

FOOD TRUCKS AND VENUES IN GENERAL IN CAMPINAS, SP - BR

A Study of Geographical Opportunities for the Businesses in the City, with Emphasis on Food Trucks

PROBLEMATIC

- Recommending the top five locations in which a food truck venue is most likely to succeed.
- Region of study: city of Campinas, São Paulo, Brazil.
- Food trucks are past their peak trend boom.
 - Demand is levelling out to a natural state, with decreasing influence of the trend.
 - Despite being originally mobile, many venues of the sort have a fixed location, leaving mostly to attend service requests by third-parties, such as: parties, events, bars, pubs, food trucks gatherings, and so on.
 - Therefore, it is important that the venues fixed location is well defined and properly thought out.
- In this study, we ascertain Campinas neighborhood characteristics, not only to be employed in this current demand of recommendation, but also to produce important resources to be used in future eventual projects.

DATA DESCRIPTION



Neighborhood data and geographical coordinates were assembled from web sources and from in-house development on the software QGIS.

The resulting dataset has contains 336 neighborhoods identified by name, and their respective latitudes and longitudes.



The Foursquare API enabled the acquiring of venues listed for each neighborhood.

The radius of search was defined to 500 meters.

The number of venues returned by the API call was limited by the maximum output of 100 venues per neighborhood.



The data from the neighborhoods produced maps using the “Folium” package in Python.



The data gathered by the Foursquare API is then employed in the elaboration of tables, graphs, a map and a K-Means algorithm, devised to cluster the neighborhoods based on the similarities of the venues within each one of them.



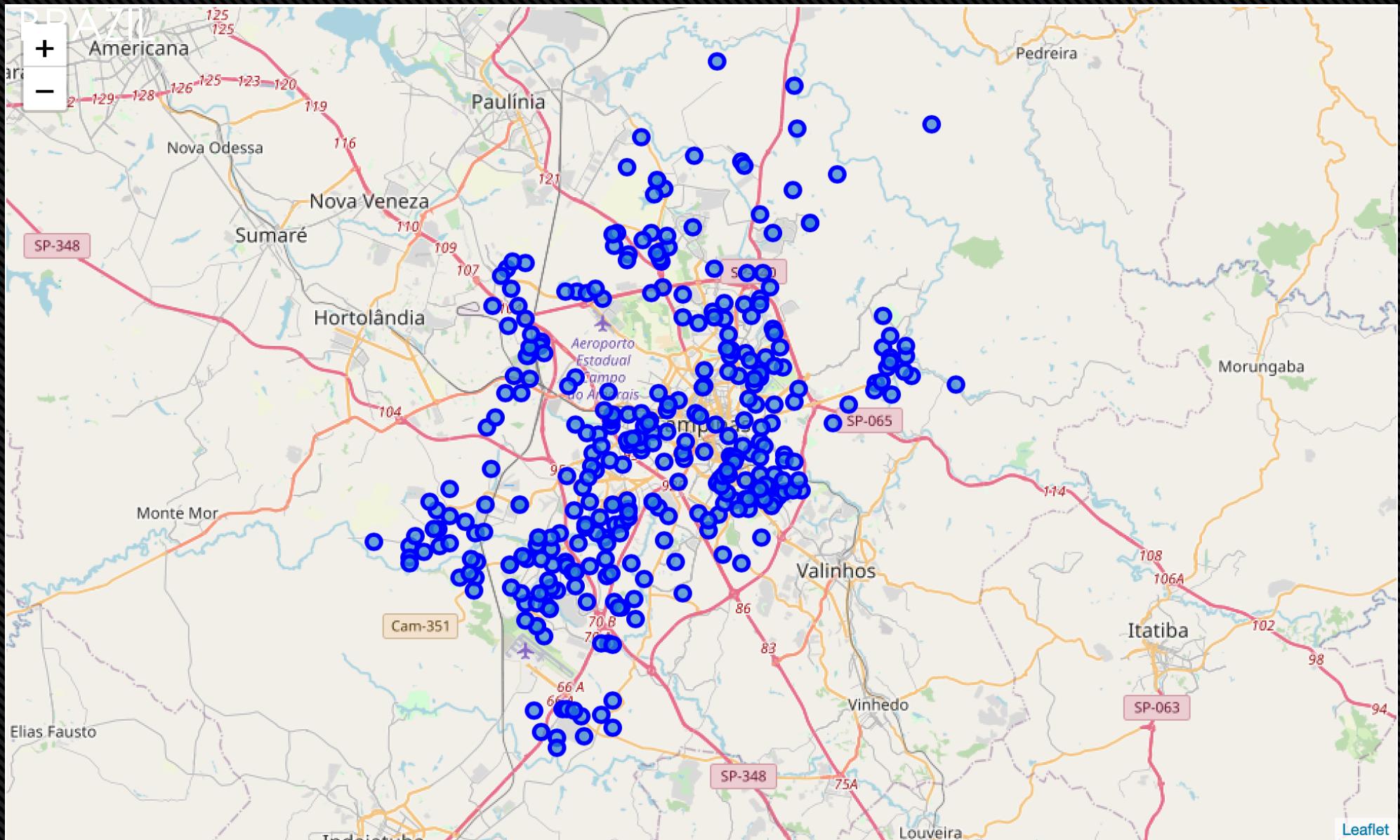
The objective of the data is the identification of a cluster with a strong food truck venue presence.

Which then is to be filtered to present the neighborhoods from within that cluster with the minimum presence of this business model, in order to obtain the top five indicated locations for implementation.

METHODOLOGY

Neighborhood	Long	Lat
Arruamento Fain José Feres	-47.084462	-22.821267
Arruamento Luiz Vicentin	-47.080811	-22.829629
Bairro das Palmeiras	-47.016018	-22.895889
Barão Geraldo	-47.079099	-22.845249
Bosque das Palmeiras	-47.041516	-22.789775
Bosque de Barão Geraldo	-47.102383	-22.827089
Campinas Jaguar	-47.047187	-22.875836
Chácara Cneo	-47.103938	-22.906759
Chácara da Barra	-47.035195	-22.888028
Chácara de Recreio Barão	-47.100895	-22.821341

NEIGHBORHOODS IN CAMPINAS, SP -



Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Arruamento Fain José Feres	-22.821267	-47.084462	Praça do Coco	-22.821576	-47.082588	Plaza
Arruamento Fain José Feres	-22.821267	-47.084462	Feirinha da Praça do Côco	-22.821189	-47.082803	Arts & Crafts Store
Arruamento Fain José Feres	-22.821267	-47.084462	Quintal De Casa Gourmet	-22.821398	-47.083359	Gastropub
Arruamento Fain José Feres	-22.821267	-47.084462	Namaste Salad	-22.821280	-47.083065	Restaurant
Arruamento Fain José Feres	-22.821267	-47.084462	Bronco Burger	-22.823686	-47.083310	Burger Joint
...
Ville Sainte Helene	-22.896746	-46.989720	Barley Club	-22.894975	-46.991331	Bar
Ville Sainte Helene	-22.896746	-46.989720	Paris 89 Restaurante	-22.893388	-46.991835	Restaurant

NEIGHBORHOODS VENUES DATA

241 different venues categories observed.

Neighborhood	Acai House	Accessories Store	Airport	Airport Lounge	Arcade	Arepá Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auto Garage	W
Arruamento Fain José Feres	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arruamento Fain José Feres	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Arruamento Fain José Feres	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arruamento Fain José Feres	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arruamento Fain José Feres	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ONE-HOT ENCODING THE VENUES CATEGORIES

	Neighborhood	Acai House	Accessories Store	Airport	Airport Lounge	Arcade	Arepas Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auto Garage
0	Arruamento Fain José Feres	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.020833	0.0	0.0	0.0
1	Arruamento Luiz Vicentin	0.027027	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0
2	Bairro das Palmeiras	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0
3	Barão Geraldo	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0
4	Bosque das Palmeiras	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0
...
315	Vila Tofanello	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.125000	0.0	0.0	0.0
316	Vila Trinta E Um de Marco	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0

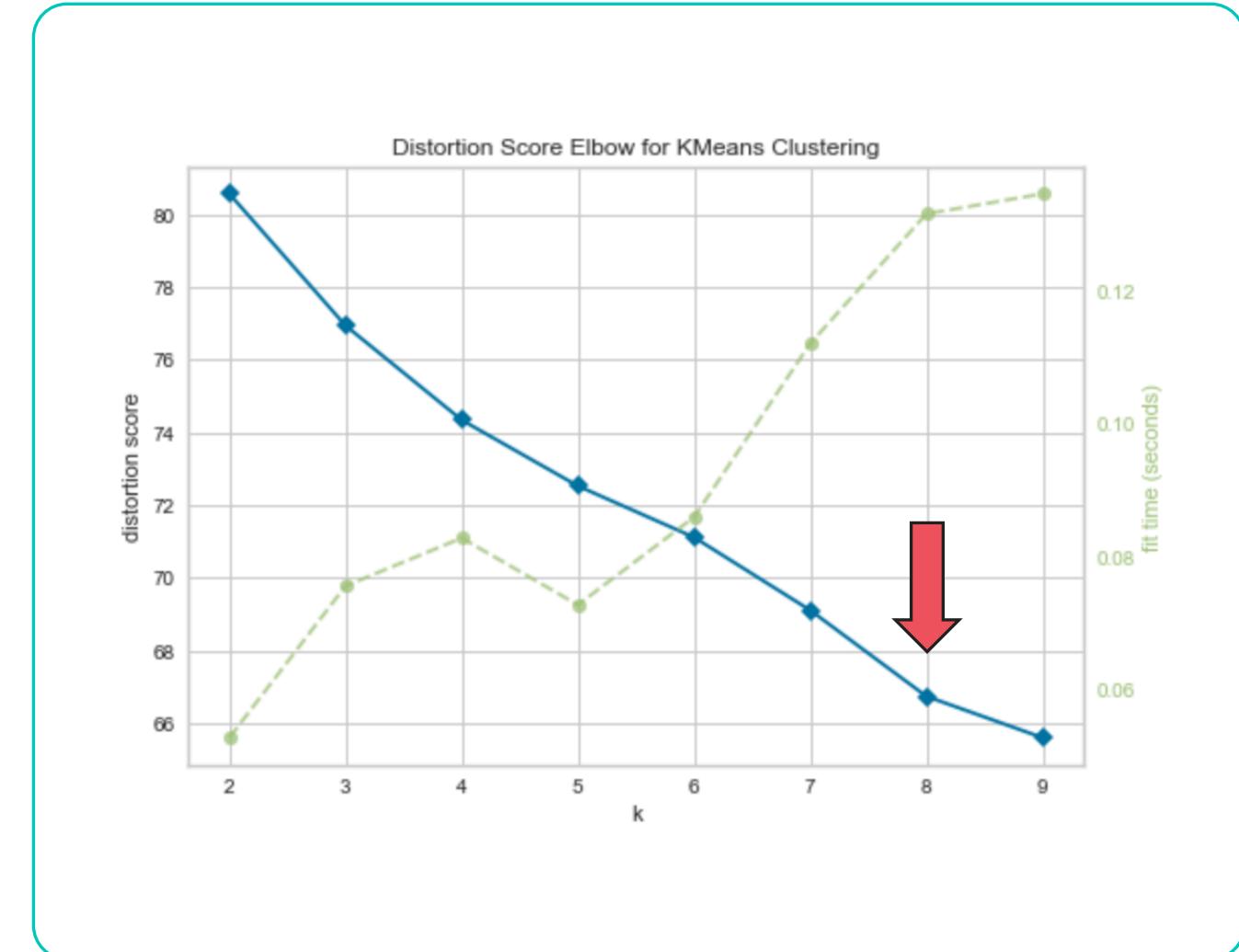
GROUPING BY NEIGHBORHOODS – MEAN

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
0 Arrumento Fain José Feres	Pizza Place	Brazilian Restaurant	Bar	Brewery	Café	Hot Dog Joint	Hotel	Gym / Fitness Center	Restaurant	Burger Joint
1 Arrumento Luiz Vicentin	Bar	Brazilian Restaurant	Pizza Place	Café	Brewery	Ice Cream Shop	Vegetarian / Vegan Restaurant	Snack Place	Supermarket	Beer Bar
2 Bairro das Palmeiras	Restaurant	Pool	Gym	Brazilian Restaurant	Tennis Court	BBQ Joint	Lake	Social Club	Volleyball Court	Diner
3 Barão Geraldo	Hardware Store	Restaurant	Bus Stop	Café	Zoo Exhibit	Fast Food Restaurant	Food Stand	Food Court	Food & Drink Shop	Food
4 Bosque das Palmeiras	Pizza Place	Restaurant	Pet Store	Cocktail Bar	Fast Food Restaurant	Field	Financial or Legal Service	Fish & Chips Shop	Zoo Exhibit	Farm
...
315 Vila Tofanello	Liquor Store	Pizza Place	Bakery	Beer Store	Gym	Electronics Store	Arts & Crafts Store	Indian Restaurant	Food	Flower Shop

1ST TO 10TH MOST COMMON VENUES IN EACH NEIGHBORHOOD

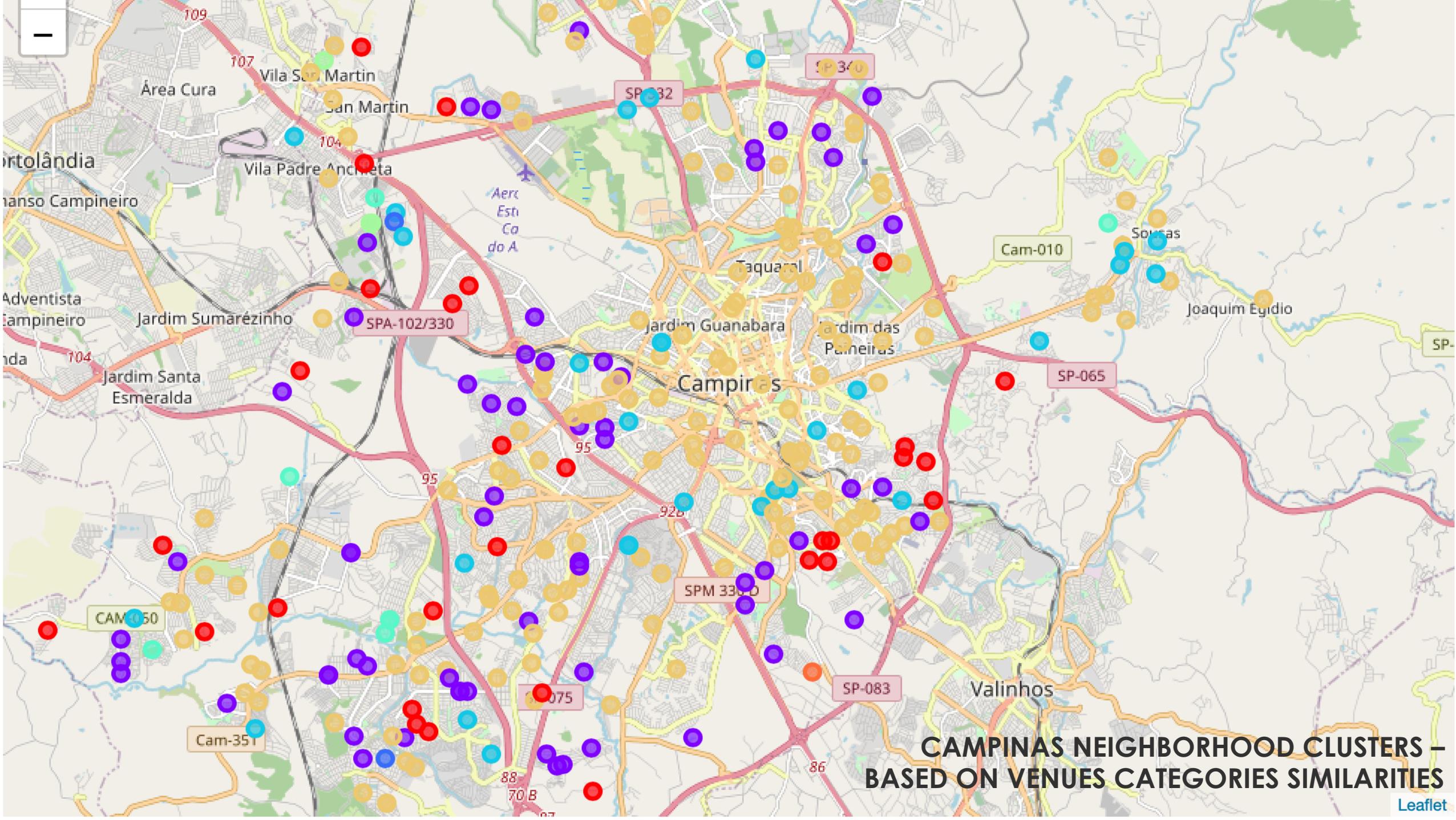
K-MEANS CLUSTERING – DETERMINING K

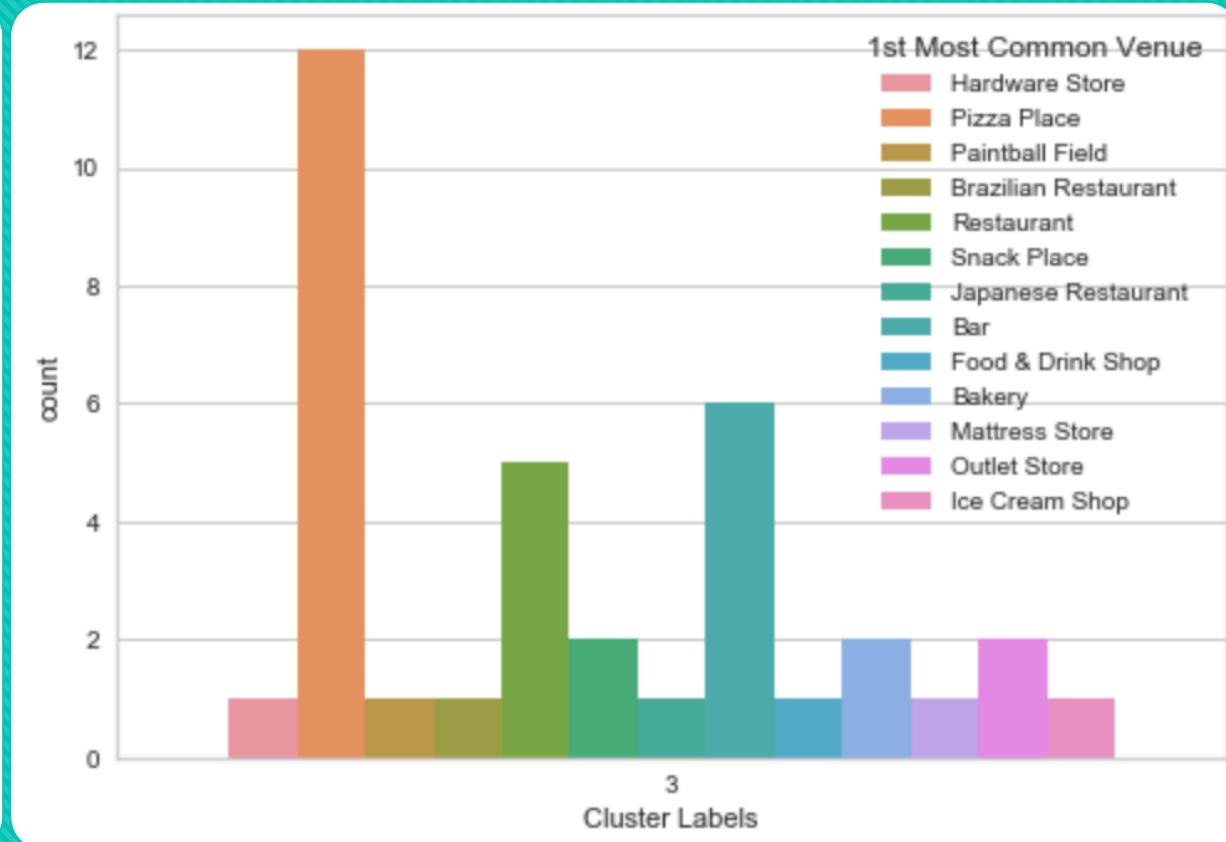
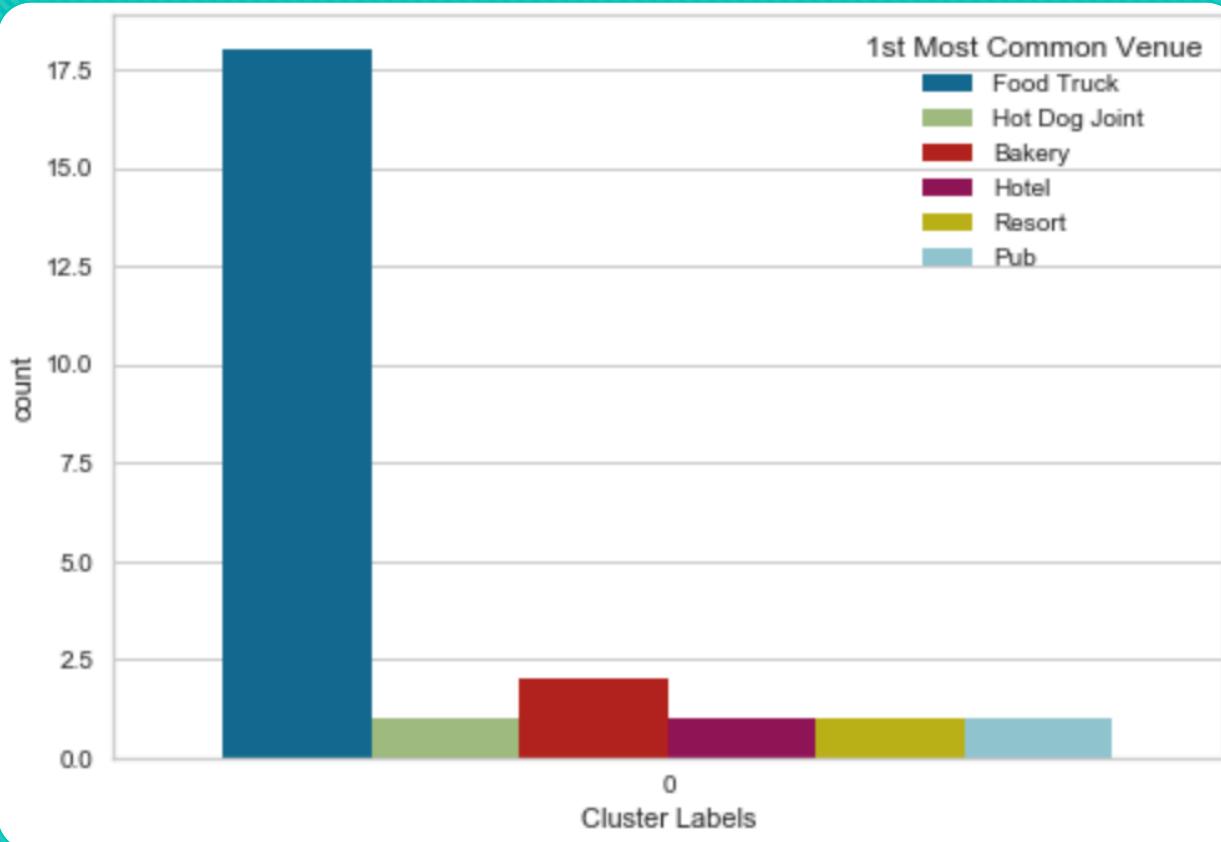
- **Use of the Elbow Method**
 - Complemented by trial and error
- **Most efficient K tested:**
 - $K = 8$



Neighborhood	Long	Lat	Cluster Labels	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
Arrumento Fain José Feres	-47.084462	-22.821267	6	Pizza Place	Brazilian Restaurant	Bar	Brewery	Café	Hot Dog Joint	Hotel	Gym / Fitness Center	Restaurant	Burger Joint
Arrumento Luiz Vicentin	-47.080811	-22.829629	6	Bar	Brazilian Restaurant	Pizza Place	Café	Brewery	Ice Cream Shop	Vegetarian / Vegan Restaurant	Snack Place	Supermarket	Beer Bar
Bairro das Palmeiras	-47.016018	-22.895889	6	Restaurant	Pool	Gym	Brazilian Restaurant	Tennis Court	BBQ Joint	Lake	Social Club	Volleyball Court	Diner
Barão Geraldo	-47.079099	-22.845249	3	Hardware Store	Restaurant	Bus Stop	Café	Zoo Exhibit	Fast Food Restaurant	Food Stand	Food Court	Food & Drink Shop	Food
Bosque das Palmeiras	-47.041516	-22.789775	3	Pizza Place	Restaurant	Pet Store	Cocktail Bar	Fast Food Restaurant	Field	Financial or Legal Service	Fish & Chips Shop	Zoo Exhibit	Farm

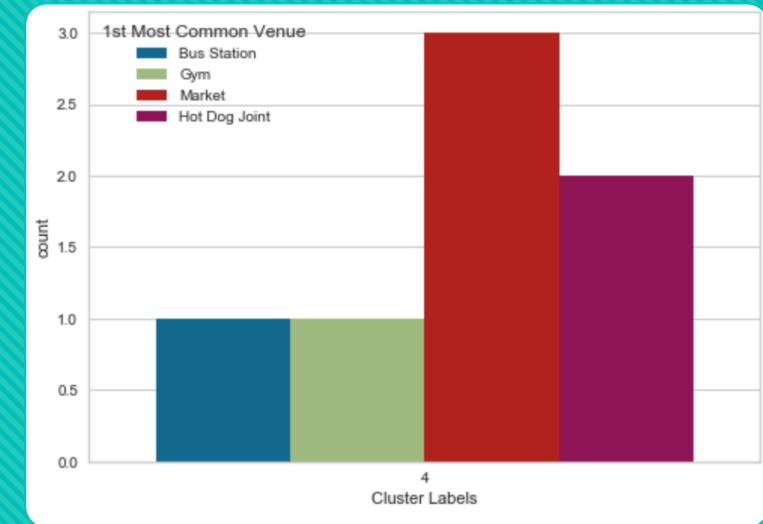
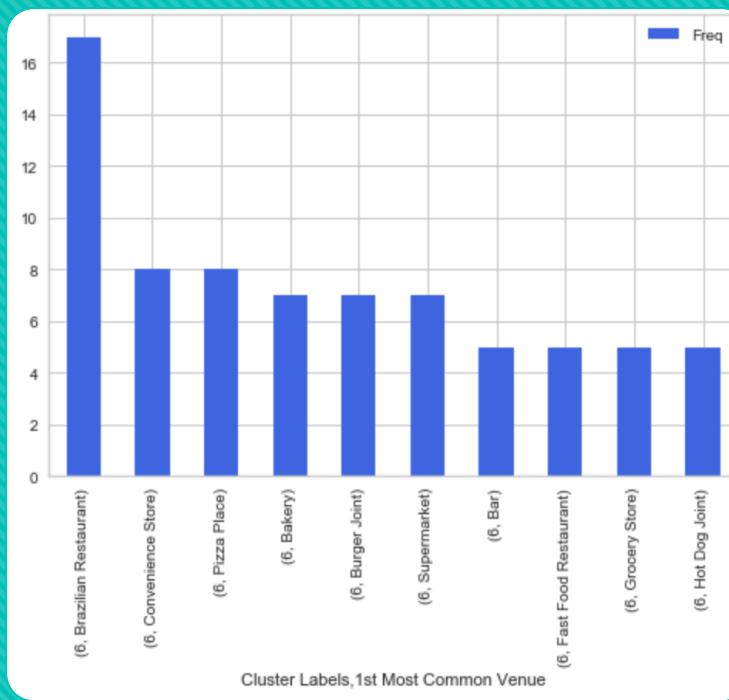
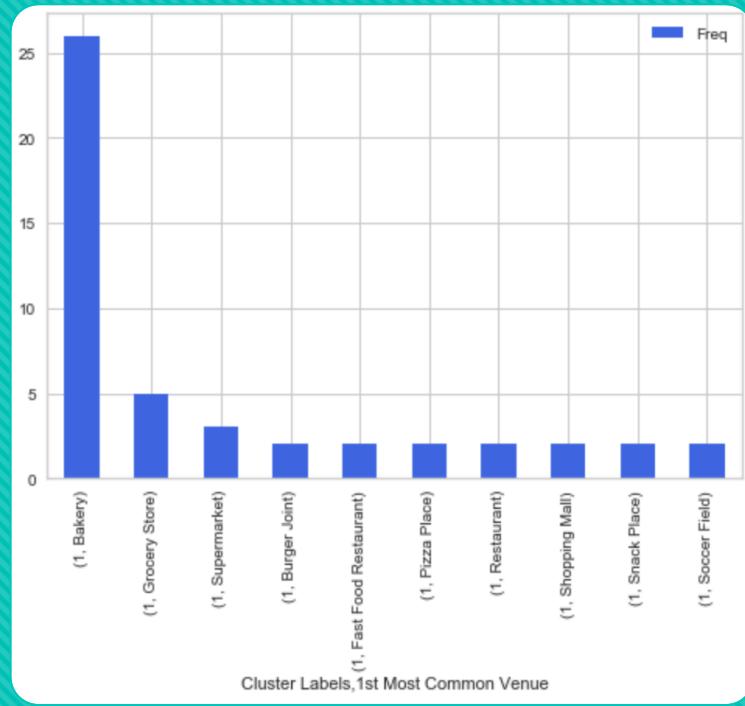
IMPLEMENTING THE K-MEANS ALGORITHM AND INSERTING THE CLUSTER LABELS ON THE DATAFRAME





MOST FREQUENT VENUES IN CLUSTERS NEIGHBORHOODS

- Observing the results, the food truck venues are concentrated on cluster “0”.
- In the next slide, there are three more clusters analyzed, although not all clusters were included in this presentation.



MOST FREQUENT VENUES IN CLUSTERS NEIGHBORHOODS

NEIGHBORHOODS IN CLUSTER “0” WITH THE MINIMUM PRESENCE OF COMPETITORS

- The "Food Truck" indicator corresponds to the amount of food truck businesses present in each neighborhood.
- Therefore, the first occurrences represent the neighborhoods in the food truck cluster that are less saturated by that business model.

Neighborhood	Food Truck
Jardim Anchieta	0.142857
Jardim Andorinhas	0.166667
Nova Aparecida	0.166667
Jardim Profilurb	0.166667
Jardim Santa Lúcia	0.200000
Dic Vi	0.200000
Jardim Amazonas	0.200000
Parque Brasília	0.200000
Jardim Itayu	0.200000
Jardim Londres	0.200000
Residencial Sirius	0.200000
Vila Ipe	0.200000

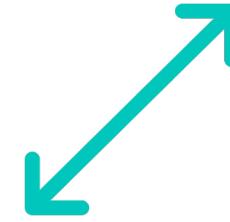


It is observed that there is in fact a group of neighborhoods with similarities that tend to retain and accept food truck venues.

This study then concludes that the cluster of neighborhood identified by the number "0" is the cluster representative of food truck venues



The first few rows pertaining to the table on the slide prior to this one represents neighborhoods that are compatible with food truck venues, and also are accompanied by the least amount of competitors for that cluster.



Implementing a business in a location that is compatible with that model, and also has few competitors when compared to other locations is a high-value information.

In neighborhoods with less competitors, the investor has more "leg room" to setup the business and mine consumers, that tend not to have a favorite food truck venue defined on their consumer preferences.

A higher tendency of neighborhood locals to visit the venue provides not only a higher level of initial cashflow, but also a higher rate of personal indications to residents of other neighborhoods. Provided there is a differential in food and service quality, non-local customers are also expected to flow in.



DISCUSSION

CONCLUSION

Neighborhood	Food Truck
Jardim Anchieta	0.142857
Jardim Andorinhas	0.166667
Nova Aparecida	0.166667
Jardim Profilurb	0.166667
Jardim Santa Lúcia	0.200000

- This study determined that the top five locations to develop a food truck venue project are, in descending order of preference:
 - Jardim Anchieta
 - Jardim Andorinhas
 - Nova Aparecida
 - Jardim Profilurb
 - Jardim Santa Lúcia
- Other variables must be taken into account in the process of choosing one of the recommended locations, such as:
 - Mean level of income vs Desired price-level
 - Average age of neighborhood locals
 - Magnitude of night-time activities
 - Cross-reference each neighborhood to its compatibility for the desired specificities in the business model intended, such as target audience, price levels and operating hours.

CONCLUSION

- During this study, important data was gathered about Campinas establishments
- This data may be very useful in the future for other projects and clients demands
- The product of this study enables other conclusions to be drawn, and it is readily available for future exploratory analytic endeavours
- For example, we can note that bakeries, although being distributed on different clusters, are concentrated the most on cluster number “1”, which allows the drawing of conclusions and further study, similarly to the one performed for the food truck case