Italian Chef Jimmy De Luca Moves to San Francisco

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Introduction and Problem Statement

- A New York City native, Jimmy De Luca has grown up to enjoy a successful career as owner and head chef of the hit restaurant, *Jaime Bolognese*

- Jimmy is ready for a new challenge: moving to the Golden Coast and opening up a second Italian restaurant

- The first priority: find an area in San Francisco with similar characteristics to his current living situation (a quaint three-story townhouse in New York City's SoHo neighborhood)

- Once found, Jimmy wants to hunt out the closest district to him that will likely have the most demand for Italian food
  - This will be measured by finding locations that have both a high number of restaurants and a high concentration of Italian Food

Data Acquisition

- The Foursquare API will be leveraged to help Jimmy answer two important questions:
    - What neighborhood in San Francisco should he move to that is most similar to New York City's SoHo neighborhood?
    - What is the best spot for his next hit Italian restaurant?
- To answer the first question, a dataset of all neighborhoods in San Francisco is needed, which can be found at *data.sfgov.org*
    - The geocoder library can then be used to get the exact latitude and longitude of each neighborhood
    - Once compiled, the Foursquare API will help perform a search of the most popular spots around each neighborhood
- To answer the second question, the Foursquare API will be used once again by searching for and classifying the most popular spots in each neighborhood
    - From these spots, we can determine how many total restaurants exist and how many Italian restaurants exist
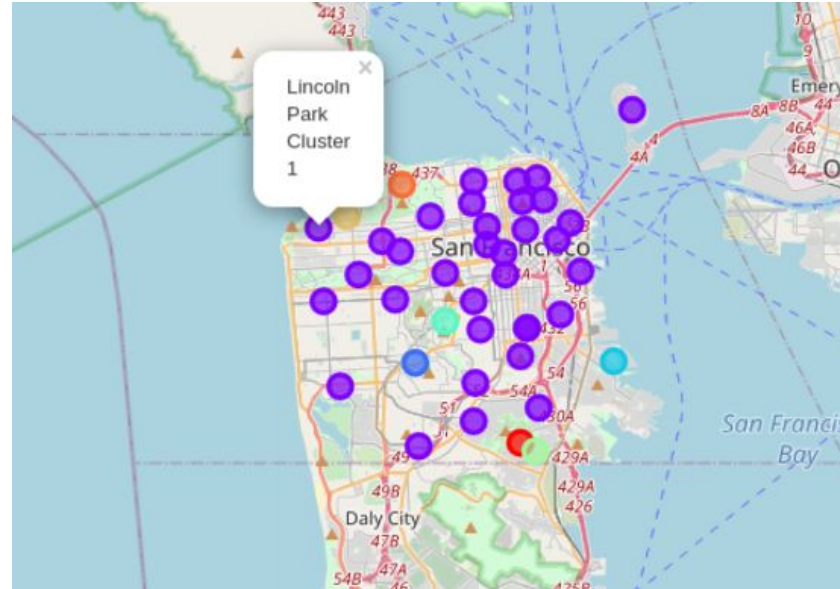
San Francisco neighborhoods dataset with respective venues imported using the Foursquare API

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Bayview Hunters Point	37.741286	-122.377633	Heron's Head Park	37.739663	-122.375904	Park
1	Bayview Hunters Point	37.741286	-122.377633	Bay Natives Nursery	37.740532	-122.376845	Garden Center
2	Bayview Hunters Point	37.741286	-122.377633	Speakeasy Ales & Lagers	37.738468	-122.380874	Brewery
3	Bayview Hunters Point	37.741286	-122.377633	Hunter's Point Shoreline	37.738240	-122.376753	Waterfront
4	Bayview Hunters Point	37.741286	-122.377633	USPS Cafeteria	37.740744	-122.382309	Café

One hot encoding is used to transform the dataset into a usable form for K-Means clustering

	Neighborhood	Yoga Studio	ATM	Accessories Store	Adult Boutique	Alternative Healer	American Restaurant	Antique Shop	Arepa Restaurant	Argentinian Restaurant	...
0	Bayview Hunters Point	0.000000	0.0	0.0	0.000000	0.0	0.000000	0.0	0.0	0.0	...
1	Bernal Heights	0.028571	0.0	0.0	0.000000	0.0	0.028571	0.0	0.0	0.0	...
2	Castro/Upper Market	0.020202	0.0	0.0	0.010101	0.0	0.010101	0.0	0.0	0.0	...
3	Chinatown	0.000000	0.0	0.0	0.000000	0.0	0.000000	0.0	0.0	0.0	...
4	Excelsior	0.021739	0.0	0.0	0.000000	0.0	0.000000	0.0	0.0	0.0	...

K-Means clustering performed on the San Francisco neighborhoods dataset

The neighborhoods grouped as the 1st cluster containing SoHo along with the top 10 venues in each area

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1	Bernal Heights	Coffee Shop	Trail	Playground	Mexican Restaurant	Italian Restaurant	Bakery	Yoga Studio	Park	Pizza Place	Cocktail Ba
2	Castro/Upper Market	Gay Bar	Coffee Shop	New American Restaurant	Cosmetics Shop	Thai Restaurant	Arts & Crafts Store	Seafood Restaurant	Playground	Convenience Store	Pet Stor
3	Chinatown	Coffee Shop	Cocktail Bar	Chinese Restaurant	Bakery	Italian Restaurant	New American Restaurant	Hotel	Restaurant	Men's Store	Bubble Te Sho
4	Excelsior	Mexican Restaurant	Bakery	Pharmacy	Chinese Restaurant	Latin American Restaurant	Bank	Sandwich Place	Grocery Store	Pizza Place	Vietnames Restaura
5	Financial District/South Beach	Coffee Shop	Café	Food Truck	Juice Bar	Art Gallery	Salad Place	Bar	Italian Restaurant	Sandwich Place	Gy

All neighborhoods that share the same 1st most common venue with New York City's SoHo

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
19	Russian Hill	Italian Restaurant	Park	Coffee Shop	Playground	Pizza Place	Café	Dive Bar	Sushi Restaurant	Chocolate Shop	Rock Club
22	Nob Hill	Italian Restaurant	Hotel	Coffee Shop	Café	Bar	Wine Bar	French Restaurant	Yoga Studio	American Restaurant	Hotel Bar
41	SoHo	Italian Restaurant	Hotel	Boutique	Coffee Shop	Clothing Store	Mediterranean Restaurant	Women's Store	Men's Store	Sushi Restaurant	Dessert Shop

The top five closest neighborhoods to Nob Hill and Russian Hill

	Neighborhood	Latitude	Longitude	Dist. to Nob Hill
0	Russian Hill	37.800073	-122.417094	44.954766
1	Chinatown	37.794301	-122.406376	56.684316
2	Tenderloin	37.784249	-122.413993	57.989573
3	North Beach	37.801175	-122.409002	64.130234
4	Japantown	37.785579	-122.429809	104.582943

	Neighborhood	Latitude	Longitude	Dist. to Russian Hill
0	Nob Hill	37.793262	-122.415249	44.954766
1	North Beach	37.801175	-122.409002	51.783916
2	Chinatown	37.794301	-122.406376	77.294286
3	Tenderloin	37.784249	-122.413993	102.745466
4	Marina	37.799793	-122.435205	114.846588

Nob Hill's closest neighborhoods and their respective restaurant densities

	Neighborhood	Latitude	Longitude	Dist. to Nob Hill	Total No. of Restaurants	No. of Italian Restaurants	Italian Restaurant Frequency
0	Russian Hill	37.800073	-122.417094	44.954766	7.0	0.0	0.000000
1	Chinatown	37.794301	-122.406376	56.684316	49.0	1.0	0.020408
2	Tenderloin	37.784249	-122.413993	57.989573	38.0	0.0	0.000000
3	North Beach	37.801175	-122.409002	64.130234	46.0	11.0	0.239130
4	Japantown	37.785579	-122.429809	104.582943	48.0	0.0	0.000000

Russian Hill's closest neighborhoods and their respective restaurant densities

	Neighborhood	Latitude	Longitude	Dist. to Russian Hill	Total No. of Restaurants	No. of Italian Restaurants	Italian Restaurant Frequency
0	Nob Hill	37.793262	-122.415249	44.954766	10.0	1.0	0.100000
1	North Beach	37.801175	-122.409002	51.783916	46.0	11.0	0.239130
2	Chinatown	37.794301	-122.406376	77.294286	49.0	1.0	0.020408
3	Tenderloin	37.784249	-122.413993	102.745466	38.0	0.0	0.000000
4	Marina	37.799793	-122.435205	114.846588	45.0	2.0	0.044444

Results and Discussion

- It is clear that North Beach is the best choice in both the Nob Hill table and the Russian Hill table

- First observing the Nob Hill table, we can see in the Total No. of Restaurants column there is a lack of restaurants in Russian Hill, the closest neighborhood to Nob Hill

- The No. of Italian Restaurants column and the Italian Restaurant Frequency column show that North Beach clearly has both the highest number of Italian restaurants in its area (11 to be exact) as well as the highest concentration (standing at nearly 25%)

- Similar results can be found in the Russian Hill table

Conclusion

- North Beach is close in proximity to both Nob Hill and Russian Hill

- North Beach has a relatively high number of total restaurants compared to other contenders (standing at 46 restaurants within a 175 meter radius from the epicenter)

- North Beach also has the highest concentration of Italian restaurants making up these venues (rounding to roughly 25% of total restaurants)

- This data-driven approach should provide Jimmy De Luca sufficient reasoning as to why he should consider Nob Hill or Russian Hill as his next place to live

- North Beach could likely grant him success if he opens up his next Italian restaurant

- Many other factors (including crime rate and educational opportunities for his kids) were not in scope for this analysis
  - Attributes such as this should be considered when Jimmy finalizes his plans to move across the country