DARRYN STARR

COURSERA DATA SCIENCE CAPSTONE PROJECT

7/20/2020

INTRODUCTION

A restaurant entrepreneur and group of investors plan to open a new Pizza restaurant in Morris County, NJ with a secret recipe by Gino. They need assistance determining which town(s) would be good business choices because this is a significant investment of both money and time. A data science analysis can be performed to identify clusters of towns with similar characteristics.

The target audience is the restaurant entrepreneur and investor group who need to evaluate towns to locate the restaurant so they can be successful.

DATA

The FourSquare data includes Venue Categories within a radius, given the zip codes and towns provided. The Venue Categories include American Restaurant, Italian Restaurant, Jewish Restaurant, and many other categories. Some can be viewed in the sample screenshot below. This data can then be summarized into average frequencies by category to determine the top categories by neighborhood. The clustering data analysis will utilize this input to help provide groups of towns that are similar.

Sample data structure from Foursquare is listed below.

	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 Com V
0	BaskingRidge	African Restaurant	Fast Food Restaurant	Construction & Landscaping	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega	Depart
1	Bernardsville	Construction & Landscaping	Garden	Yoga Studio	Diner	Farm	Electronics Store	Donut Shop	Doctor's Office	Div
2	Brookside	Baseball Field	Trail	Yoga Studio	Dive Bar	Farmers Market	Farm	Electronics Store	Donut Shop	Do
3	Butler	Smoke Shop	Greek Restaurant	Mediterranean Restaurant	Yoga Studio	Electronics Store	Donut Shop	Doctor's Office	Dive Bar	
4	Califon	Home Service	Yoga Studio	Diner	Farmers Market	Farm	Electronics Store	Donut Shop	Doctor's Office	Div

I found the zip codes, latitude, and longitude for towns in Morris County NJ through Google and stored the data. I will match the town's coordinates with Foursquare location data to perform the analysis.

	Neighborhood	PostalCode	Latitude	Longitude
0	BaskingRidge	7920	40.6868	-74.5580
1	Bernardsville	7924	40.7296	-74.5815
2	Boonton	7005	40.9245	-74.4174
3	Brookside	7926	40.7954	-74.5663
4	BuddLake	7828	40.8903	-74.7454

Population Data can also be used in the Post Analysis of the towns.

METHODOLOGY

I gathered data from FourSquare to evaluate Venue Categories within Neighborhoods. An analysis was then performed to examine the frequency of types of venues.

I performed a statistical analysis using k-means to cluster the neighborhood into 5 clusters to find similarities between towns. The method will group

points together to minimize the difference between points in the same cluster, while maximizing differences between different clusters.

I then reviewed each of the 5 cluster results to determine which cluster is most applicable to the business question of setting up a new restaurant.

RESULTS

Five clusters were created in the analysis. It is notable that the third cluster contained the most towns grouped together.

Cluster 1 had Parks as the most common venue.

Cluster 2 had Home Service, Yoga Studios, Diners, and Farmers Markets as the most common.

Cluster 3 was the largest grouping, with several different restaurant types as the most common venues.

Cluster 4 had Beer Garden, Fields, and Convenience Store as the most common.

Cluster 5 showed Farm and Yoga Studio as the most common.

CLUSTER 1

	PostalCode	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	
13	7931	Park	Speakeasy	Restaurant	Yoga Studio	Donut Shop	Doctor's Office	Dive Bar	
20	7845	Italian Restaurant	American Restaurant	Park	Diner	Farm	Electronics Store	Donut Shop	
27	7853	Park	Yoga Studio	Fast Food Restaurant	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli
58	7885	Park	Speakeasy	Spa	Department Store	Donut Shop	Doctor's Office	Dive Bar	

CLUSTER 2

	PostalCode	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	
6	7830	Home Service	Yoga Studio	Diner	Farmers Market	Farm	Electronics Store	Donut Shop	
0	7946	Home Service	Yoga Studio	Diner	Farmers Market	Farm	Electronics Store	Donut Shop	
8	7046	Home Service	Yoga Studio	Diner	Farmers Market	Farm	Electronics Store	Donut Shop	
9	7869	Home Service	Piano Bar	Yoga Studio	Diner	Farm	Electronics Store	Donut Shop	

CLUSTER 3

	PostalCode	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	
0	7920	African Restaurant	Fast Food Restaurant	Construction & Landscaping	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega	Department Store	
1	7924	Construction & Landscaping	Garden	Yoga Studio	Diner	Farm	Electronics Store	Donut Shop	Doctor's Office	Dive Bar	D
3	7926	Baseball Field	Trail	Yoga Studio	Dive Bar	Farmers Market	Farm	Electronics Store	Donut Shop	Doctor's Office	
5	7405	Smoke Shop	Greek Restaurant	Mediterranean Restaurant	Yoga Studio	Electronics Store	Donut Shop	Doctor's Office	Dive Bar	Diner	D
7	7927	Construction & Landscaping	Sculpture Garden	Yoga Studio	Diner	Farm	Electronics Store	Donut Shop	Doctor's Office	Dive Bar	De
9	7930	Coffee Shop	Breakfast Spot	Ice Cream Shop	Sandwich Place	Mexican Restaurant	Cupcake Shop	Salon / Barbershop	Candy Store	Gift Shop	F
10	7834	Italian Restaurant	Vegetarian / Vegan Restaurant	Pub	Pizza Place	Coffee Shop	Yoga Studio	Grocery Store	Seafood Restaurant	Sandwich Place	B
11	7801	Mexican Restaurant	Italian Restaurant	Coffee Shop	Bank	Convenience Store	Deli / Bodega	Café	Shoe Store	Soccer Field	F
12	7936	Flower Shop	Cafeteria	Yoga Studio	Diner	Farm	Electronics Store	Donut Shop	Doctor's Office	Dive Bar	D
14	7836	Garden Center	Chinese Restaurant	Burger Joint	Yoga Studio	Electronics Store	Donut Shop	Doctor's Office	Dive Bar	Diner	D
18	7840	Music Venue	Farmers Market	Yoga Studio	Fast Food Restaurant	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega	D
19	7842	Post Office	Baseball Field	Deli / Bodega	Restaurant	Construction & Landscaping	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	
22	7034	Chinese Restaurant	Liquor Store	Sushi Restaurant	Bank	Pizza Place	Dance Studio	Deli / Bodega	Middle Eastern Restaurant	Mexican Restaurant	Mec
24	7850	Health & Beauty Service	Asian Restaurant	Donut Shop	Martial Arts Dojo	Italian Restaurant	Athletics & Sports	Convenience Store	Train Station	Hobby Shop	
25	7852	Gym / Fitness Center	Church	New American Restaurant	Bank	Dive Bar	Farm	Electronics Store	Donut Shop	Doctor's Office	

#	ID	1	2	3	4	5	6	7	8	9
26	7035	Grocery Store	Pharmacy	Pizza Place	Donut Shop	Japanese Restaurant	Gym / Fitness Center	Mobile Phone Shop	Wine Shop	Gas Station
28	7940	Theater	Soccer Field	College Arts Building	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega	Department Store
29	7945	Farm	Pub	Flower Shop	Home Service	Tech Startup	Deli / Bodega	Bowling Alley	Dive Bar	Electronics Store
31	7803	Chinese Restaurant	Pizza Place	Arcade	Donut Shop	Deli / Bodega	Gas Station	New American Restaurant	Bagel Shop	Italian Restaurant
32	7045	Stadium	Restaurant	Bar	Salon / Barbershop	Italian Restaurant	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio
33	7950	Construction & Landscaping	Gym	Pool	Bar	Diner	Farm	Electronics Store	Donut Shop	Doctor's Office
34	7960	Park	Flea Market	Amphitheater	History Museum	Trail	Bath House	Dive Bar	Farm	Electronics Store
35	7856	Harbor / Marina	Dive Bar	Martial Arts Dojo	Chinese Restaurant	Deli / Bodega	Park	Farm	Electronics Store	Donut Shop
36	7970	Italian Restaurant	Food	American Restaurant	Golf Course	Pizza Place	Martial Arts Dojo	Pharmacy	Deli / Bodega	Café
37	7878	Concert Hall	Golf Course	Auto Workshop	Park	Diner	Farm	Electronics Store	Donut Shop	Doctor's Office
39	7857	Pizza Place	Café	Donut Shop	Italian Restaurant	Bagel Shop	Mexican Restaurant	Sports Bar	Restaurant	Grocery Store
40	7974	Gym	Cosmetics Shop	Pizza Place	Chinese Restaurant	Liquor Store	Bistro	Tennis Court	Doctor's Office	Farm
43	7438	Diner	Video Store	Pizza Place	Pharmacy	Fast Food Restaurant	Salon / Barbershop	Cosmetics Shop	Supermarket	Donut Shop
44	7054	Pizza Place	Automotive Shop	Coffee Shop	Indian Restaurant	Cosmetics Shop	Playground	Rental Car Location	Department Store	Diner
45	7440	Farm	Pool	Ice Cream Shop	Fast Food Restaurant	Yoga Studio	Diner	Electronics Store	Donut Shop	Doctor's Office
46	7806	Pet Store	Park	Mediterranean Restaurant	Greek Restaurant	Electronics Store	Donut Shop	Doctor's Office	Dive Bar	Diner
47	7058	Mexican Restaurant	Spanish Restaurant	Cosmetics Shop	Sandwich Place	Asian Restaurant	Italian Restaurant	Furniture / Home Store	Diner	Electronics Store
48	7444	Soccer Field	Track	Football Stadium	Cafeteria	Yoga Studio	Department Store	Donut Shop	Doctor's Office	Dive Bar
50	7457	Building	Arts & Crafts Store	Furniture / Home Store	Tex-Mex Restaurant	Yoga Studio	Dive Bar	Farm	Electronics Store	Donut Shop
51	7866	Rental Service	Lake	Bus Station	Diner	Electronics Store	Donut Shop	Doctor's Office	Dive Bar	Department Store
52	7870	Deli / Bodega	Sandwich Place	Campground	Diner	Farm	Electronics Store	Donut Shop	Doctor's Office	Dive Bar
57	7470	Construction & Landscaping	Italian Restaurant	Moving Target	Playground	Nightclub	Donut Shop	Doctor's Office	Dive Bar	Diner
59	7981	Pizza Place	Bar	Italian Restaurant	Gym	Sandwich Place	Diner	Other Repair Shop	Deli / Bodega	Hobby Shop

CLUSTER 4

	PostalCode	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	1(C
53	7874	Beer Garden	Field	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega	Department Store	Diner	
55	7876	Beer Garden	Field	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega	Department Store	Diner	

CLUSTER 5

	PostalCode	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	10t C
8	7928	Farm	Yoga Studio	Fast Food Restaurant	Construction & Landscaping	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega	Depa
56	7082	Farm	Yoga Studio	Fast Food Restaurant	Construction & Landscaping	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega	Depa

DISCUSSION

Based on the clustering results, a significant number of towns were grouped together in Cluster 3.

Several towns had a higher frequency of Italian restaurants with lower frequency of Pizza Places. Zip codes 07801 (Dover), 07470 (Wayne), and 07970 (Mount Freedom) met that criteria.

CONCLUSION

In Conclusion, the group should consider Dover, Wayne, and Mount Freedom as location choices to scout real estate in to locate the new Pizza restaurant.