco	CA	+14150429222	101192_20190606	2019-06-06T00:00:00.000	New Ownersh
1	97975	BREADBELLY	1408 Clement St	San Francisco	CA	+14157240859	97975_20190725	2019-07-25T00:00:00.000	Routine - Unscheduled
2	92982	Great Gold Restaurant	3161 24th St.	San Francisco	CA	NaN	92982_20170912	2017-09-12T00:00:00.000	New Ownersh
3	101389	HOMAGE	214 CALIFORNIA ST	San Francisco	CA	+14154878161	101389_20190625	2019-06-25T00:00:00.000	New Construction
4	85986	Pronto Pizza	798 Eddy St	San Francisco	CA	NaN	85986_20161011	2016-10-11T00:00:00.000	New Ownersh

The above table represents these restaurants that were inspected. It's important to note that the inspection type differs for each one. While unscheduled/routine visits are preferably *truer* than new construction one primarily because data confirms that restaurant hygiene deteriorates as they span for longer times.

	business_name	business_address	inspection_date	inspection_type	violation_description	risk_category	inspection_score
1	BREADBELLY	1408 Clement St	2019-07-25T00:00:00.000	Routine - Unscheduled	Inadequately cleaned or sanitized food contact...	Moderate Risk	96
7	Fools Errand	639 Divisadero St A	2019-03-27T00:00:00.000	Routine - Unscheduled	Inadequately cleaned or sanitized food contact...	Moderate Risk	84
8	MoBowL	428 11th St	2017-04-29T00:00:00.000	Routine - Unscheduled	Moderate risk food holding temperature	Moderate Risk	94
11	VICTOR'S	210 TOWNSEND St	2018-10-30T00:00:00.000	Routine - Unscheduled	Improper storage use or identification of toxi...	Low Risk	71
12	New Garden Restaurant, Inc.	716 Kearny St	2019-04-01T00:00:00.000	Routine - Unscheduled	Improper or defective plumbing	Low Risk	85
...	...	...	...	...	...	...	...
53967	7 Eleven #2366-35722A	4850 Geary Blvd	2018-09-19T00:00:00.000	Routine - Unscheduled	Inadequate and inaccessible handwashing facili...	Moderate Risk	84
53968	Snowbird Coffee	1352 A 9th Ave	2019-04-11T00:00:00.000	Routine - Unscheduled	Wiping cloths not clean or properly stored or ...	Low Risk	94
53969	Buffalo Kitchen	107 Leland Ave	2019-04-17T00:00:00.000	Routine - Unscheduled	Foods not protected from contamination	Moderate Risk	75
53970	BUNN MIKE	300 DE HARO ST	2019-03-21T00:00:00.000	Routine - Unscheduled	Inadequate and inaccessible handwashing facili...	Moderate Risk	84
53971	City Discount Meat & Grocery Market	2298 Mission St	2019-04-18T00:00:00.000	Routine - Unscheduled	Unclean or unsanitary food contact surfaces	High Risk	83

I was able to sort these restaurants by their inspection rating while corelating to the neighborhood they're located in. Based on a combination of all these platforms, I was able to rank these restaurants by their Hygiene score:

$$\text{Hygiene score} = i + c_{ns} / 2, \text{ where } i = \text{Inspection Score } \& \ c_{ns} = \text{neighborhood score}$$

4. Results

	Neighbourhood	Venue	Venue_Latitude	Venue_Longitude	Venue_Category	business_name	business_address	inspection_date	inspection_type
0	Alamo Square	Little Star Pizza	37.777489	-122.438281	Pizza Place	Little Star Pizza	846 Divisadero	2018-04-24T00:00:00.000	Routine - Unscheduled
1	Alamo Square	Brenda's Meat & Three	37.778265	-122.438584	Southern / Soul Food Restaurant	Brendas Meat & Three	919 DIVISADERO ST	2019-03-13T00:00:00.000	Routine - Unscheduled
2	Alamo Square	The Mill	37.776425	-122.437970	Bakery	The Mill	736 DIVISADERO St	2019-04-11T00:00:00.000	Routine - Unscheduled
3	Alamo Square	Jane the Bakery	37.783797	-122.434283	Bakery	Jane the Bakery	1875 Geary Blvd	2019-07-03T00:00:00.000	Routine - Unscheduled
4	Alamo Square	The Progress	37.783745	-122.432972	American Restaurant	The Progress	1525 Fillmore St	2019-02-14T00:00:00.000	Routine - Unscheduled
...	...	...	...	...	...	...	...	...	...
5024	Nob Hill	Osso Steakhouse	37.791447	-122.413530	Steakhouse	Osso Steakhouse	1177 California St	2019-06-03T00:00:00.000	Routine - Unscheduled
5025	Nob Hill	Batter Bakery	37.789551	-122.420776	Bakery	Batter Bakery	1517 Pine St	2018-08-21T00:00:00.000	Routine - Unscheduled
5026	Nob Hill	Nobhill Pizza & Shawerma	37.790767	-122.419747	Pizza Place	Nobhill Pizza & Shawerma	1534 California St	2019-09-23T00:00:00.000	Routine - Unscheduled
5027	Nob Hill	Kasa Indian Eatery	37.789655	-122.420449	Indian Restaurant	Kasa Indian Eatery	4001 18th St	2019-09-23T00:00:00.000	Routine - Unscheduled
5028	Nob Hill	Golden Horse Restaurant	37.790860	-122.417340	Chinese Restaurant	Golden Horse Restaurant	1060 Hyde St	2018-01-23T00:00:00.000	Routine - Unscheduled

The results revealed that one of the city's neighborhoods – Alamo Square, had the most number of clean and hygienic restaurants. Where all top 9 positions were acquired by restaurants in this neighborhood. Meanwhile, restaurants located in Nob Hill were found to be the least cleanest among all – where all bottom 4 positions were consequently acquired by restaurants in the region.

5. Discussion

I recommend leaving any comments, inputs and suggestions in the peer-graded review discussion section of the Coursera assignment page. Or you can leave a comment on this GitHub to let me know your inputs.

Some recommendations that I'd like to make are:

- There should be easier accessibility to these numbers
- There should be a portal where anyone could enter, see and check a neighborhood and restaurant's hygiene without having to use an API

6. Conclusions

The report concludes that restaurants can be ranked on the basis of the overall hygiene and neighborhood's cleanliness. However, a restaurant that is surrounded by restaurants having lower hygienic practices is more likely to follow the suit as well and vice versa. Which is an interesting topic that a neighborhood can affect the way a restaurant manages its hygiene.