

Capstone Project- The Battle of Neighborhood Austin TX BBQs

Introduction

Texas is known for its own unique barbeque (BBQ) venues and there are many 'BBQ Joints' to visit. Turns out that around the state capitol, Austin TX, there are some of the most rewarding BBQ places to try. Also are some of the highest ranked BBQ Joints are around Austin, at least claimed by food critics. This ends up being convenient since many visitors to the state conduct business or vacation in the Austin area.

The question to answer then is to decide where in the Austin area to "stay" based on the number of BBQ venues to visit. A Secondary question is finding locations that also have other food venues in case BBQ becomes too much for the palette of the visiting group of members.

Perhaps a food critic would be interested in this analysis, but the intent is to help a visitor pick a location that will be close to good BBQ venues as well as considerations on other food venue opportunities.

Data Sources

The critical data requirements are 1) a source of Texas cities, 2) data on the BBQ venues located within a radius of a city, and 3) a list of top-rated BBQ venues.

- 1) Data on individual Texas cities was found in the "United States Cities Database" located at <https://simplemaps.com/data/us-cities>. The data format was either a csv or Excel file and included latitude (lat) and longitude (lng) information for each city. The only data cleaning required was setting the city, state_id, and state_name to string types. Calculating the distance between {lat, lng} city coordinates narrow the city count to those surrounding the Austin area within a radius of 50 miles. This distance is "as a bird flies" not necessarily driving distance.
- 2) Identifying BBQ venues within a radius circle on each city required the help of Foursquare by searching on venues with the search parameter set to 'BBQ Joint'. First the number of venues located around Austin were summoned followed by the number of venues per each surrounding city of interest to Austin. Not that at times, there were overlapping venue names between adjacent cities. This is not a problem because the end goal was to determine where to stay, i.e., what city.
Foursquare data required cleaning as venues sent back were at times not BBQ venues. It was also proven that different venue data on different calls to the venue Foursquare API were occurring.
More cleaning of the JSON's from Foursquare are required but looking at the top venues in the K-means clusters seems to have cleaned that data sufficiently.

Foursquare was also used to obtain the food venues for each surrounding city and including Austin, TX. While the search criteria were set to Food, data cleaning to remove many venues that were Truck stops, pet stores, factory, etc. were removed.

- 3) Data for top-rated BBQ venues seemed like a simple scrapping on web sites but ended up not being allowed. An Excel file was hand generated using inputs from the following sites:

<https://www.texasmonthly.com/food/the-list-the-top-50-barbecue-joints-in-texas/>

<https://theculturetrip.com/north-america/usa/texas/articles/the-10-best-bbq-joints-in-texas/>

<https://www.southernliving.com/souths-best/texas-bbq>

<https://bigseventravel.com/best-places-for-barbecue-texas/>

Since the data was created by hand, the only data cleaning was setting the City and BBQ Joint columns to string.

A problem exists between the venue name within these lists versus what has been returned from Foursquare.

Methodology and Exploratory Data Analysis

The methodology was simply:

1. Look for surrounding cities to Austin, TX within a 50 mi radius.
 - a. Used a distance calculation between city {lat, lng} coordinates.
 - b. Created a Folium map for visualization.
2. Used Foursquare to determine the 'BBQ Joint' venues around Austin only.
 - a. Created a Folium map for visualization.
3. Used Foursquare to determine the 'BBQ Joint' venues for the surrounding cities around Austin.
 - a. Created a Folium map for visualization.
 - b. Created a bar chart showing the number of BBQ Joints found within each city.
4. Examined Top Rated BBQ places per food critics.
 - a. Had to compare the venues identified from top rated web sites against the data from Foursquare since the names were different between the two data sources. Updated the hand generated file for name equates.
 - b. Created a bar chart showing the number of Top-Rated BBQ Joints found within each city. This showed perhaps a bias on BBQ venues around Austin with Houston next.
 - c. Created a Folium map for visualization.
5. Used Foursquare to determine "Food" venues for the surrounding cities around Austin.
 - a. Created a bar chart showing the number of 'Food' venues found within each city. This showed insight into popular cities.
 - b. Created a Folium map for visualization.
6. For each city, computed the top 10 most common food venues determined by the popularity or count of the venue category. This table of results was also instrumental in removing Foursquare venues that were not realistic 'Food' places of interest.
7. K-means was used on the food venue data in order to determine cities that had similar Food venue offerings as well as to get an understanding of how the BBQ venue was rated.

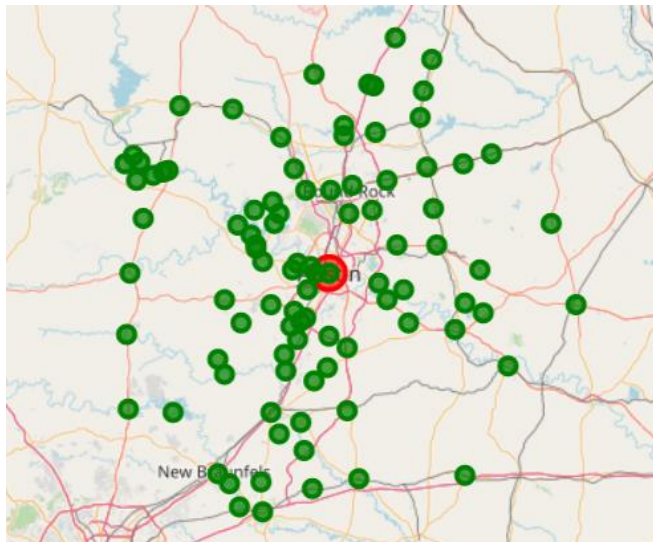
- a. Created a Folium map for visualization.
- b. Printed the top 10 venue categories for the 5 clusters.

Items explored were the locations of venues around Austin noticing the importance of suburbs, highways, and locations of Top-Rated BBQ venues. Also investigated competing food venues in the cities by using K-means clustering.

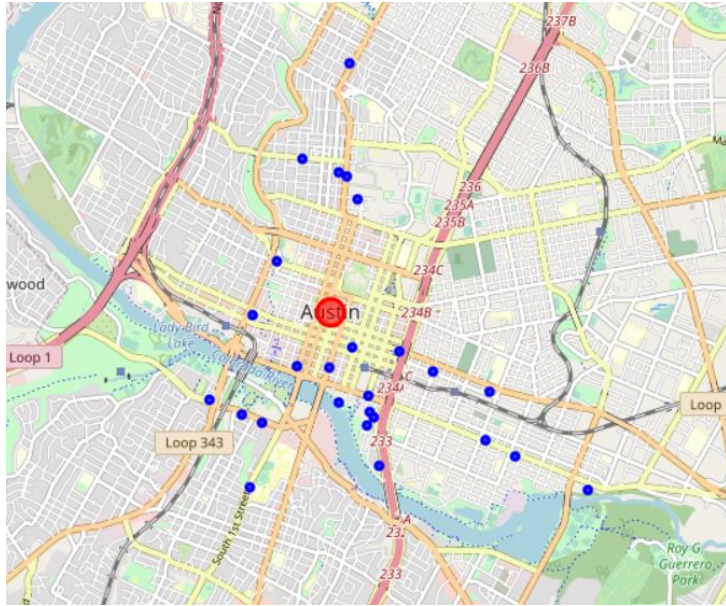
Clustering was used in order to map out cities that had similar food venues. It was also used to see if the BBQ venue was in to the top or not.

Results

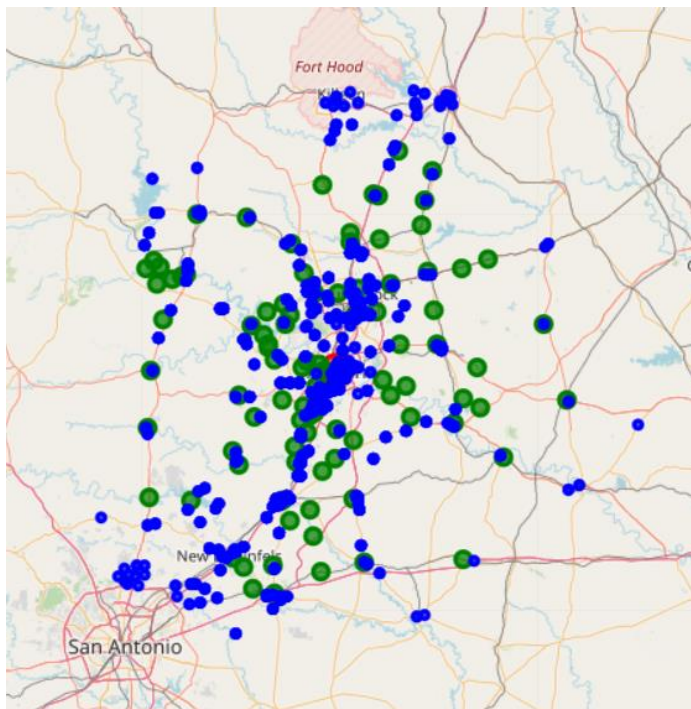
First result was finding the surrounding cities within a 50-mile radius of Austin, TX. The result was 93 cities shown as green circles with Austin identified as a red circle in the following map:



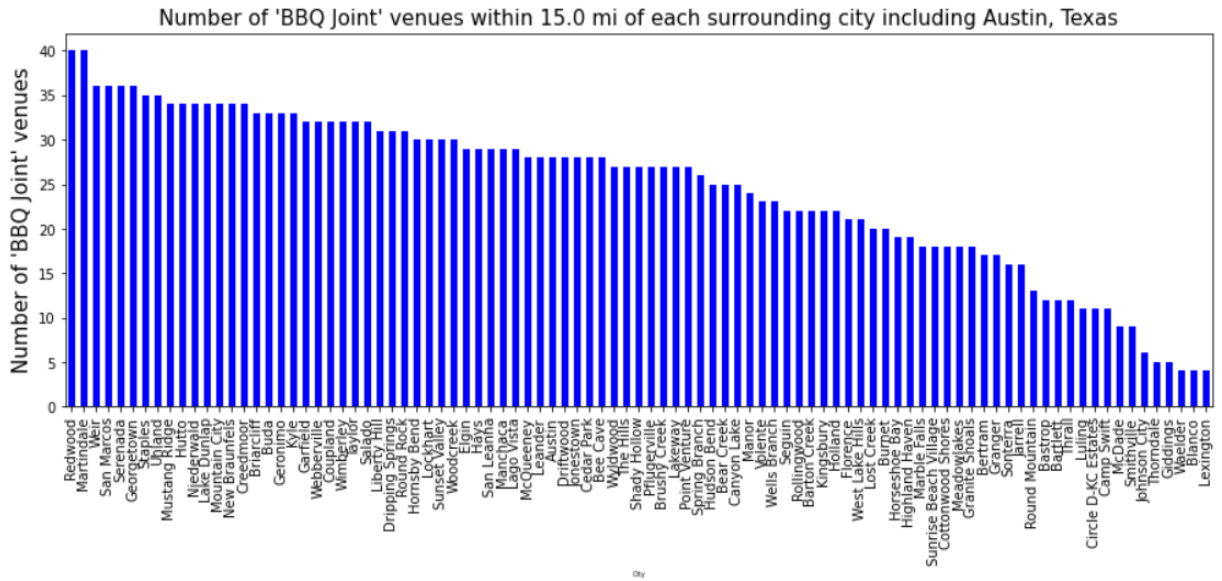
Austin by itself was analyzed first searching for BBQ Joints within 15 miles of its geocenter. Foursquare return 28 venues. Visualizing the data confirms venues within Austin:



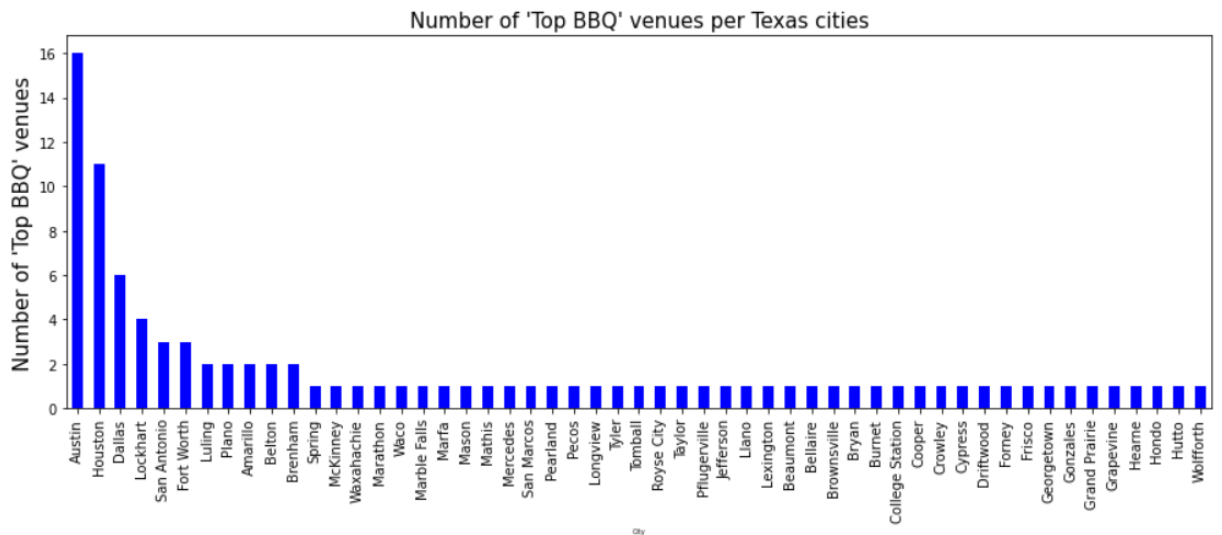
The same process was applied to the 93 surrounding cities to Austin. Note that venues could be associated with adjacent cities since a radial distance 15 miles was applied to each city and cleaning of the Foursquare data had to be used. 2,261 BBQ venues were found.



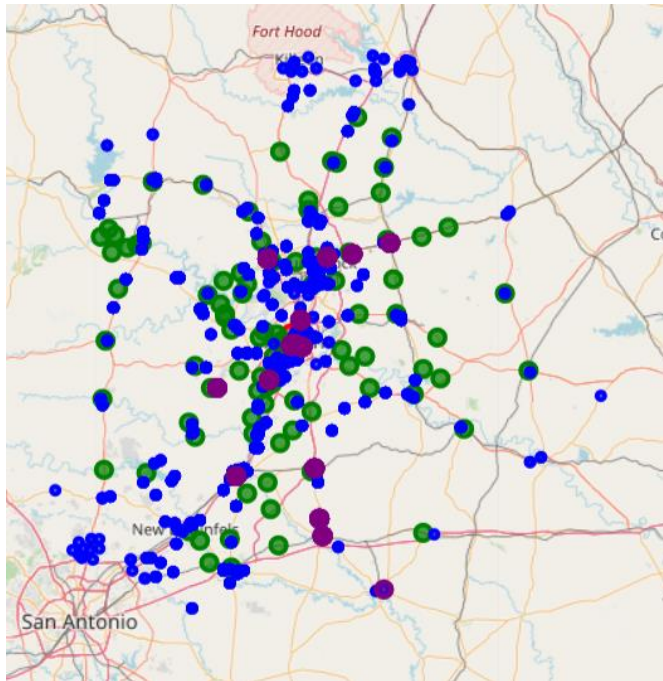
To get a better idea of the number of venues per city:



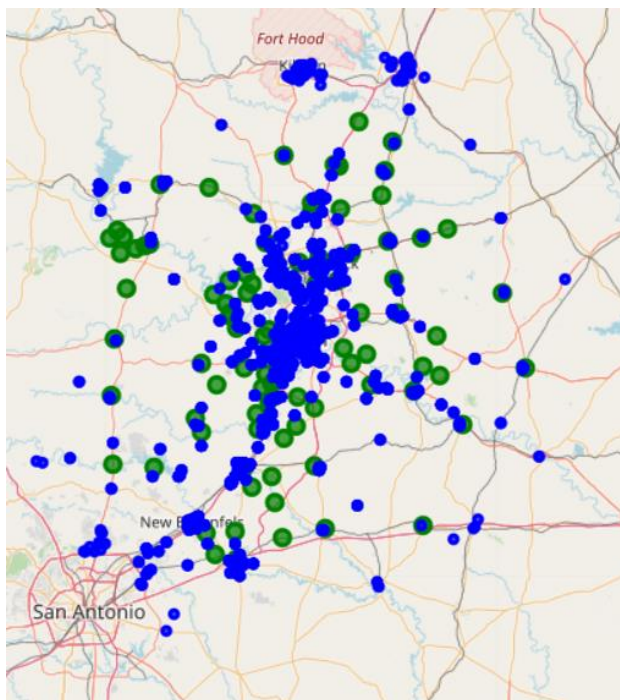
A look at critically acclaimed BBQ joints as defined by web recommendations resulted in the following counts (95 total throughout Texas):



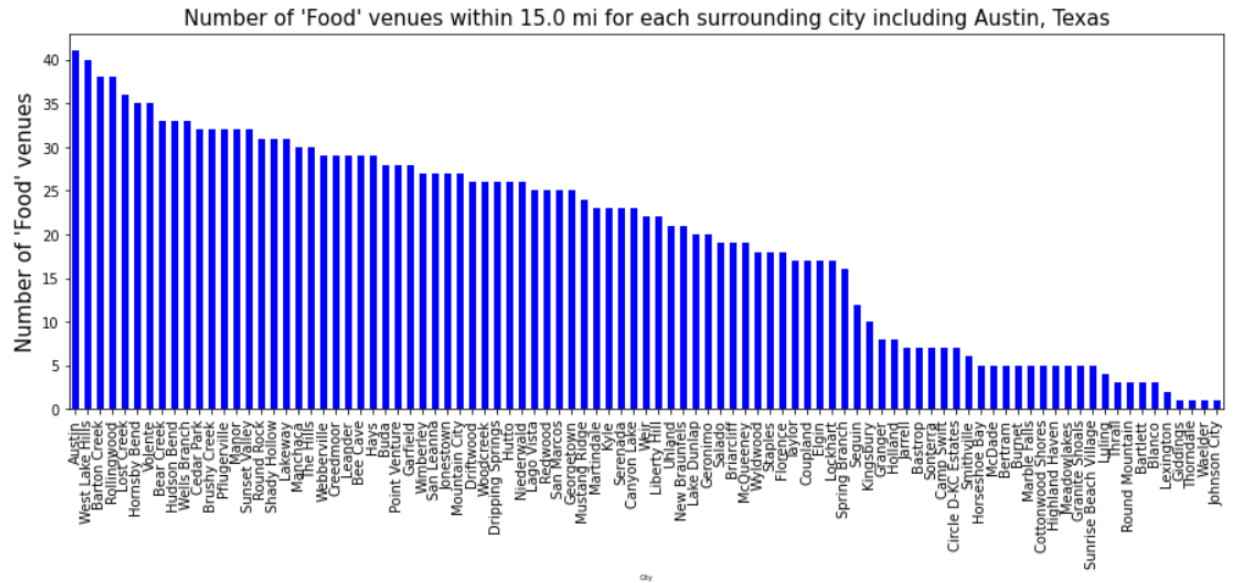
Mapping these top-rated venues:



In looking at competing food venues not just BBQ venues results in 1,942 places and the visualization:



And a bar chart ranking the different cities for food venues:



Looking at the top 10 food venues for the first 12 cities:

	city	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
0	Austin	Food Truck	Sandwich Place	New American Restaurant	Japanese Restaurant	Soup Place	Israeli Restaurant	Deli / Bodega	Comfort Food Restaurant	Fast Food Restaurant	Café
1	Bartlett	Truck Stop	Cajun / Creole Restaurant	Mexican Restaurant	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint
2	Barton Creek	Food Truck	Food Court	Japanese Restaurant	New American Restaurant	Mexican Restaurant	Sandwich Place	Restaurant	Health Food Store	Food & Drink Shop	Fast Food Restaurant
3	Bastrop	Southern / Soul Food Restaurant	Food Truck	Asian Restaurant	Mexican Restaurant	Burger Joint	Fruit & Vegetable Store	Caribbean Restaurant	Fast Food Restaurant	Food & Drink Shop	Food Court
4	Bear Creek	Food Truck	Mexican Restaurant	Food Court	New American Restaurant	Sandwich Place	Japanese Restaurant	Juice Bar	Deli / Bodega	Restaurant	Fast Food Restaurant
5	Bee Cave	Food Truck	Food Court	Japanese Restaurant	American Restaurant	Sandwich Place	Mexican Restaurant	New American Restaurant	Food & Drink Shop	Fast Food Restaurant	Deli / Bodega
6	Bertram	Food Truck	Himalayan Restaurant	Farmers Market	Restaurant	Bar	Dessert Shop	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
7	Blanco	Beer Garden	Food Truck	Mexican Restaurant	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint
8	Briarcliff	Food Truck	American Restaurant	Burger Joint	Korean Restaurant	Food Court	Gluten-free Restaurant	Thai Restaurant	Mexican Restaurant	Greek Restaurant	Dessert Shop
9	Brushy Creek	Food Truck	Food Court	Japanese Restaurant	Mexican Restaurant	New American Restaurant	Korean Restaurant	Restaurant	Sandwich Place	Burger Joint	Mediterranean Restaurant
10	Buda	Food Truck	Mexican Restaurant	New American Restaurant	American Restaurant	Restaurant	Fast Food Restaurant	Food & Drink Shop	Soup Place	Food Court	BBQ Joint
11	Burnet	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store

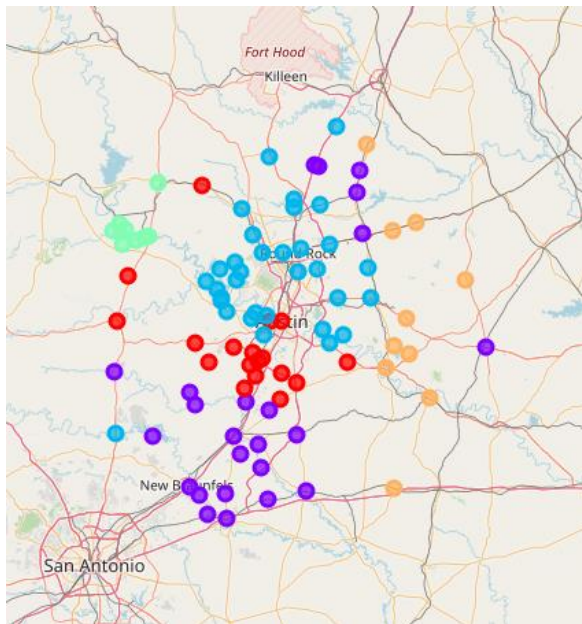
In fact, the following cities showed BBQ venues somewhere in the top 10:

	city	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
10	Buda	Food Truck	Mexican Restaurant	New American Restaurant	American Restaurant	Restaurant	Fast Food Restaurant	Food & Drink Shop	Soup Place	Food Court	BBQ Joint
48	Lost Creek	Food Truck	Food Court	Japanese Restaurant	Sandwich Place	Mexican Restaurant	New American Restaurant	Wine Bar	Organic Grocery	BBQ Joint	Cafeteria
49	Luling	Mexican Restaurant	BBQ Joint	Bar	Wine Bar	Dessert Shop	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint
57	Mountain City	Food Truck	Mexican Restaurant	Food Court	New American Restaurant	Deli / Bodega	BBQ Joint	Food & Drink Shop	Fast Food Restaurant	Restaurant	Wine Bar
60	Niederwald	Food Truck	Mexican Restaurant	Deli / Bodega	BBQ Joint	Food Court	Soup Place	Food & Drink Shop	Fast Food Restaurant	New American Restaurant	Wine Bar
80	The Hills	Food Court	Food Truck	Japanese Restaurant	Burger Joint	New American Restaurant	Sandwich Place	Mexican Restaurant	American Restaurant	Thai Restaurant	BBQ Joint
85	Waelder	BBQ Joint	Wine Bar	Deli / Bodega	Greek Restaurant	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint	Food Truck
89	West Lake Hills	Food Truck	Food Court	Japanese Restaurant	New American Restaurant	Sandwich Place	Mediterranean Restaurant	Mexican Restaurant	Wine Bar	BBQ Joint	Cafeteria

And surprisingly the most iconic city known for BBQ did not show a BBQ venue at all in the top 10:

	city	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
47	Lockhart	Mexican Restaurant	Food Truck	Bar	Food Court	Food & Drink Shop	Chinese Restaurant	Music Venue	Wine Bar	Dessert Shop	Gourmet Shop

Grouping of similar food venues using K-means with 5 clusters resulted in:



With the clusters as follows:

Cluster 1 (18 cities):

	city	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
1150	Austin	Food Truck	Sandwich Place	New American Restaurant	Japanese Restaurant	Soup Place	Israeli Restaurant	Deli / Bodega	Comfort Food Restaurant	Fast Food Restaurant	Café
1625	Bear Creek	Food Truck	Mexican Restaurant	Food Court	New American Restaurant	Sandwich Place	Japanese Restaurant	Juice Bar	Deli / Bodega	Restaurant	Fast Food Restaurant
2044	Bertram	Food Truck	Himalayan Restaurant	Farmers Market	Restaurant	Bar	Dessert Shop	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
3242	Buda	Food Truck	Mexican Restaurant	New American Restaurant	American Restaurant	Restaurant	Fast Food Restaurant	Food & Drink Shop	Soup Place	Food Court	BBQ Joint
5763	Creedmoor	Food Truck	Mexican Restaurant	Japanese Restaurant	Food Court	American Restaurant	New American Restaurant	Deli / Bodega	Restaurant	Sandwich Place	Fast Food Restaurant
6844	Driftwood	Food Truck	Mexican Restaurant	Food Court	Restaurant	Chinese Restaurant	New American Restaurant	Wine Bar	Deli / Bodega	Gluten-free Restaurant	German Restaurant
6848	Dripping Springs	Food Truck	Food Court	Mexican Restaurant	Restaurant	American Restaurant	Organic Grocery	Venezuelan Restaurant	New American Restaurant	German Restaurant	Fruit & Vegetable Store
11010	Hays	Food Truck	Mexican Restaurant	Food Court	Japanese Restaurant	Soup Place	Food & Drink Shop	Deli / Bodega	Restaurant	Sandwich Place	Fast Food Restaurant
12553	Johnson City	Food Truck	Wine Bar	Deli / Bodega	Greek Restaurant	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint	Food Court
15306	Manhaca	Food Truck	Mexican Restaurant	Food Court	Japanese Restaurant	American Restaurant	Food & Drink Shop	Deli / Bodega	Restaurant	Sandwich Place	Fast Food Restaurant
17266	Mountain City	Food Truck	Mexican Restaurant	Food Court	New American Restaurant	Deli / Bodega	BBQ Joint	Food & Drink Shop	Fast Food Restaurant	Restaurant	Wine Bar
17420	Mustang Ridge	Food Truck	Mexican Restaurant	Food Court	Soup Place	Deli / Bodega	Fast Food Restaurant	Food & Drink Shop	Japanese Restaurant	Snack Place	New American Restaurant
18061	Niederwald	Food Truck	Mexican Restaurant	Deli / Bodega	BBQ Joint	Food Court	Soup Place	Food & Drink Shop	Fast Food Restaurant	New American Restaurant	Wine Bar
21856	Rollingwood	Food Truck	Japanese Restaurant	New American Restaurant	Sandwich Place	Mediterranean Restaurant	Food Court	Health Food Store	Venezuelan Restaurant	Cafeteria	Soup Place
22040	Round Mountain	Food Truck	Mexican Restaurant	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint	Food Court
22407	San Leanna	Food Truck	Mexican Restaurant	Food Court	Japanese Restaurant	American Restaurant	Food & Drink Shop	Deli / Bodega	Restaurant	Sandwich Place	Fast Food Restaurant
22967	Shady Hollow	Food Truck	Mexican Restaurant	Food Court	Sandwich Place	Japanese Restaurant	Soup Place	Juice Bar	Deli / Bodega	Restaurant	Fast Food Restaurant
28174	Wylidwood	Food Truck	Food & Drink Shop	Southern / Soul Food Restaurant	Caribbean Restaurant	Food Court	Snack Place	Mexican Restaurant	Burger Joint	Asian Restaurant	Fried Chicken Joint

Cluster 2 (24 cities):

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	city	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
1458	Bartlett	Truck Stop	Cajun / Creole Restaurant	Mexican Restaurant	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint
2339	Blanco	Beer Garden	Food Truck	Mexican Restaurant	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint
3754	Canyon Lake	Mexican Restaurant	Food Truck	Food Court	Liquor Store	Snack Place	German Restaurant	Pizza Place	Chinese Restaurant	Food & Drink Shop	Italian Restaurant
9524	Geronimo	Mexican Restaurant	Food Truck	Food Court	Liquor Store	Snack Place	Health Food Store	German Restaurant	Food & Drink Shop	Music Venue	Deli / Bodega
9560	Giddings	Mexican Restaurant	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint	Food Truck	Food Court
10054	Granger	Mexican Restaurant	Taco Place	Dessert Shop	Restaurant	Cajun / Creole Restaurant	Food Truck	Truck Stop	Fruit & Vegetable Store	Fried Chicken Joint	Deli / Bodega
12417	Jarrell	Food Truck	Mexican Restaurant	Truck Stop	Cajun / Creole Restaurant	Restaurant	Wine Bar	Deli / Bodega	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
13071	Kingsbury	Mexican Restaurant	Bar	Food Truck	Food Court	Snack Place	Liquor Store	Music Venue	Wine Bar	Dessert Shop	Gluten-free Restaurant
13273	Kyle	Food Truck	Mexican Restaurant	Food Court	New American Restaurant	Food & Drink Shop	Liquor Store	Snack Place	Chinese Restaurant	Wine Bar	Gluten-free Restaurant
13549	Lake Dunlap	Food Court	Mexican Restaurant	Food Truck	Snack Place	Health Food Store	German Restaurant	Italian Restaurant	Liquor Store	Food & Drink Shop	Deli / Bodega
14623	Lockhart	Mexican Restaurant	Food Truck	Bar	Food Court	Food & Drink Shop	Chinese Restaurant	Music Venue	Wine Bar	Dessert Shop	Gourmet Shop
14993	Luling	Mexican Restaurant	BBQ Joint	Bar	Wine Bar	Dessert Shop	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint
15646	Martindale	Mexican Restaurant	Food Truck	Food Court	Chinese Restaurant	Liquor Store	Pizza Place	Snack Place	Music Venue	Bar	Deli / Bodega
15952	McQueeney	Mexican Restaurant	Food Truck	Snack Place	Health Food Store	German Restaurant	Italian Restaurant	Fried Chicken Joint	Food Court	Liquor Store	Food & Drink Shop
17702	New Braunfels	Food Court	Mexican Restaurant	Food Truck	Snack Place	Health Food Store	German Restaurant	Italian Restaurant	Liquor Store	Food & Drink Shop	Deli / Bodega
21210	Redwood	Mexican Restaurant	Food Truck	Food Court	Liquor Store	Snack Place	Pizza Place	Chinese Restaurant	Music Venue	Food & Drink Shop	Bar
22420	San Marcos	Mexican Restaurant	Food Truck	Food Court	Chinese Restaurant	Snack Place	Liquor Store	New American Restaurant	Health Food Store	Pizza Place	Music Venue
22850	Seguin	Mexican Restaurant	Food Truck	Snack Place	Health Food Store	German Restaurant	Liquor Store	Food & Drink Shop	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant
23575	Sonterra	Food Truck	Mexican Restaurant	Truck Stop	Cajun / Creole Restaurant	Restaurant	Wine Bar	Deli / Bodega	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
24280	Staples	Mexican Restaurant	Food Court	Liquor Store	Food Truck	Pizza Place	Chinese Restaurant	Snack Place	Music Venue	Bar	Deli / Bodega
25011	Taylor	Mexican Restaurant	Food Truck	Food Court	American Restaurant	Taco Place	Truck Stop	Restaurant	Dessert Shop	Burger Joint	German Restaurant
25804	Umland	Mexican Restaurant	Food Truck	Food Court	Food & Drink Shop	Liquor Store	Snack Place	Chinese Restaurant	Music Venue	Wine Bar	Dessert Shop
27783	Wimberley	Food Truck	Mexican Restaurant	Food Court	Liquor Store	Chinese Restaurant	New American Restaurant	Pizza Place	Music Venue	Snack Place	Deli / Bodega
28004	Woodcreek	Food Truck	Mexican Restaurant	Food Court	Chinese Restaurant	Pizza Place	Liquor Store	Music Venue	New American Restaurant	Deli / Bodega	German Restaurant

Cluster 3 (33 cities but not all cities shown):

	city	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
1464	Barton Creek	Food Truck	Food Court	Japanese Restaurant	New American Restaurant	Mexican Restaurant	Sandwich Place	Restaurant	Health Food Store	Food & Drink Shop	Fast Food Restaurant
1716	Bee Cave	Food Truck	Food Court	Japanese Restaurant	American Restaurant	Sandwich Place	Mexican Restaurant	New American Restaurant	Food & Drink Shop	Fast Food Restaurant	Deli / Bodega
2882	Briard Cliff	Food Truck	American Restaurant	Burger Joint	Korean Restaurant	Food Court	Gluten-free Restaurant	Thai Restaurant	Mexican Restaurant	Greek Restaurant	Dessert Shop
3171	Brushy Creek	Food Truck	Food Court	Japanese Restaurant	Mexican Restaurant	New American Restaurant	Korean Restaurant	Restaurant	Sandwich Place	Burger Joint	Mediterranean Restaurant
4166	Cedar Park	Food Truck	Food Court	Mexican Restaurant	American Restaurant	Japanese Restaurant	Korean Restaurant	New American Restaurant	Burger Joint	Chinese Restaurant	Gluten-free Restaurant
5656	Coupland	Food Court	Food Truck	American Restaurant	Food & Drink Shop	Burger Joint	Gourmet Shop	Restaurant	Candy Store	Mediterranean Restaurant	Mexican Restaurant
7570	Elgin	Food Truck	American Restaurant	Candy Store	Food Court	Food & Drink Shop	Market	Mediterranean Restaurant	Mexican Restaurant	Restaurant	Gourmet Shop
8583	Florence	Food Truck	Restaurant	Himalayan Restaurant	Seafood Restaurant	Cajun / Creole Restaurant	Food Court	Mexican Restaurant	Salad Place	American Restaurant	Southern / Soul Food Restaurant
9360	Garfield	Food Truck	Japanese Restaurant	Sandwich Place	New American Restaurant	Soup Place	Mexican Restaurant	Deli / Bodega	Restaurant	Fast Food Restaurant	Snack Place
9489	Georgetown	Food Truck	Food Court	Mexican Restaurant	Himalayan Restaurant	Restaurant	Burger Joint	Cajun / Creole Restaurant	Gluten-free Restaurant	Korean Restaurant	New American Restaurant
11745	Hornsby Bend	Food Truck	Japanese Restaurant	New American Restaurant	Food Court	Mexican Restaurant	Deli / Bodega	Restaurant	Sandwich Place	Mediterranean Restaurant	Soup Place
11856	Hudson Bend	Food Truck	Food Court	Mexican Restaurant	Japanese Restaurant	New American Restaurant	Korean Restaurant	Soup Place	Sandwich Place	Restaurant	Health Food Store
11953	Hutto	Food Truck	Food Court	American Restaurant	Mexican Restaurant	Restaurant	Candy Store	Indian Restaurant	Japanese Restaurant	Korean Restaurant	Mediterranean Restaurant
12589	Jonestown	Food Truck	Food Court	Burger Joint	American Restaurant	Japanese Restaurant	Korean Restaurant	Mexican Restaurant	Sandwich Place	Chinese Restaurant	Gluten-free Restaurant
13466	Lago Vista	Food Truck	Food Court	American Restaurant	Sandwich Place	Burger Joint	Japanese Restaurant	Korean Restaurant	Mexican Restaurant	Gluten-free Restaurant	Greek Restaurant
13776	Lakeway	Food Truck	Food Court	Japanese Restaurant	American Restaurant	Sandwich Place	Burger Joint	Mexican Restaurant	New American Restaurant	Fast Food Restaurant	Korean Restaurant
14086	Leander	Food Truck	Food Court	American Restaurant	Japanese Restaurant	Korean Restaurant	Mexican Restaurant	Sandwich Place	Burger Joint	Chinese Restaurant	Gluten-free Restaurant
14359	Liberty Hill	Food Truck	Food Court	Restaurant	Korean Restaurant	Himalayan Restaurant	Cajun / Creole Restaurant	Gluten-free Restaurant	Greek Restaurant	Mexican Restaurant	American Restaurant
14851	Lost Creek	Food Truck	Food Court	Japanese Restaurant	Sandwich Place	Mexican Restaurant	New American Restaurant	Wine Bar	Organic Grocery	BBQ Joint	Cafeteria
15376	Manor	Food Truck	Food Court	Japanese Restaurant	American Restaurant	Sandwich Place	Mexican Restaurant	New American Restaurant	Burger Joint	Southern / Soul Food Restaurant	Gourmet Shop
15864	Pflugerville	Food Truck	Food Court	Japanese Restaurant	American Restaurant	Sandwich Place	Mexican Restaurant	New American Restaurant	Street Food Gathering	Restaurant	Gourmet Shop
20349	Point Venture	Food Truck	Food Court	American Restaurant	Japanese Restaurant	Burger Joint	Sandwich Place	New American Restaurant	Gluten-free Restaurant	Korean Restaurant	Fast Food Restaurant
22042	Round Rock	Food Truck	Food Court	Mexican Restaurant	American Restaurant	Japanese Restaurant	Southern / Soul Food Restaurant	Sandwich Place	Indian Restaurant	Korean Restaurant	Mediterranean Restaurant
22256	Salado	Food Truck	Mexican Restaurant	Salad Place	Fast Food Restaurant	Korean Restaurant	Cajun / Creole Restaurant	Restaurant	Seafood Restaurant	American Restaurant	Southern / Soul Food Restaurant
22909	Serenada	Food Truck	Mexican Restaurant	Food Court	Restaurant	Himalayan Restaurant	Burger Joint	Cajun / Creole Restaurant	Gluten-free Restaurant	Korean Restaurant	American Restaurant
23908	Spring Branch	Food Truck	Indian Restaurant	Italian Restaurant	Mexican Restaurant	Mediterranean Restaurant	Liquor Store	Food Court	Music Venue	Beer Garden	Bar
24751	Sunset Valley	Food Truck	Japanese Restaurant	New American Restaurant	Food Court	Sandwich Place	Snack Place	Liquor Store	Juice Bar	Restaurant	Farmers Market

Cluster 4 (8 cities):

	city	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
3370	Burnet	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
5624	Cottonwood Shores	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
10072	Granite Shoals	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
11337	Highland Haven	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
11752	Horseshoe Bay	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
15467	Marble Falls	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
16026	Meadowlakes	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store
24739	Sunrise Beach Village	Food Truck	Mexican Restaurant	Farmers Market	Coffee Shop	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store

Cluster 5 (10 cities):

	city	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
1494	Bastrop	Southern / Soul Food Restaurant	Food Truck	Asian Restaurant	Mexican Restaurant	Burger Joint	Fruit & Vegetable Store	Caribbean Restaurant	Fast Food Restaurant	Food & Drink Shop	Food Court
3683	Camp Swift	Southern / Soul Food Restaurant	Food Truck	Asian Restaurant	Mexican Restaurant	Burger Joint	Fruit & Vegetable Store	Caribbean Restaurant	Fast Food Restaurant	Food & Drink Shop	Food Court
4719	Circle D-KC Estates	Southern / Soul Food Restaurant	Food Truck	Asian Restaurant	Mexican Restaurant	Burger Joint	Fruit & Vegetable Store	Caribbean Restaurant	Fast Food Restaurant	Food & Drink Shop	Food Court
11540	Holland	Food Truck	Fast Food Restaurant	Fruit & Vegetable Store	Snack Place	Mexican Restaurant	Salad Place	Wine Bar	Comfort Food Restaurant	Gluten-free Restaurant	German Restaurant
14330	Lexington	Greek Restaurant	Mexican Restaurant	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint	Food Truck	Food Court
15905	McDade	Asian Restaurant	Burger Joint	Food Truck	Caribbean Restaurant	Mexican Restaurant	Wine Bar	Dessert Shop	Gourmet Shop	Gluten-free Restaurant	German Restaurant
23470	Smithville	Asian Restaurant	Burger Joint	Fruit & Vegetable Store	Food Truck	Caribbean Restaurant	Mexican Restaurant	Wine Bar	Dessert Shop	Gourmet Shop	Gluten-free Restaurant
25229	Thorndale	Greek Restaurant	Wine Bar	Deli / Bodega	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint	Food Truck	Food Court
25251	Thrall	Greek Restaurant	Taco Place	Dessert Shop	Comfort Food Restaurant	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint	Food Truck
26411	Waelder	BBQ Joint	Wine Bar	Deli / Bodega	Greek Restaurant	Gourmet Shop	Gluten-free Restaurant	German Restaurant	Fruit & Vegetable Store	Fried Chicken Joint	Food Truck

Discussion

The cities examined represented a good cross section of the various areas know around Austin: Austin itself, suburbs of all social-economic domains, the Hill country, the I-35 corridor, and outside of Austin. This would then be good consideration for a visitor in deciding if Austin or one of its out areas is of interest to target as a stay location.

When examining the results returned by Foursquare with the search criteria set to 'BBQ Joint', 50 venues were return however, on looking at the categories of these venues, only 28 were truly BBQ places. This suggests the possibility that Foursquare is not "cleaned data, in fact, many cleaning operations had to be added.

In viewing the BBQ Joint venues around Austin and its surrounding cities, the map showed the high count of venues along the I35 corridor, the cited North of Austin noted as the suburbs, and in the Fort Hood area which is an Army base.

Surprising that the number of BBQ venues was not the highest for Austin but for many cities outside of Austin. However, per critics Austin has the most highly rated BBQ joints followed by Houston and Dallas. This may be biased data as the critics are probably from these cities as they are the largest metropolitan areas for Texas. Furthermore, many of the top-rated places were indeed close to Austin. Texas has BBQ venues throughout the state, some of the best places are not around the metropolitan areas.

When considering all food venues then Austin is at the top as expected since Austin has the largest social-economic diversity. Next in line are some of the more affluent suburbs as well.

When looking at the top Food venues for the top 12 cities, it was not until the 11th city, Buda, that showed BBQ Joint as a top 10th venue. So, BBQ is not that popular OR since the ranking criteria is a count on the venues returned by Foursquare, it could be that not many BBQ venues can exist when the places that are in business are so good. In fact, Lockhart did not register a BBQ venue in the top 10 which does not seem correct.

The cluster analysis showed some trends:

1. BBQ venues were in the different clusters but not significant to account.

Cluster #	# of Cities	1 st Venue Makeup	2 nd Venue Makeup
1 (Red)	18	All Food Truck	11 Mexican
2 (Purple)	24	15 Mexican	11 Food Truck + 1 BBQ
3 (Blue)	33	31 Food Truck	21 Food Court
4 (Green)	8	8 Food Truck	8 Mexican
5 (Yellow)	10	Southern, Greek, Asian, 1 BBQ	3 Food Truck

2. Cluster 1 (Red circles) included Austin and mostly the southern cities, what was obvious is the top-rated number of food trucks then Mexican venues. Food trucks are a classic trademark to Austin and its areas.
3. Cluster 2 (Purple circles) and were cities furthest from Austin which showed Mexican type venues then food trucks.
4. Cluster 3 (Blue circles) also showed interest in Food trucks followed with food courts. Interesting how this covered North Austin where there are many mall venues.

5. Cluster 4 (Green circles) had Food trucks followed by Mexican venues. This is an area that contains many “tourists” cities deep in the heart of Hill country. Surprising the number of Food trucks.
6. Cluster 5 (Yellow circles) had a better balance of top different venues. These cities are East of Austin where it turns out that many first-time home buyers are finding the best housing prices.

Conclusion

Analysis on the BBQ venues within and surrounding Austin, TX resulted in some surprising results:

- BBQ venues were not highly rated as anticipated per the ranking method of number of venues within a given area. This may change if customer ratings had been used.
- Food trucks are everywhere, in fact maybe at the point of saturation(?) and of course Foursquare did not break out BBQ related food trucks.
- Mexican is popular, most likely Tex-Mex as this is also a food venue a visitor should sample.
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Addressing the questions defined in the start of this project:

- 1) Where in the Austin area to “stay” based on the number of BBQ venues to visit. The data did not present a reasonable answer. However, if considering food critic recommendations, stick to Austin. On a personal note, go to Lockhart.
- 2) Locations that also have other food venues in case BBQ becomes too much for the palette of the visiting group of members, one could go East of Austin but analysis on Food trucks should be added as they ones in Austin probably offer a diverse range of cuisines or modern cuisines.

Finally, rating per customers should be incorporated in the ratings of venues and data cleaning on Foursquare JSON's should also be performed as well.