

# THE BATTLE OF NEIGHBORHOODS

## APPLIED DATA SCIENCE CAPSTONE PROJECT

How do I find a good neighbourhood in the greater  
Dallas county to start my Asian restaurant?

by: ian lim

# Introduction

## ■ Background

- *Asian migrants to the U.S. tends to favor starting a Asian cuisine as a viable option when starting a new life there.*

## ■ Problem Description

- *U.S. is a big place and finding a feasible location to start an Asian cuisine can be a challenge.*
- *This project demonstrates how the basic fundamental law of Demand and Supply can be used to analyze statistical data*
- *This project will use the greater area of Dallas and narrow down to a few feasible neighborhoods. The same process can be repeated with other areas of interest.*

## ■ Interest

- *Those who are interested in starting an Asian Restaurant in the U.S. once they migrate there.*

# Data Acquisition and Processing

## ■ Data Terminology

- *Term “Asian cuisine” has loose definition and its interpretation can impact the nature of data from a given source*

## ■ Data Sources: 3 types identified

- *Demographic profile from U.S. Census Bureau 2013-2017 American Community Survey 5-Year Estimates (ACS) and Center for Public Policy Priorities*
- *Venue data from Foursquare.com*
- *Dallas zip codes for the neighborhoods in Dallas county and the latitude/longitudes*

## ■ Data cleaning

- *Foursquare takes a lat/long, a radius, and attempts to retrieve the specified number of venues covered by the circle scribed by the radius. Small radius means insufficient venues retrieved. Large radius means overlapping circles and duplicate venues*
- *Food Venue Category- venues are classified rather arbitrary*
- *Census data is only a rough guide, sourced from ACS is up to 2017.*

# Data Acquisition and Processing (cont.)

- Feature selection
  - *Dallas county has 20 neighborhoods and 84 zip codes. Group by neighborhoods*
  - *Foursquare will retrieve firstly by food, then by Asian food*
  - *Demographics- % of Asian population*
- Analytical method – Demand and Supply of the market segment
  - *The data is influenced by the understanding of the definition of food category, such as “Asian” vs “Sushi” or “dumpling”*
  - *Percentage of Asians population in a neighborhood may be related to amount of Asian venues in that neighborhood*

# Exploratory Data Analysis - Demographics

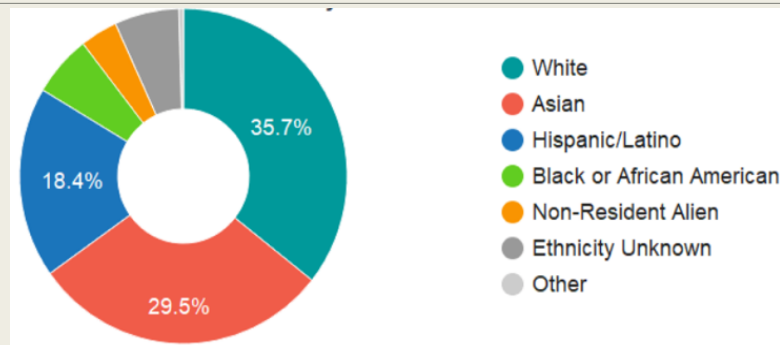
- The [population](#) of Dallas county is approximately 2.4M, with:
  - *White being 1.56M which is 61% and*
  - *Asians forming 153K which translates to 6%*
- The table shows a snippet of the census data from ACS which shows the breakdown of what constitutes Asian where Vietnamese forms 21% of the Asian race. Chinese forms only 11%. Asian Indian form 36%
- Hence, any neighbourhood with higher than 6% Asian population is worth noting.

#	Race		Estimate
1	White		1,565,175
2	Black		572,491
3	Asian Total		153,214
	Asian Indian	54,697	
	Chinese	16,879	
	Filipino	10,306	
	Japanese	2,388	
	Korean	9,242	
	Vietnamese	32,610	
	Asian Others	27,092	
4	American Indian		8,310

# Exploratory Data Analysis – Demographics (cont.)

- Also, most of the neighbourhood with higher percentage of Asian population such as, Addison, Coppell, Garland, Sachse, Richardson, and Rowlett are all to the North side (between North East to North West) of Dallas
- Another thing to call out will be that Richardson is the home to University of Texas, Dallas. The university has reported that 29.5% of its undergrads are Asians

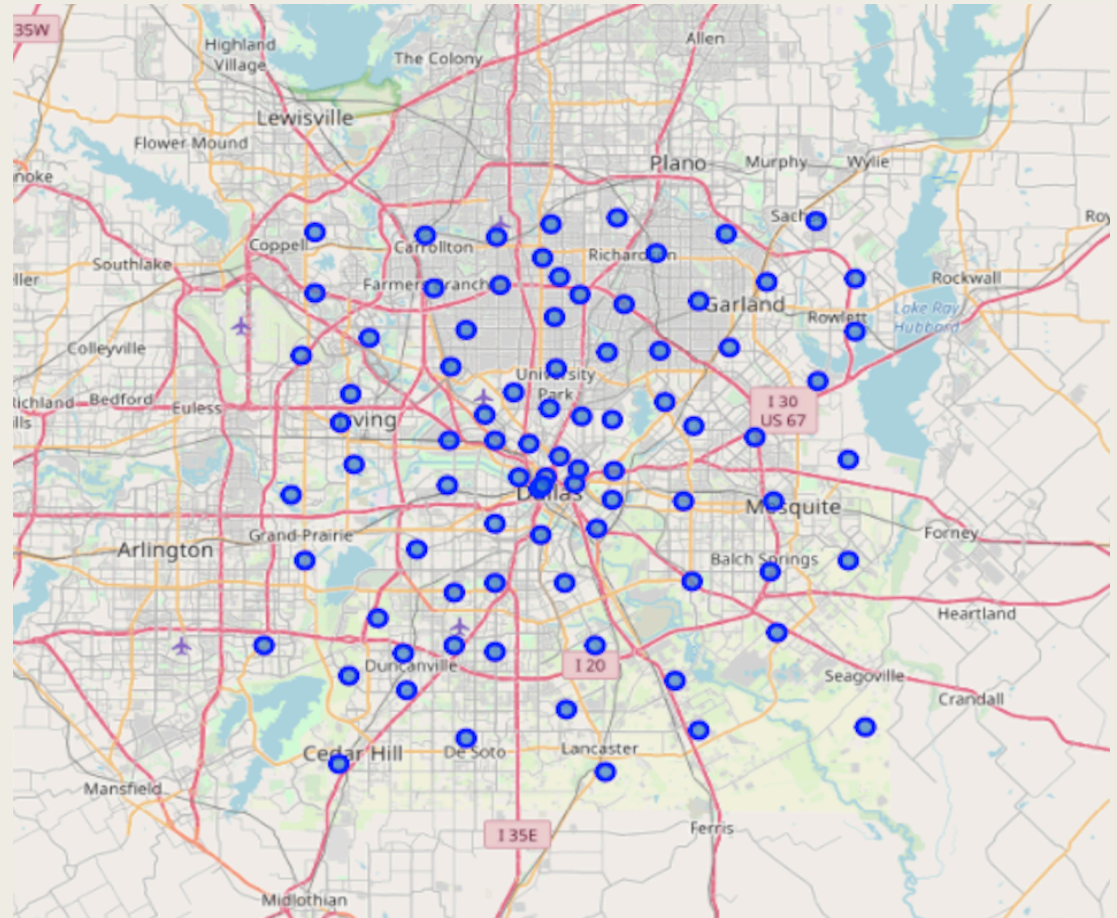
University of Texas, Dallas, Undergraduate Ethnic Diversity



No.	Neighborhood	Population	% of Asians
1	Addison	12414	11.22
2	Balch Springs	23031	
3	Carrollton	46364	14.37
4	Cedar Hill	45373	
5	Coppell	38666	23.58
6	Dallas	1190205	
7	Desoto	48877	
8	Duncanville	38530	
9	Garland	226892	10.93
10	Grand Prairie	169322	7.29
11	Hutchins	5374	
12	Irving	217883	18.52
13	Lancaster	38269	
14	Mesquite	140703	
15	Richardson	78165	16.39
16	Rowlett	54963	7.7
17	Sachse	20328	
18	Seagoville	18339	
19	Sunnyvale	5118	
20	Wilmer	3956	

# Exploratory Data Analysis – Foursquare

- Foursquare takes a lat/long, a radius, and attempts to retrieve the specified number of venues covered by the circle scribed by the radius.
- Folium map shows zip code density higher around Dallas central
- The returned values were grouped by neighbourhood as there would otherwise be 84 zip codes as opposed to 20 neighborhoods
- 3KM radius passed to Foursquare may not be effective if venue density is too high resulting in overlapping zip codes or too low with less values returned.



# Exploratory Data Analysis – Foursquare (cont.)

- The All venues frequency is built using the “Food” as venue category
- The Asian venues frequency is built using the “Asian Restaurant” as venue category
- The returned values were grouped by neighbourhood as there would otherwise be 84 zip codes as opposed to 20 neighborhoods.
- Foursquare venue data shows that places with percentage of Asian population above the 6% average also tend to have a higher ratio of Asian venues.
- Richardson which has 67% Asian venues is the home of the University of Texas, Dallas.

No	Neighborhood	Population	% of Asians	Venues Frequency	
				All	Asian
1	Addison	12414	11.22	100	38
2	Balch Springs	23031		40	5
3	Carrollton	46364	14.37	100	65
4	Cedar Hill	45373		50	3
5	Coppell	38666	23.58	75	9
6	Dallas	1190205		3506	1235
7	Desoto	48877		40	3
8	Duncanville	38530		117	20
9	Garland	226892	10.93	321	70
10	Grand Prairie	169322	7.29	136	15
11	Hutchins	5374		10	2
12	Irving	217883	18.52	481	98
13	Lancaster	38269		30	3
14	Mesquite	140703		187	16
15	Richardson	78165	16.39	200	134
16	Rowlett	54963	7.7	79	15
17	Sachse	20328		17	4
18	Seagoville	18339			
19	Sunnyvale	5118		7	1
20	Wilmer	3956		7	



# All Venues Frequencies in Dallas County from Foursquare

- Foursquare breakdowns the Asian venue into its subclassifications such as Chinese, Asian, Thai, Indian, Japanese, and Korean.
- Data is just indicative - Coppell has a 23.58 % Asian population, but no Asian or Chinese venues in top 20. Has Indian, Japanese & Vietnamese venues.

	Neighborhood	1st Most Common	2nd Most Common	3rd Most Common	4th Most Common	5th Most Common	6th Most Common	7th Most Common	8th Most Common	9th Most Common	10th Most Common	11th Most Common	12th Most Common	13th Most Common	14th Most Common	15th Most Common	16th Most Common	17th Most Common	18th Most Common	19th Most Common	20th Most Common
0	Addison	Mexican Restaurant	Italian Restaurant	American Restaurant	Burger Joint	Steakhouse	Pizza Place	Sandwich Place	Sushi Restaurant	Diner	Restaurant	Seafood Restaurant	Wings Joint	Chinese Restaurant	Asian Restaurant	Breakfast Spot	Deli / Bodega	Bakery	Fried Chicken Joint	BBQ Joint	Thai Restaurant
1	Balch Springs	Fast Food Restaurant	Fried Chicken Joint	Pizza Place	Chinese Restaurant	Food	Mexican Restaurant	Taco Place	Bakery	Bagel Shop	Burger Joint	Sandwich Place	Diner	Café	Asian Restaurant	Seafood Restaurant	Ethiopian Restaurant	Fondue Restaurant	Fish & Chips Shop	Dumpling Restaurant	Donut Shop
2	Carrollton	Mexican Restaurant	Fast Food Restaurant	Pizza Place	Korean Restaurant	Sandwich Place	Sushi Restaurant	Fried Chicken Joint	Indian Restaurant	Chinese Restaurant	Asian Restaurant	Vietnamese Restaurant	Burger Joint	Thai Restaurant	Diner	Donut Shop	Café	BBQ Joint	Breakfast Spot	Bakery	Caribbean Restaurant
3	Cedar Hill	Fast Food Restaurant	American Restaurant	Pizza Place	Mexican Restaurant	Fried Chicken Joint	Burger Joint	Donut Shop	Seafood Restaurant	Italian Restaurant	Breakfast Spot	Chinese Restaurant	Sandwich Place	Food	Café	Wings Joint	Southern / Soul Food Restaurant	Sushi Restaurant	Tex-Mex Restaurant	Bakery	BBQ Joint
4	Coppell	Pizza Place	Fast Food Restaurant	American Restaurant	Sandwich Place	Mexican Restaurant	Bakery	Tex-Mex Restaurant	Burger Joint	Donut Shop	Indian Restaurant	Food	Café	BBQ Joint	Italian Restaurant	Japanese Restaurant	Mediterranean Restaurant	Vietnamese Restaurant	Middle Eastern Restaurant	Diner	Greek Restaurant
5	Dallas	Mexican Restaurant	Fast Food Restaurant	American Restaurant	Pizza Place	Sandwich Place	Burger Joint	Fried Chicken Joint	Taco Place	Italian Restaurant	Seafood Restaurant	BBQ Joint	Restaurant	Chinese Restaurant	Bakery	Steakhouse	New American Restaurant	Donut Shop	Breakfast Spot	Thai Restaurant	Diner
6	Desoto	Pizza Place	Donut Shop	Fast Food Restaurant	American Restaurant	Sandwich Place	Seafood Restaurant	Fried Chicken Joint	Burger Joint	Fish & Chips Shop	Mexican Restaurant	Wings Joint	Chinese Restaurant	Tex-Mex Restaurant	Bakery	Restaurant	Ethiopian Restaurant	Diner	Dumpling Restaurant	Food	Fondue Restaurant
7	Duncanville	Fast Food Restaurant	Pizza Place	American Restaurant	Fried Chicken Joint	Mexican Restaurant	Chinese Restaurant	Wings Joint	Seafood Restaurant	BBQ Joint	Italian Restaurant	Sandwich Place	Food	Donut Shop	Diner	Restaurant	Bagel Shop	Taco Place	Sushi Restaurant	Bakery	Burger Joint
8	Garland	Fast Food Restaurant	Mexican Restaurant	Pizza Place	Burger Joint	Chinese Restaurant	American Restaurant	Sandwich Place	Donut Shop	Fried Chicken Joint	Taco Place	Seafood Restaurant	Wings Joint	BBQ Joint	Restaurant	Vietnamese Restaurant	Italian Restaurant	Breakfast Spot	Food	Bakery	Sushi Restaurant
9	Grand Prairie	Fast Food Restaurant	Mexican Restaurant	Pizza Place	Fried Chicken Joint	Sandwich Place	Bakery	American Restaurant	Taco Place	BBQ Joint	Donut Shop	Wings Joint	Chinese Restaurant	Burger Joint	Restaurant	Italian Restaurant	Seafood Restaurant	Diner	Steakhouse	Food Stand	Food Court
10	Hutchins	Fast Food Restaurant	Food	American Restaurant	Sandwich Place	Truck Stop	Fried Chicken Joint	Wings Joint	Diner	Donut Shop	Dumpling Restaurant	Ethiopian Restaurant	Fish & Chips Shop	Fondue Restaurant	Food Stand	Food Court	Deli / Bodega	Food Truck	French Restaurant	Gastropub	German Restaurant
11	Irving	Mexican Restaurant	Fast Food Restaurant	Sandwich Place	Indian Restaurant	Pizza Place	American Restaurant	Fried Chicken Joint	Burger Joint	Asian Restaurant	Bakery	Restaurant	Chinese Restaurant	Breakfast Spot	Italian Restaurant	Deli / Bodega	Donut Shop	Japanese Restaurant	Brazilian Restaurant	American Restaurant	Food
12	Lancaster	Fast Food Restaurant	Pizza Place	Wings Joint	Chinese Restaurant	Café	Fried Chicken Joint	Food	Mexican Restaurant	Food Truck	Burger Joint	Donut Shop	Taco Place	Italian Restaurant	Bakery	BBQ Joint	Asian Restaurant	American Restaurant	Gastropub	German Restaurant	Greek Restaurant
13	Mesquite	Fast Food Restaurant	Mexican Restaurant	American Restaurant	Pizza Place	Burger Joint	Sandwich Place	Fried Chicken Joint	Chinese Restaurant	BBQ Joint	Taco Place	Breakfast Spot	Donut Shop	Greek Restaurant	Italian Restaurant	Steakhouse	Diner	Restaurant	Deli / Bodega	Wings Joint	Seafood Restaurant
14	Richardson	Mexican Restaurant	Sandwich Place	Chinese Restaurant	Bakery	Burger Joint	American Restaurant	Mediterranean Restaurant	Fast Food Restaurant	Vietnamese Restaurant	Indian Restaurant	BBQ Joint	Pizza Place	Taco Place	Café	Italian Restaurant	Asian Restaurant	Donut Shop	Fried Chicken Joint	Breakfast Spot	Wings Joint
15	Rowlett	Fast Food Restaurant	Mexican Restaurant	Pizza Place	Sandwich Place	Chinese Restaurant	Fried Chicken Joint	Deli / Bodega	Restaurant	Burger Joint	Italian Restaurant	Greek Restaurant	Seafood Restaurant	Wings Joint	Asian Restaurant	BBQ Joint	American Restaurant	Thai Restaurant	Breakfast Spot	Vietnamese Restaurant	Donut Shop
16	Sachse	Burger Joint	Sandwich Place	Fast Food Restaurant	Fried Chicken Joint	Mexican Restaurant	Wings Joint	Breakfast Spot	Pizza Place	Café	Donut Shop	Food Truck	French Restaurant	Diner	Food Court	Gastropub	Food	Fondue Restaurant	Fish & Chips Shop	German Restaurant	Ethiopian Restaurant
17	Sunnyvale	American Restaurant	Sandwich Place	Italian Restaurant	Donut Shop	Food Truck	Mexican Restaurant	Sushi Restaurant	Wings Joint	Fondue Restaurant	Diner	Dumpling Restaurant	Ethiopian Restaurant	Fast Food Restaurant	Fish & Chips Shop	Food Stand	Food	Food Court	Deli / Bodega	French Restaurant	Fried Chicken Joint
18	Wilmer	Fast Food Restaurant	American Restaurant	Diner	Truck Stop	Sandwich Place	Pizza Place	Wings Joint	Food	Donut Shop	Dumpling Restaurant	Ethiopian Restaurant	Fish & Chips Shop	Fondue Restaurant	Food Court	Deli / Bodega	Food Stand	Food Truck	French Restaurant	Fried Chicken Joint	Gastropub

# Asian Venues Frequencies in Dallas County from Foursquare

- “Asian” and “Chinese” restaurant classification may be a bucket for those that restaurants that offer a “wider” variety of cuisines
- Neighborhoods that have Chinese and/or Asian restaurants below top 4 ranking, which is Desoto, Hutchins, Grand Prairie, Sachse, and Sunnyvale, all have a below average % of Asian populations

Neighborhood	1st Most Common	2nd Most Common	3rd Most Common	4th Most Common	5th Most Common	6th Most Common	7th Most Common	8th Most Common	9th Most Common	10th Most Common	11th Most Common	12th Most Common	13th Most Common	14th Most Common	15th Most Common	16th Most Common	17th Most Common	18th Most Common	19th Most Common	20th Most Common
Addison	Asian Restaurant	Chinese Restaurant	Thai Restaurant	Sushi Restaurant	Japanese Restaurant	Vietnamese Restaurant	Korean Restaurant	Noodle House	Food Truck	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Wings Joint	Filipino Restaurant	Fast Food Restaurant	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Diner
Balch Springs	Chinese Restaurant	Asian Restaurant	Wings Joint	Filipino Restaurant	Karaoke Bar	Japanese Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Fast Food Restaurant	Vietnamese Restaurant	Diner	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Korean Restaurant	Mongolian Restaurant	New American Restaurant
Carrollton	Korean Restaurant	Asian Restaurant	Chinese Restaurant	Vietnamese Restaurant	Sushi Restaurant	Thai Restaurant	Ramen Restaurant	Japanese Restaurant	Karaoke Bar	Soup Place	Noodle House	Filipino Restaurant	Fried Chicken Joint	Food Truck	Wings Joint	Fast Food Restaurant	Himalayan Restaurant	Dim Sum Restaurant	Burmese Restaurant	Buffet
Cedar Hill	Asian Restaurant	Chinese Restaurant	Sushi Restaurant	Wings Joint	Filipino Restaurant	Japanese Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Diner	Fast Food Restaurant	Korean Restaurant	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Karaoke Bar	Mongolian Restaurant	Vietnamese Restaurant
Coppell	Vietnamese Restaurant	Chinese Restaurant	Japanese Restaurant	Asian Restaurant	Thai Restaurant	Sushi Restaurant	Peking Duck Restaurant	Filipino Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Wings Joint	Fast Food Restaurant	Karaoke Bar	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Diner
Dallas	Asian Restaurant	Chinese Restaurant	Sushi Restaurant	Thai Restaurant	Japanese Restaurant	Vietnamese Restaurant	Korean Restaurant	Ramen Restaurant	Noodle House	Food Truck	Fast Food Restaurant	Seafood Restaurant	Taiwanese Restaurant	Fried Chicken Joint	Sandwich Place	New American Restaurant	American Restaurant	Vegetarian / Vegan Restaurant	Poke Place	Szechuan Restaurant
Desoto	Chinese Restaurant	Thai Restaurant	Wings Joint	Fast Food Restaurant	Japanese Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Filipino Restaurant	Diner	Korean Restaurant	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Asian Restaurant	Karaoke Bar	Mongolian Restaurant	Vietnamese Restaurant
Duncanville	Chinese Restaurant	Asian Restaurant	Vietnamese Restaurant	Sushi Restaurant	Mongolian Restaurant	Burmese Restaurant	Buffet	Bakery	Dim Sum Restaurant	Korean Restaurant	Fast Food Restaurant	Filipino Restaurant	Food Truck	Fried Chicken Joint	Himalayan Restaurant	Indian Restaurant	Japanese Restaurant	Karaoke Bar	Diner	Wings Joint
Garland	Chinese Restaurant	Vietnamese Restaurant	Asian Restaurant	Sushi Restaurant	Thai Restaurant	Korean Restaurant	Tianjin Restaurant	Filipino Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Wings Joint	Fast Food Restaurant	Diner	Japanese Restaurant	Burmese Restaurant	Buffet	Bakery	Dim Sum Restaurant
Grand Prairie	Chinese Restaurant	Asian Restaurant	Japanese Restaurant	Filipino Restaurant	Sushi Restaurant	Wings Joint	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Diner	Fast Food Restaurant	Korean Restaurant	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Karaoke Bar	Mongolian Restaurant	Vietnamese Restaurant
Hutchins	Asian Restaurant	Sushi Restaurant	Wings Joint	Fast Food Restaurant	Japanese Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Filipino Restaurant	Diner	Korean Restaurant	Dim Sum Restaurant	Chinese Restaurant	Burmese Restaurant	Buffet	Bakery	Karaoke Bar	Mongolian Restaurant	Vietnamese Restaurant
Irving	Asian Restaurant	Chinese Restaurant	Thai Restaurant	Japanese Restaurant	Sushi Restaurant	Korean Restaurant	Vietnamese Restaurant	Indian Restaurant	Himalayan Restaurant	Sandwich Place	Bakery	Wings Joint	Dim Sum Restaurant	Diner	Fast Food Restaurant	Filipino Restaurant	Food Truck	Fried Chicken Joint	Burmese Restaurant	Buffet
Lancaster	Chinese Restaurant	Asian Restaurant	Wings Joint	Filipino Restaurant	Karaoke Bar	Japanese Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Fast Food Restaurant	Vietnamese Restaurant	Diner	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Korean Restaurant	Mongolian Restaurant	New American Restaurant
Mesquite	Chinese Restaurant	Japanese Restaurant	Asian Restaurant	Thai Restaurant	Sushi Restaurant	Wings Joint	Filipino Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Dim Sum Restaurant	Fast Food Restaurant	Diner	Korean Restaurant	Burmese Restaurant	Buffet	Bakery	Karaoke Bar	Mongolian Restaurant
Richardson	Asian Restaurant	Chinese Restaurant	Vietnamese Restaurant	Thai Restaurant	Japanese Restaurant	Sushi Restaurant	Korean Restaurant	Noodle House	Ramen Restaurant	Dim Sum Restaurant	Vegetarian / Vegan Restaurant	Buffet	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Wings Joint	Food Truck	Filipino Restaurant	Fast Food Restaurant	Burmese Restaurant
Rowlett	Chinese Restaurant	Asian Restaurant	Vietnamese Restaurant	Thai Restaurant	Filipino Restaurant	Karaoke Bar	Japanese Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Wings Joint	Fast Food Restaurant	Korean Restaurant	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Diner	Mongolian Restaurant
Sachse	Japanese Restaurant	Chinese Restaurant	Sushi Restaurant	Korean Restaurant	Wings Joint	Filipino Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Diner	Fast Food Restaurant	Dim Sum Restaurant	Burmese Restaurant	Buffet	Bakery	Asian Restaurant	Karaoke Bar	Mongolian Restaurant	Vietnamese Restaurant
Sunnyvale	Sushi Restaurant	Wings Joint	Fast Food Restaurant	Japanese Restaurant	Indian Restaurant	Himalayan Restaurant	Fried Chicken Joint	Food Truck	Filipino Restaurant	Diner	Korean Restaurant	Dim Sum Restaurant	Chinese Restaurant	Burmese Restaurant	Buffet	Bakery	Asian Restaurant	Karaoke Bar	Mongolian Restaurant	Vietnamese Restaurant

# Interpreting the results

- Terminologies and classifications don't follow a hard and fast rule. Need to use judgement when analyzing results from Foursquare or Census ACS.
- Generally, neighborhoods with above average Asian population have an average higher ratio of Asian venue count.
- Data may be skewed either by zoning, such as the city of Dallas which has multiple zip codes or neighborhoods with high concentration such as universities
- The trend is for a restaurant to serve a wide range of Asian cuisines and classify itself Asian or Chinese restaurant.
- Hence, in conclusion, places with high concentration of Asians such as universities or neighborhoods with above average percentage of Asian population is worth exploring for starting an Asian restaurant that offers a wide option of Asian cuisine



The End

