

An aerial photograph of the Dallas skyline. In the foreground on the left is the Reunion Tower, a tall structure with a spherical top. The background is filled with numerous skyscrapers of varying heights and architectural styles, including the Bank of America Tower. The sky is clear and blue. A dark blue banner is overlaid at the bottom of the image, containing white text.

SEGMENTING AND CLUSTERING NEIGHBORHOODS IN DALLAS, TX

IBA APPLIED DATA SCIENCE CAPSTONE PROJECT

ALEX P. BLIZZARD

PROJECT OVERVIEW

- Introduction and Data
- Methodology
- Results
- Discussion
- Conclusion

INTRODUCTION AND DATA

BACKGROUND

- Rising food movement in Dallas, TX
- Restaurants range from Texas BBQ to up-scale ramen bars

PROBLEM AND INTEREST

- 14 districts with already massive restaurant population.
- Where is best location to open restaurant?

INTEREST

- Business owners of expanding restaurants
- Restaurant industry know as highest risk investment

DATA

BACKGROUND

- Dallas neighborhood csv file
- Venue location data from Foursquare location platform

	Latitude	Longitude
Neighborhood		
Baylor District	32.797826	-96.778186
The Cedars	32.769897	-96.785852
Civic Center District	32.776255	-96.798500
Dallas Arts District	32.788885	-96.798924
Dallas Farmers Market	32.778543	-96.788246
Deep Ellum	32.784001	-96.778559
Design District	32.789055	-96.821590
Main Street District	32.780931	-96.798114
Reunion District	32.773613	-96.807676
Riverfront District	32.768468	-96.812929
South Side	32.765736	-96.794980
Thanksgiving Commercial Center	32.784866	-96.796783
Uptown	32.802121	-96.800784
Victory Park	32.788206	-96.810155
West End Historic District	32.780877	-96.807525

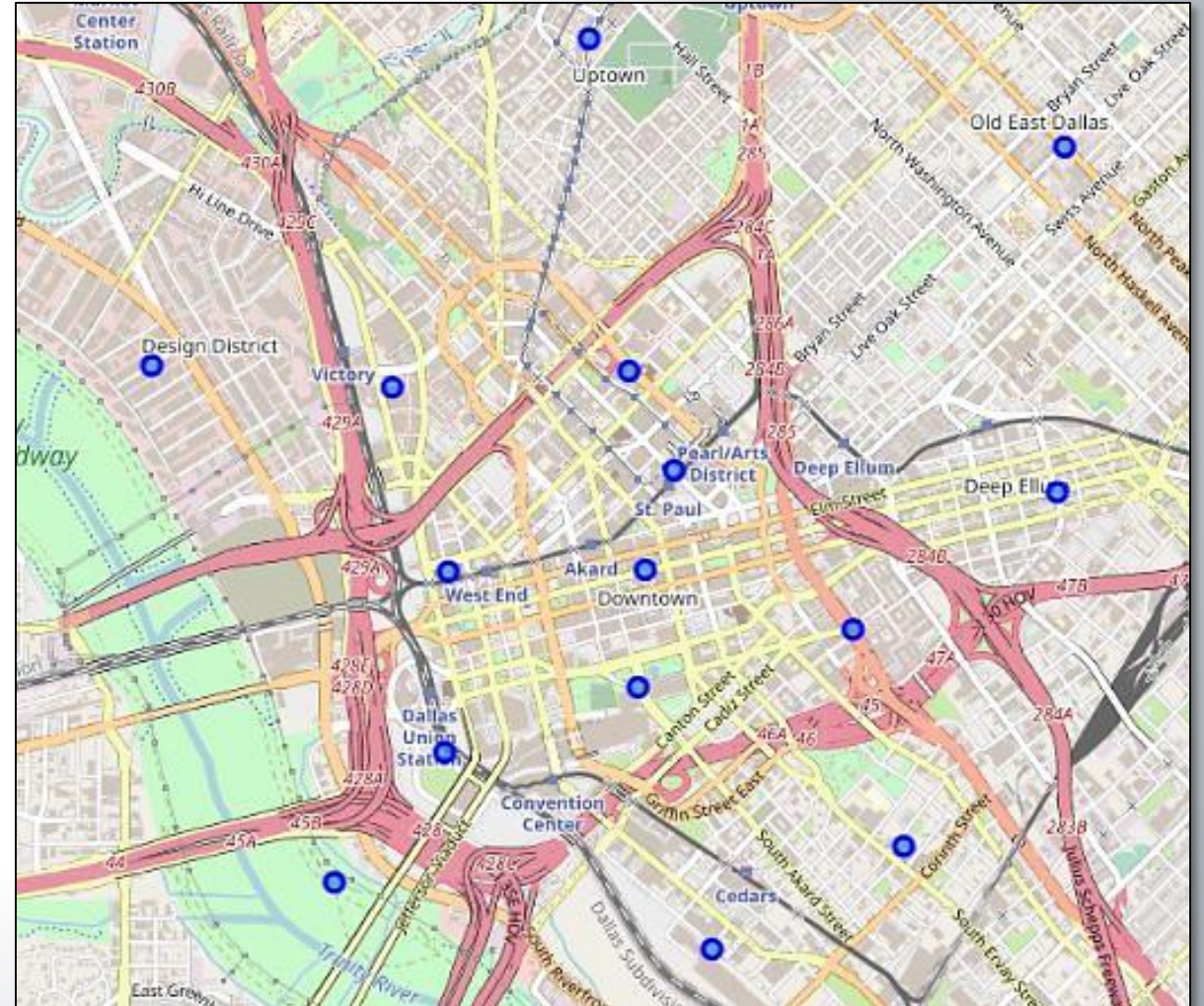
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METHODOLOGY

DATA PRE-PROCESSING

- Import libraries, Dallas data set, and venues data from Foursquare API
- 100 venues collected within 500m radius of neighborhoods



METHODOLOGY

DATA PROCESSING

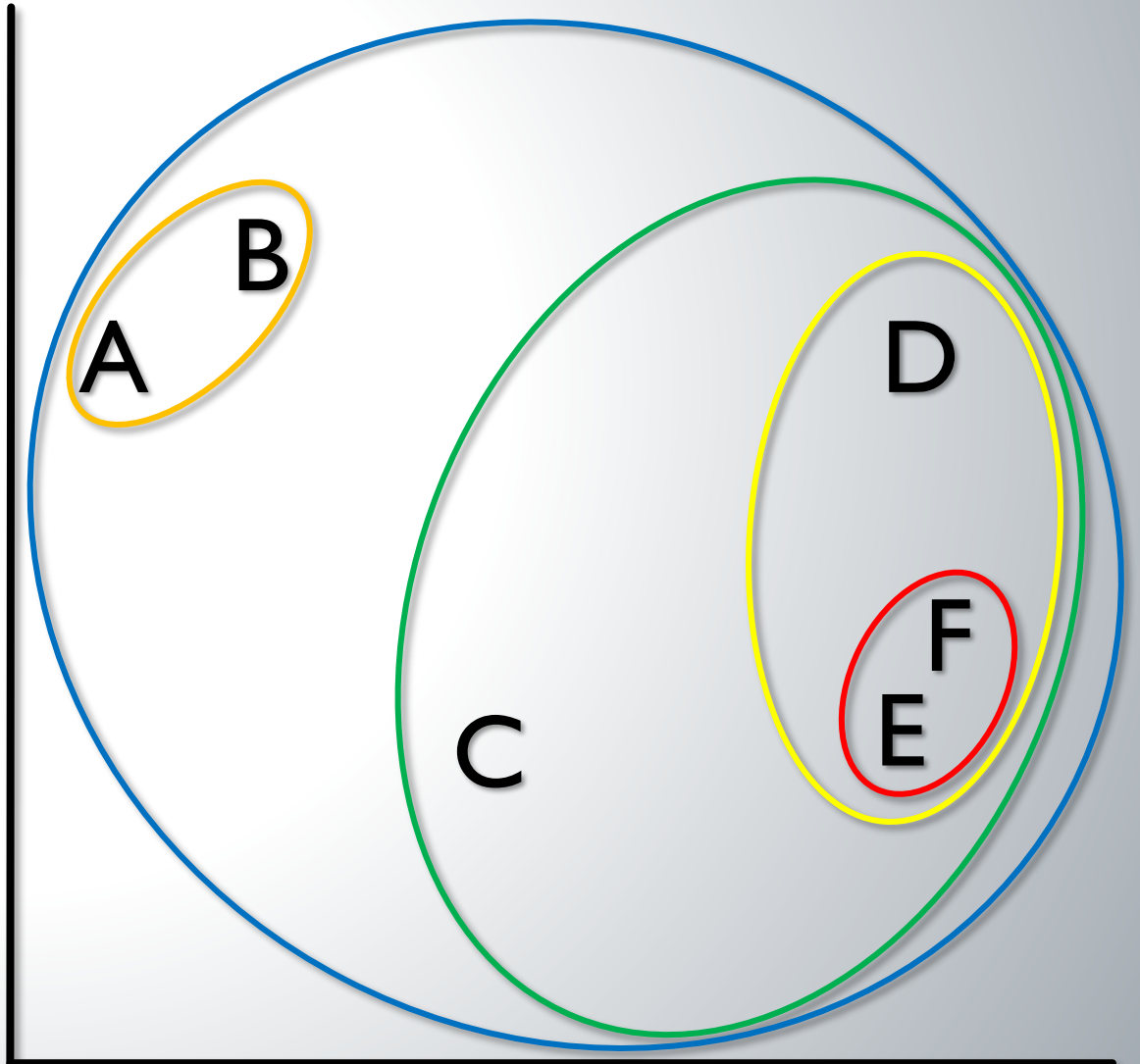
- Assigning statistical variable to venue category
- Neighborhoods grouped and calculated average frequency of venue occurrence

	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	Baylor District	Pizza Place	Discount Store	Sandwich Place	Mexican Restaurant	Taco Place	Grocery Store	Mobile Phone Shop	Donut Shop	Nail Salon	Fast Food Restaurant
1	Civic Center District	Hotel	Coffee Shop	Bar	Café	Plaza	IT Services	Seafood Restaurant	Salad Place	Cocktail Bar	Department Store
2	Dallas Arts District	Food Truck	Performing Arts Venue	Steakhouse	American Restaurant	Japanese Restaurant	Art Museum	Theater	Sandwich Place	Seafood Restaurant	Dog Run
3	Dallas Farmers Market	American Restaurant	Farmers Market	Food Truck	Vietnamese Restaurant	Pool	Dessert Shop	Sandwich Place	Dog Run	Coffee Shop	Design Studio
4	Deep Ellum	Bar	BBQ Joint	Music Venue	American Restaurant	Mexican Restaurant	Dessert Shop	Dive Bar	Coffee Shop	Art Gallery	Pizza Place

METHODOLOGY

DATA MODELING

- Unsupervised machine learning cluster analysis
- K means and Euclidean distance algorithm



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RESULTS

	Neighborhood	Latitude	Longitude	Cluster Labels2	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	The Cedars	32.769897	-96.785852	0	Skate Park	Food Court	Museum	History Museum	Art Gallery	Coffee Shop	Pharmacy	Dive Bar	BBQ Joint	Dog Run

	Neighborhood	Latitude	Longitude	Cluster Labels2	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
3	Dallas Arts District	32.788885	-96.798924	1	Food Truck	Performing Arts Venue	Steakhouse	American Restaurant	Japanese Restaurant	Art Museum	Theater	Sandwich Place	Seafood Restaurant	Dog Run
4	Dallas Farmers Market	32.778543	-96.788246	1	American Restaurant	Farmers Market	Food Truck	Vietnamese Restaurant	Pool	Dessert Shop	Sandwich Place	Dog Run	Coffee Shop	Design Studio
5	Deep Ellum	32.784001	-96.778559	1	Bar	BBQ Joint	Music Venue	American Restaurant	Mexican Restaurant	Dessert Shop	Dive Bar	Coffee Shop	Art Gallery	Pizza Place
10	South Side	32.765736	-96.794980	1	Music Venue	Bar	American Restaurant	Coffee Shop	Rock Club	Business Service	Record Shop	Pub	Cocktail Bar	Convenience Store
12	Uptown	32.802121	-96.800784	1	Cocktail Bar	Bar	Seafood Restaurant	Pizza Place	Café	Gym	Italian Restaurant	Burger Joint	Breakfast Spot	Salon / Barbershop

	Neighborhood	Latitude	Longitude	Cluster Labels2	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
9	Riverfront District	32.768468	-96.812929	2	Liquor Store	BBQ Joint	Nightclub	Gay Bar	Business Service	Design Studio	Dive Bar	Discount Store	Diner	Dessert Shop

RESULTS CONT.

	Neighborhood	Latitude	Longitude	Cluster Labels2	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
6	Design District	32.789055	-96.82159	3	Art Gallery	Furniture / Home Store	Antique Shop	Mexican Restaurant	Convenience Store	Shipping Store	Brewery	Pizza Place	Steakhouse	Bridal Shop

	Neighborhood	Latitude	Longitude	Cluster Labels2	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	Baylor District	32.797826	-96.778186	4	Pizza Place	Discount Store	Sandwich Place	Mexican Restaurant	Taco Place	Grocery Store	Mobile Phone Shop	Donut Shop	Nail Salon	Fast Food Restaurant
2	Civic Center District	32.776255	-96.798500	4	Hotel	Coffee Shop	Bar	Café	Plaza	IT Services	Seafood Restaurant	Salad Place	Cocktail Bar	Department Store
7	Main Street District	32.780931	-96.796114	4	Hotel	Coffee Shop	Mexican Restaurant	Sandwich Place	Bar	Cocktail Bar	Salad Place	Park	Café	Sports Bar
8	Reunion District	32.773613	-96.807676	4	Hotel	American Restaurant	Scenic Lookout	Plaza	Bar	Restaurant	Event Space	Coffee Shop	Beer Garden	Food Truck
11	Thanksgiving Commercial Center	32.784866	-96.796783	4	Gym	Coffee Shop	Cocktail Bar	Italian Restaurant	Hotel	Steakhouse	Taco Place	New American Restaurant	Boutique	Sandwich Place
13	Victory Park	32.788206	-96.810155	4	Restaurant	Lounge	Sports Bar	Bar	Yoga Studio	Cocktail Bar	Ramen Restaurant	Furniture / Home Store	Pizza Place	Pharmacy
14	West End Historic District	32.780877	-96.807525	4	History Museum	Sandwich Place	Plaza	Hotel	Music Venue	Liquor Store	Pharmacy	Coffee Shop	Convenience Store	Lounge

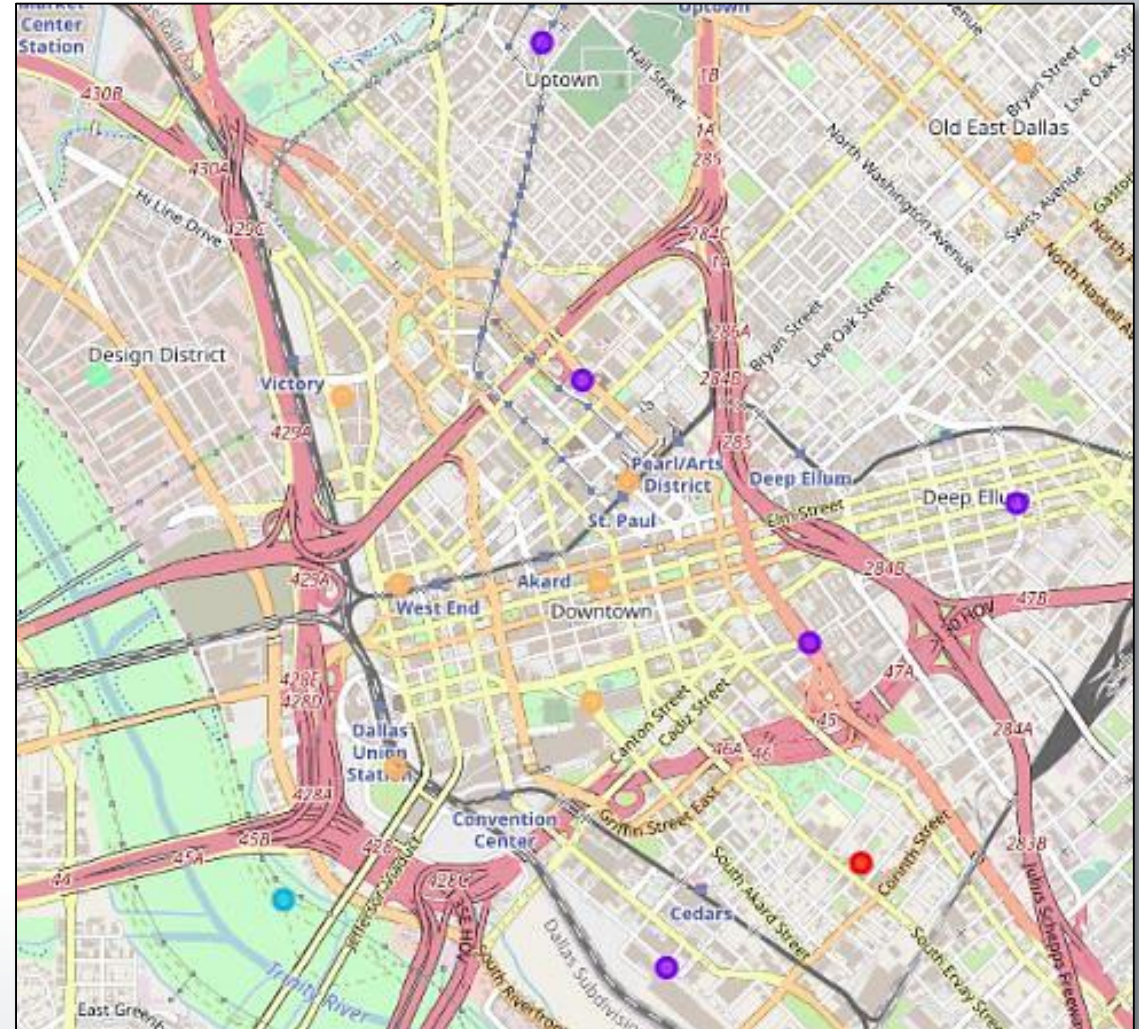
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DISCUSSION

NEIGHBORHOODS

- Primary most common venue
 - Cluster 0: Parks
 - Cluster 1: Bars
 - Cluster 2: Stores
 - Cluster 3: Galleries
 - Cluster 4: Hotels



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CONCLUSION

- 1) The Cedars is primarily associated with parks.
- 2) Dallas Arts District, Dallas Farmers Market, Deep Ellum, South Side, and Uptown is primarily associated with bars.
- 3) Riverfront District is primarily associated with stores.
- 4) Design District is primarily associated with galleries.
- 5) Baylor District, Civic Center District, Main Street District, Reunion District, Thanksgiving Commercial Center, Victory Park, and West End Historic District are primarily associated with hotels.
- 6) For a trendy restaurant targeting young professionals, neighborhoods associated with bars would be an ideal location.
- 7) For a fine dining restaurant targeting upper class travelers, neighborhoods associated with hotels would be an ideal location.



THANK YOU