Clustering Neighborhoods in Newport County, RI

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Business Problem

Joe is in the US Navy and has been stationed in Newport, Rhode Island

He initially found a house near the Melville Elementary school, but descided to move following these criteria:

1. Joe wants to find a similar neighborhood to the one with Melville Elementary School.
2. Joe wants to find a neighborhood close to an elementary school.
3. Joe wants to find a neighborhood much closer to the First and Second town beaches on southern Aquidneck island.

Data Acquisition - Wikipedia

The data was taken from the webpage below.

- Filtered data about elementary schools
- Filtered to only include schools in Newport County
- Geopy was used to find coordinates for each location
- If not found, I replaced school name with City name.

	School	City	State
0	Aquidneck School	Middletown	Rhode Island
1	Carey School	Newport	Rhode Island
2	Elmhurst School	Portsmouth	Rhode Island
3	Forest Avenue School	Middletown	Rhode Island
4	Fort Barton School	Tiverton	Rhode Island
5	Howard Hathaway School	Portsmouth	Rhode Island
6	Jamestown	Jamestown	Rhode Island
7	Middletown	Middletown	Rhode Island
8	Melville School	Portsmouth	Rhode Island
9	Nonquit School	Tiverton	Rhode Island
10	Pocasset School	Tiverton	Rhode Island
11	Prudence Island School	Prudence Island	Rhode Island
12	Tiverton	Tiverton	Rhode Island
13	Newport	Newport	Rhode Island
14	Little Compton	Little Compton	Rhode Island

https://en.wikipedia.org/wiki/List_of_Rhode_Island_schools

Data Acquisition - Google Maps

	Beach	Address
0	Eastons Beach	175 Memorial Blvd
1	Second Beach	315 Sachuest Point Rd
2	Third Beach	Hanging Rock rd

- Using Google Maps addresses to the three beaches were found and entered into a data frame
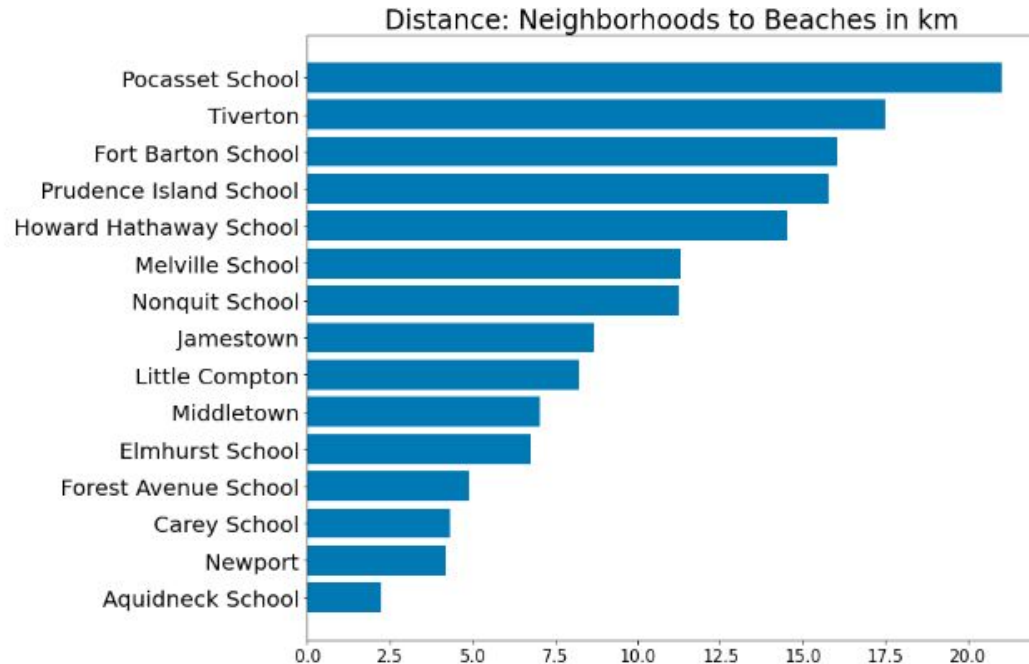- Geopy was used again to find the coordinates

Methodology - Foursquare

Using the foursquare api, venues near each neighborhood were found and tables were made to show the most common venues.

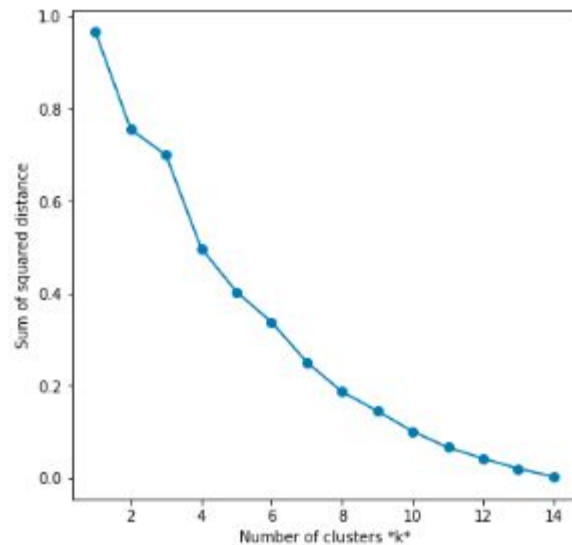|	School	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Aquidneck School	American Restaurant	Seafood Restaurant	Beach	Pizza Place	Scenic Lookout
1	Carey School	American Restaurant	Seafood Restaurant	Hotel	Historic Site	Pub
2	Elmhurst School	Trail	Park	Vineyard	Beach	Athletics & Sports
3	Forest Avenue School	Hotel	Airport	Bakery	Donut Shop	Gym / Fitness Center
4	Fort Barton School	American Restaurant	Harbor / Marina	Café	Coffee Shop	Liquor Store
5	Howard Hathaway School	American Restaurant	Hostel	Beach	Grocery Store	Liquor Store
6	Jamestown	Harbor / Marina	Hotel	Ice Cream Shop	Beach	City
7	Little Compton	Pizza Place	Gift Shop	Breakfast Spot	Post Office	Thrift / Vintage Store
8	Melville School	Harbor / Marina	American Restaurant	Pizza Place	Museum	Café
9	Middletown	Airport	Sporting Goods Shop	Gas Station	Cosmetics Shop	Coffee Shop
10	Newport	Seafood Restaurant	American Restaurant	Bar	Hotel	Pub
11	Nonquit School	Deli / Bodega	Cheese Shop	American Restaurant	Art Gallery	Arts & Crafts Store
12	Pocasset School	American Restaurant	Pharmacy	Pizza Place	Convenience Store	Food & Drink Shop
13	Prudence Island School	Beach	Convenience Store	Boat or Ferry	Other Great Outdoors	Candy Store
14	Tiverton	Sandwich Place	Ice Cream Shop	Donut Shop	Playground	Spa

Methodology - Geopy Distance

- Using the Geopy distance method, distances to each beach from each neighborhood were found.
- This graph shows the average distance to the three beaches for each Neighborhood.

Distance: Neighborhoods to Beaches in km

Methodology - Clustering and Metrics

- Using k means clustering the Neighborhoods were clustered based on the venues within 500 meters.
- Before clustering the Elbow method was used
- The graph shows a change in function type at k=6
- Neighborhoods clustered using k=6

Results - Aquidneck School

Aquidneck
School
Cluster 0

Joe should seek housing in the Aquidneck School's neighborhood to fulfill Joe's requirements.

1. Joe wants to find a similar neighborhood to the one with Melville Elementary School.

   Both Melville and Aquidneck are in Cluster 0. They are similar.

2. Joe wants to find a neighborhood close to an elementary school.

   Aquidneck is an elementary school in Middletown, RI

3. Joe wants to find a neighborhood much closer to the First and Second town beaches on southern Aquidneck island.
   The aquidneck school is on average 2.3 km to the beaches, while the Melville school is 11.3 kilometers away from the beaches.