

# Finding the best San Francisco neighborhood to open a bubble tea shop

Final Presentation – 3<sup>rd</sup> April 2020



## Open the boba shop in Outer Richmond and/or Bayview-Hunters Point

### Overview & Problem

**Which neighborhood would maximize profit for a new boba shop?**

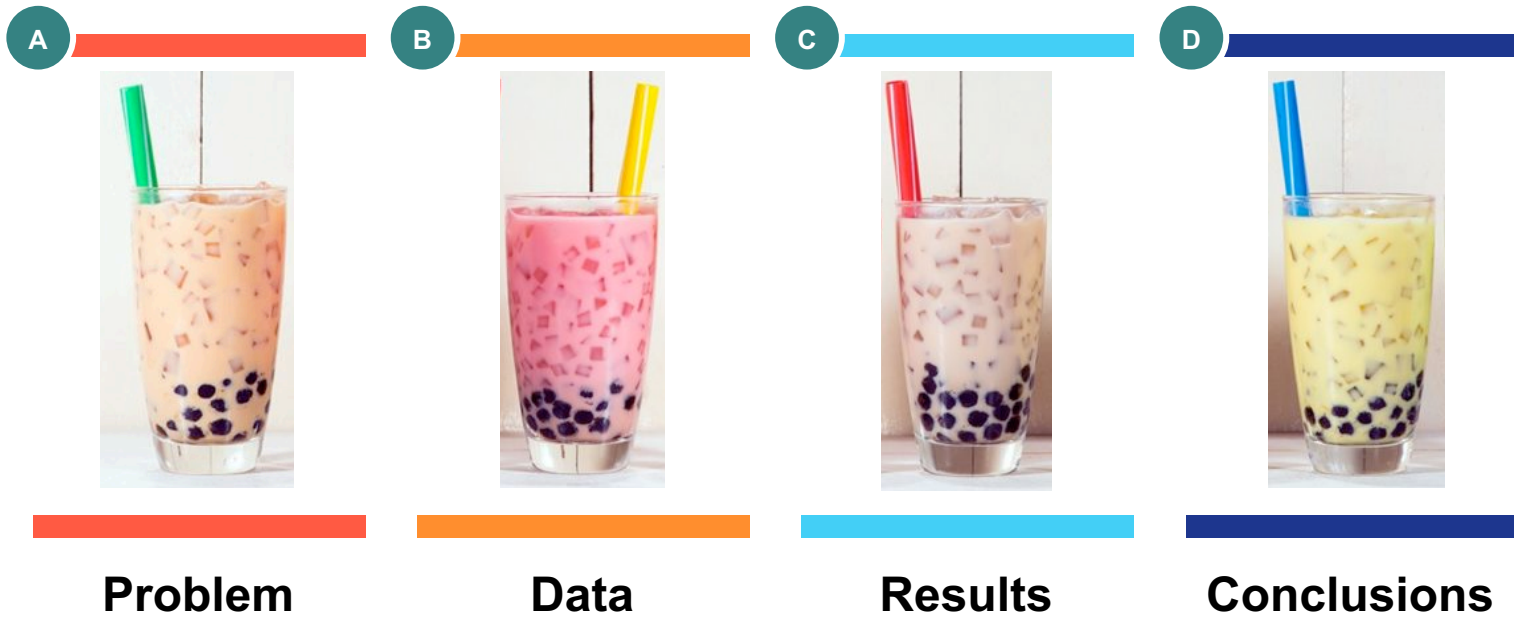
- Boba (aka bubble tea) is a popular Taiwanese drink.
- Boba shops are popular gathering places for people to do work and meet friends
- San Francisco has a large Asian population that has a high demand for boba

### Objective

**Determine the neighborhoods with a high density of Chinese Restaurants and low density of Bubble Tea Shops.**

- Asian restaurants typically drive boba demand.
  - Chinese restaurants are especially strong drivers of drive boba demand compared to others
- Having less boba shops in an area reduces our competition and drives higher demand for our shop

# Agenda



# Problem



**A Which neighborhood would maximize profit for a new boba shop?**

San Francisco & Boba Overview

- Relevant for bubble tea corporations (e.g. Boba Guys, Chatime, Gong Cha, etc.) and small business owners
- Boba (aka bubble tea) is a popular Taiwanese drink.
- Boba shops are popular gathering places for people to do work and meet friends
- San Francisco has a large Asian population that has a high demand for boba

# Data



## B Data Sources

### (1) SF Department of Public Health and (2) Foursquare API



#### San Francisco Neighborhoods as ZIP Codes



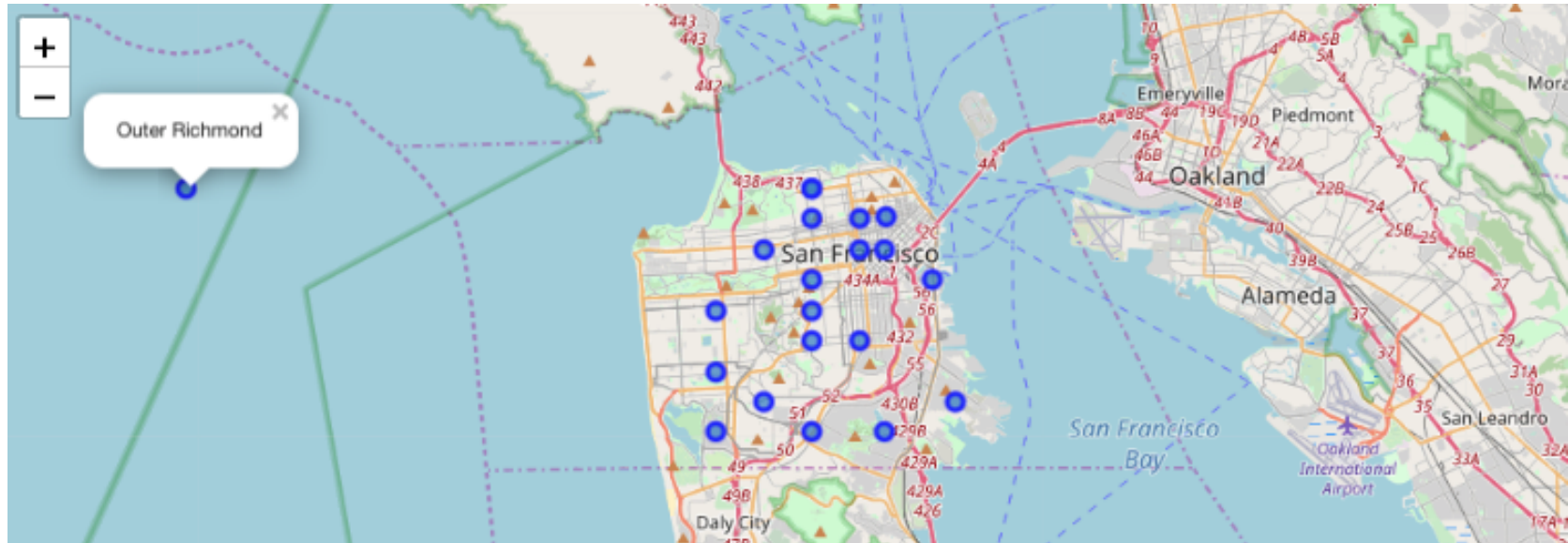
Zip Code	Neighborhood	Population (Census 2000)
<a href="#">94102</a>	Hayes Valley/Tenderloin/North of Market	28,991
<a href="#">94103</a>	South of Market	23,016
<a href="#">94107</a>	Potrero Hill	17,368
<a href="#">94108</a>	Chinatown	13,716



- Needed:
  - San Francisco Zip Codes and Neighborhoods
  - Restaurants and Bubble Tea Shops

## B Data Cleaning

Initial map of San Francisco with misplaced Outer Richmond neighborhood marker



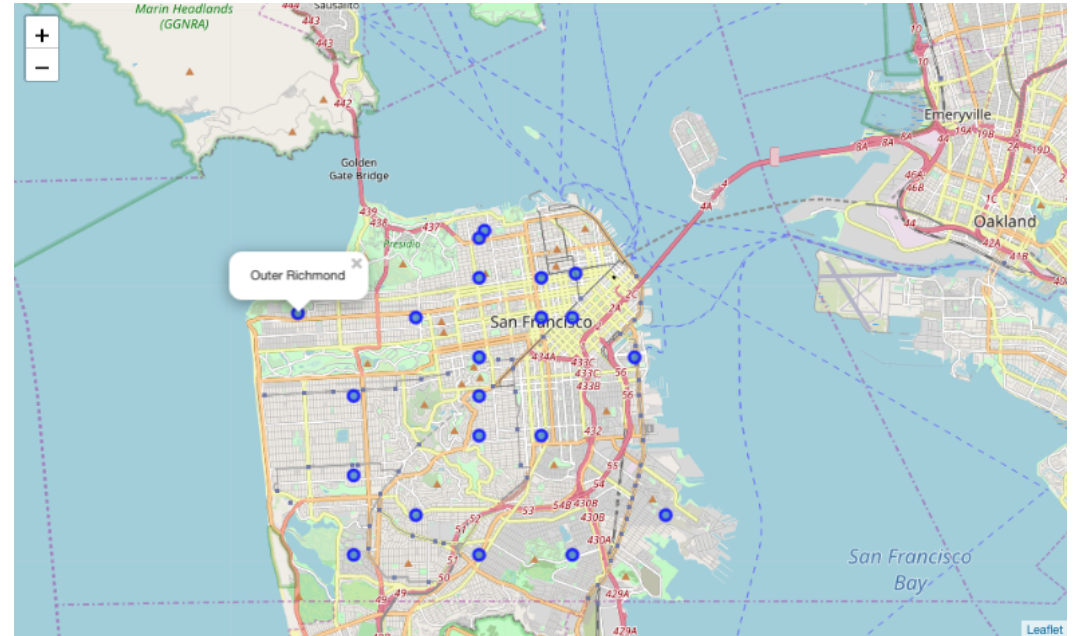
- Outer Richmond and Marina neighborhoods have inaccurate coordinates!
  - Outer Richmond is in the Pacific Ocean??



## B Data Cleaning

### Updated San Francisco map of neighborhoods

	Zip Code	Neighborhood	Population (Census 2000)	Latitude	Longitude
1	94102	Hayes Valley/Tenderloin/North of Market	28991	37.780	-122.420
2	94103	South of Market	23016	37.780	-122.410
3	94107	Potrero Hill	17368	37.770	-122.390
4	94108	Chinatown	13716	37.791	-122.409
5	94109	Polk/Russian Hill (Nob Hill)	56322	37.790	-122.420
6	94110	Inner Mission/Bernal Heights	74633	37.750	-122.420
7	94112	Ingelside-Excelsior/Crocker-Amazon	73104	37.720	-122.440
8	94114	Castro/Noe Valley	30574	37.760	-122.440
9	94115	Western Addition/Japantown	33115	37.790	-122.440
10	94116	Parkside/Forest Hill	42958	37.740	-122.480
11	94117	Haight-Ashbury	38738	37.770	-122.440
12	94118	Inner Richmond	38939	37.780	-122.460
13	94121	Outer Richmond	42473	37.781	-122.498
14	94122	Sunset	55492	37.760	-122.480
15	94123	Marina	22903	37.802	-122.438
16	94124	Bayview-Hunters Point	33170	37.730	-122.380
17	94127	St. Francis Wood/Miraloma/West Portal	20624	37.730	-122.460
18	94131	Twin Peaks-Glen Park	27897	37.750	-122.440
19	94132	Lake Merced	26291	37.720	-122.480
20	94133	North Beach/Chinatown	26827	37.800	-122.440
21	94134	Visitacion Valley/Sunnydale	40134	37.720	-122.410




- Manually adjusted coordinates based on data from Google search
- Updated San Francisco map with corrected neighborhood markers


## B Data Cleaning


### Foursquare venue data searches


	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Hayes Valley/Tenderloin/North of Market	37.78	-122.42	Herbst Theater	37.779548	-122.420953	Concert Hall
1	Hayes Valley/Tenderloin/North of Market	37.78	-122.42	War Memorial Opera House	37.778601	-122.420816	Opera House
2	Hayes Valley/Tenderloin/North of Market	37.78	-122.42	San Francisco Ballet	37.778580	-122.420798	Dance Studio
3	Hayes Valley/Tenderloin/North of Market	37.78	-122.42	Louise M. Davies Symphony Hall	37.777976	-122.420157	Concert Hall
4	Hayes Valley/Tenderloin/North of Market	37.78	-122.42	Asian Art Museum	37.780178	-122.416505	Art Museum


- Initial Foursquare search included all venue categories
- Filtered search on Asian Restaurant and Bubble Tea Shop venue category values in Foursquare Venue API search



**Asian Restaurant**  
4bf58dd8d48988d142941735



**Burmese Restaurant**  
56aa371be4b08b9a8d573568


**Cambodian Restaurant**  
52e81612bcbc57f1066b7a03


**Chinese Restaurant**  
4bf58dd8d48988d145941735


**Anhui Restaurant**  
52af3a5e3cf9994f4e043bea  
Supported countries: CNHKMOMYTWGSG


**Beijing Restaurant**  
52af3a723cf9994f4e043bec  
Supported countries: CNHKMOMYTWGJJP


**Cantonese Restaurant**  
52af3a7c3cf9994f4e043bed

## B K-means clustering

Segmented SF neighborhoods into 4 cluster types based on most common Asian venues

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Polk/Russian Hill (Nob Hill)	144	144	144	144	144	144
Chinatown	139	139	139	139	139	139
South of Market	131	131	131	131	131	131
Hayes Valley/Tenderloin/North of Market	122	122	122	122	122	122
Sunset	119	119	119	119	119	119
Parkside/Forest Hill	116	116	116	116	116	116
Inner Richmond	109	109	109	109	109	109
Western Addition/Japantown	106	106	106	106	106	106
Inner Mission/Bernal Heights	98	98	98	98	98	98
Haight-Ashbury	93	93	93	93	93	93
Castro/Noe Valley	73	73	73	73	73	73
Outer Richmond	72	72	72	72	72	72
St. Francis Wood/Miraloma/West Portal	71	71	71	71	71	71
Marina	65	65	65	65	65	65
North Beach/Chinatown	64	64	64	64	64	64
Potrero Hill	61	61	61	61	61	61
Ingelside-Excelsior/Crocker-Amazon	56	56	56	56	56	56
Lake Merced	42	42	42	42	42	42
Twin Peaks-Glen Park	34	34	34	34	34	34
Visitacion Valley/Sunnydale	34	34	34	34	34	34
Bayview-Hunters Point	11	11	11	11	11	11

```

----Bayview-Hunters Point----
      venue  freq
0   Chinese Restaurant  0.36
1 Vietnamese Restaurant  0.18
2   Asian Restaurant    0.09
3   Japanese Restaurant  0.09
4   Hawaiian Restaurant  0.09

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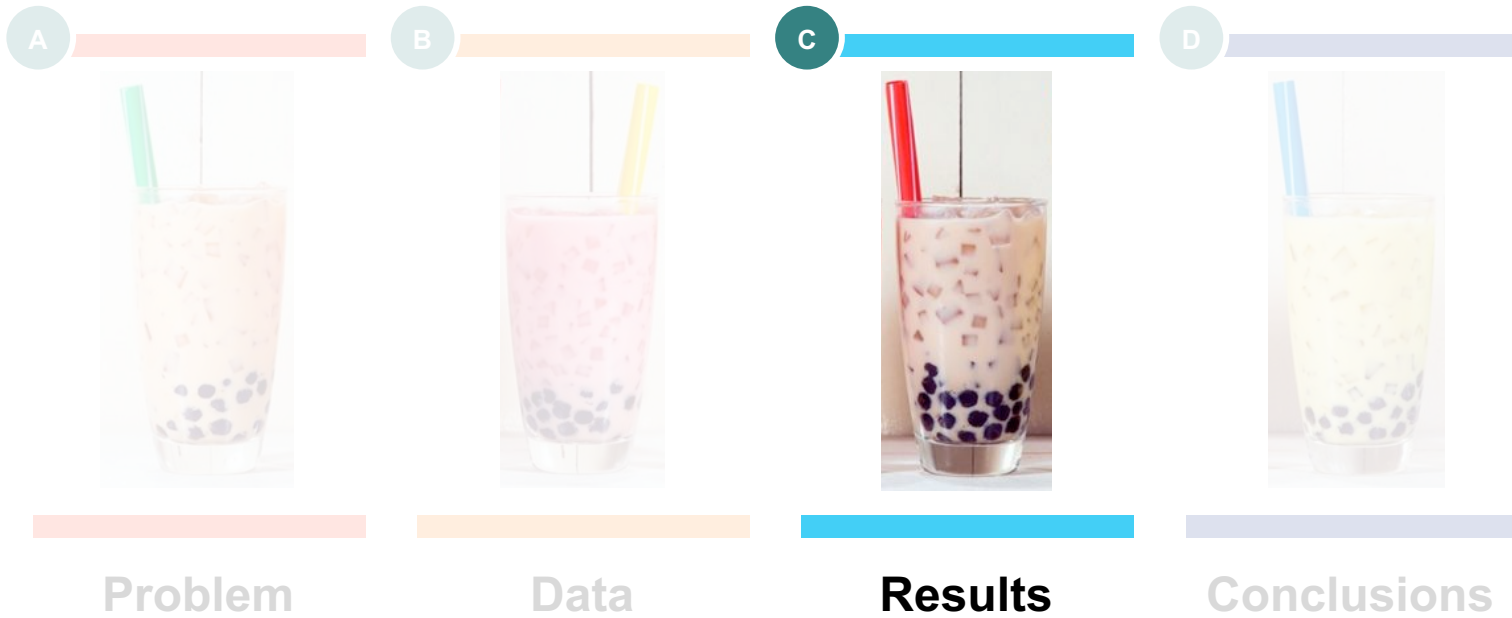
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----Castro/Noe Valley----
      venue  freq
0   Thai Restaurant    0.26
1   Sushi Restaurant    0.22
2 Vietnamese Restaurant  0.08
3   Asian Restaurant    0.08
4   Chinese Restaurant  0.05

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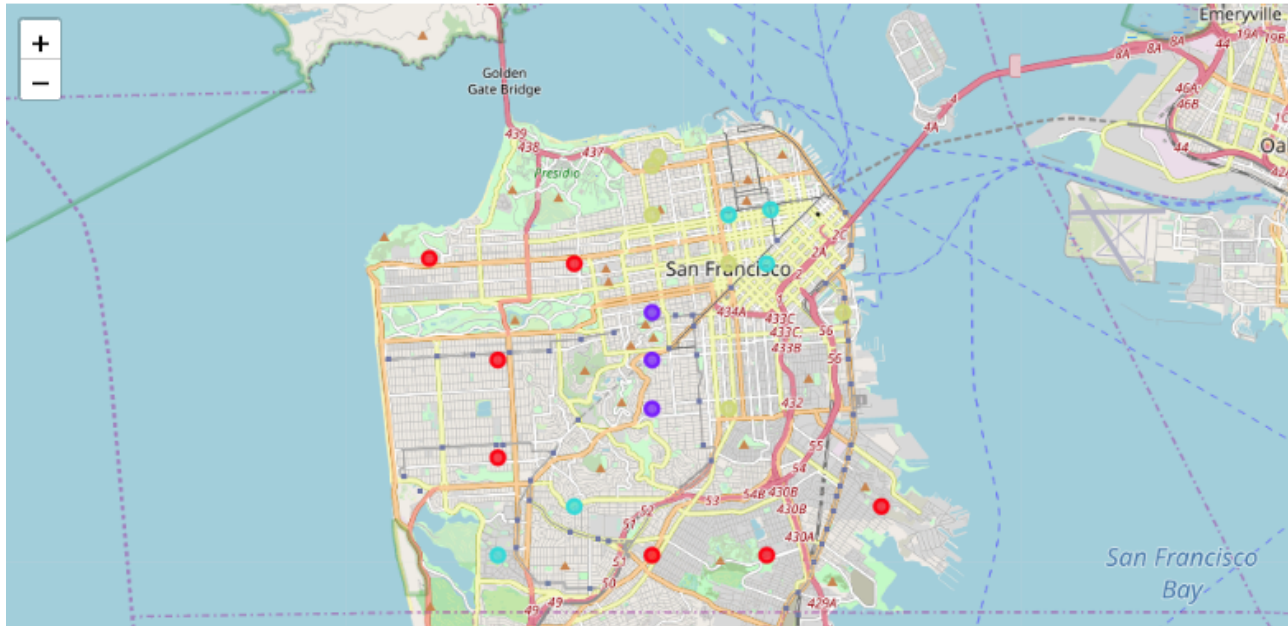
- Nob Hill (not Chinatown!) has the most Asian Restaurants and Bubble Tea Shops in San Francisco

# Results



## c Cluster Analysis

Segmented SF neighborhoods into 4 cluster types based on most common Asian venues



- Neighborhoods with similar Asian restaurant density are physically located near one another
- Exception: Red (Cluster #1) neighborhoods are distributed around the outskirts and NOT Downtown

## c Cluster Analysis

### Cluster #1

Neighborhood	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Ingelside-Excelsior/Crocker-Amazon	0	Chinese Restaurant	Vietnamese Restaurant	Bubble Tea Shop	Filipino Restaurant	Asian Restaurant
Parkside/Forest Hill	0	Chinese Restaurant	Bubble Tea Shop	Sushi Restaurant	Asian Restaurant	Japanese Restaurant
Inner Richmond	0	Chinese Restaurant	Asian Restaurant	Sushi Restaurant	Thai Restaurant	Bubble Tea Shop
Outer Richmond	0	Chinese Restaurant	Sushi Restaurant	Vietnamese Restaurant	Japanese Restaurant	Asian Restaurant
Sunset	0	Chinese Restaurant	Bubble Tea Shop	Japanese Restaurant	Asian Restaurant	Vietnamese Restaurant
Bayview-Hunters Point	0	Chinese Restaurant	Vietnamese Restaurant	Asian Restaurant	Sushi Restaurant	Japanese Restaurant
Visitacion Valley/Sunnydale	0	Vietnamese Restaurant	Chinese Restaurant	Asian Restaurant	Bubble Tea Shop	Dim Sum Restaurant

- Neighborhoods with mainly Chinese restaurants and low density of Bubble Tea Shops
- **Outer Richmond and Bayview-Hunters Point are ideal based on high density of Chinese Restaurant and low density of Bubble Tea Shops**

## C Cluster Analysis

### Cluster #2 - Neighborhoods with high density of Thai and Sushi restaurants

	Neighborhood	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
8	Castro/Noe Valley	1	Thai Restaurant	Sushi Restaurant	Asian Restaurant	Vietnamese Restaurant	Chinese Restaurant
11	Haight-Ashbury	1	Sushi Restaurant	Thai Restaurant	Bubble Tea Shop	Asian Restaurant	Chinese Restaurant
18	Twin Peaks-Glen Park	1	Sushi Restaurant	Thai Restaurant	Chinese Restaurant	Japanese Restaurant	Bubble Tea Shop

### Cluster #3 - Neighborhoods with high density of bubble tea shops!

	Neighborhood	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
2	South of Market	2	Bubble Tea Shop	Thai Restaurant	Asian Restaurant	Sushi Restaurant	Vietnamese Restaurant
4	Chinatown	2	Bubble Tea Shop	Asian Restaurant	Thai Restaurant	Chinese Restaurant	Sushi Restaurant
5	Polk/Russian Hill (Nob Hill)	2	Bubble Tea Shop	Asian Restaurant	Thai Restaurant	Sushi Restaurant	Chinese Restaurant
17	St. Francis Wood/Miraloma/West Portal	2	Bubble Tea Shop	Chinese Restaurant	Japanese Restaurant	Asian Restaurant	Vietnamese Restaurant
19	Lake Merced	2	Bubble Tea Shop	Chinese Restaurant	Japanese Restaurant	Asian Restaurant	Thai Restaurant

### Cluster #4 - Neighborhoods with high density of Japanese/Sushi restaurants

	Neighborhood	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	Hayes Valley/Tenderloin/North of Market	3	Sushi Restaurant	Thai Restaurant	Bubble Tea Shop	Asian Restaurant	Vietnamese Restaurant
3	Potrero Hill	3	Japanese Restaurant	Sushi Restaurant	Food Truck	Chinese Restaurant	Asian Restaurant
6	Inner Mission/Bernal Heights	3	Sushi Restaurant	Chinese Restaurant	Thai Restaurant	Vietnamese Restaurant	Asian Restaurant
9	Western Addition/Japantown	3	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Chinese Restaurant	Thai Restaurant
15	Marina	3	Sushi Restaurant	Asian Restaurant	Chinese Restaurant	Thai Restaurant	Japanese Restaurant
20	North Beach/Chinatown	3	Sushi Restaurant	Asian Restaurant	Thai Restaurant	Japanese Restaurant	Chinese Restaurant

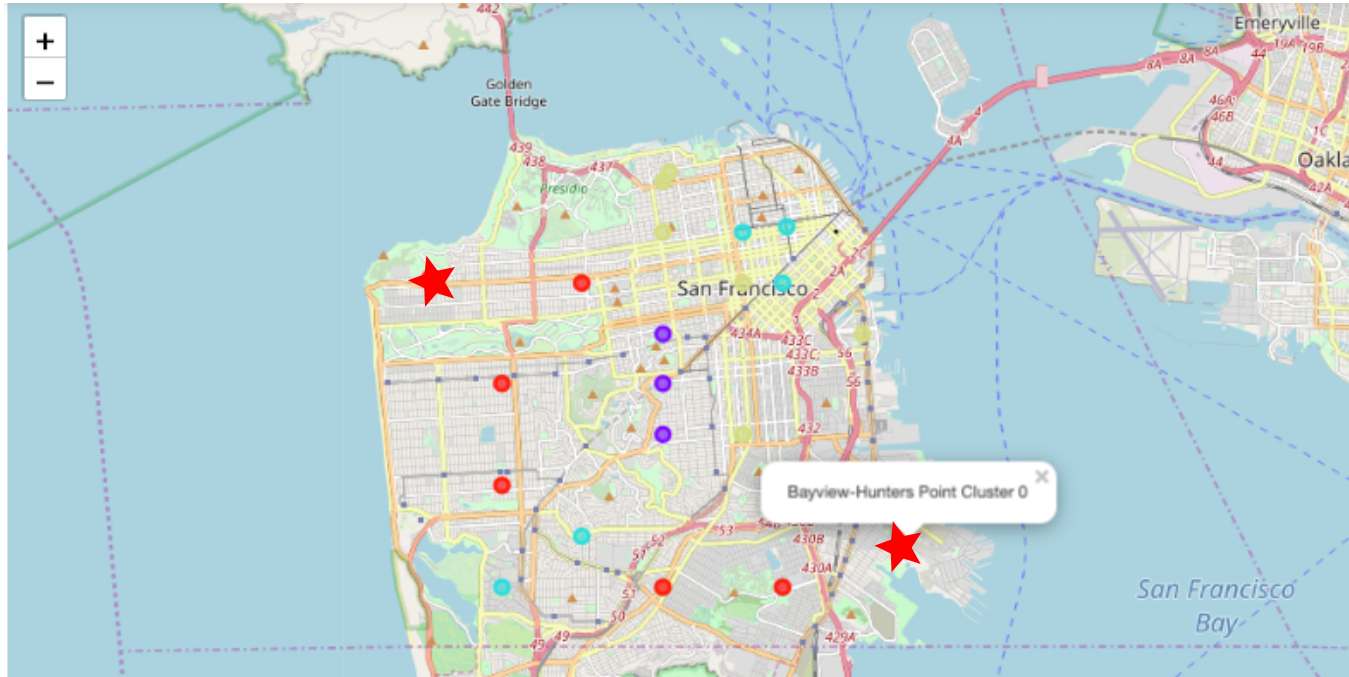


# Conclusions





**D Outer Richmond and Bayview-Hunters Point neighborhoods are ideal!**



- Both have a high density of Chinese restaurants and low density of Bubble Tea Shops!

## **D Future Directions**

- Other data to include in further analysis:
  - Neighborhood walkability and "hot spot" analysis of trendy areas
  - Neighborhood population demographics
  - Neighborhood crime rates
  - "Trendy" Asian restaurant locations and future development
  - Commercial rent prices
  - Trends in boba consumption
  - Boba shop competitive analysis

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**Would you like an adventure now, or  
shall we have our tea first?**

**– Alice in Wonderland**