Coursera Capstone Project Report

An Exploration of Food Desserts and its Implications in Milwaukee

Introduction/Business Problem

The problem that I am proposing is the scarcity of grocery stores in Milwaukee neighborhoods predominately in African American communities. Routinely Milwaukee is labeled as one of the most segregated cities in the United States. This exploration into the scarcity of grocery stores will be important to city planners, entrepreneurs and politicians. These stakeholders hold a vested interest in desegregating the metro, data will further drive the conversation.

Data

The Foursquare location data will be used to locate grocery stores and create clusters of other landmarks in Milwaukee neighborhoods. I will find what other landmarks are common in neighborhoods that have low number of grocery stores to try to find other indicators of segregation. Neighborhood data will be pulled from Milwaukee city website and demographics will be pulled from the US Census American Community Survey. The data on neighborhoods was stored in shapefiles. I used ArcGis online to view the map. Through that interface I was able to add metrics for population with high school diploma and a poverty metric. Figures are provided to show what I am explaining. There was not any data available for latitude and longitude for the neighborhoods. I was able to use a tool on ArcGis to calculate the center of the polygons and then calculate that points latitude and longitude points. I then entered all this information into a CSV file so that I could load it into the Jupyter Notebook.

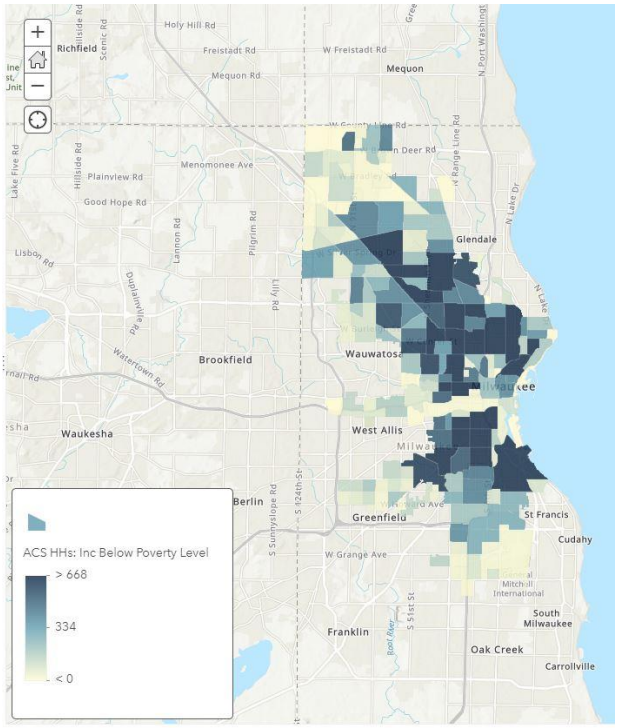


Fig. 1. A map depicting Milwaukee neighborhoods and poverty levels

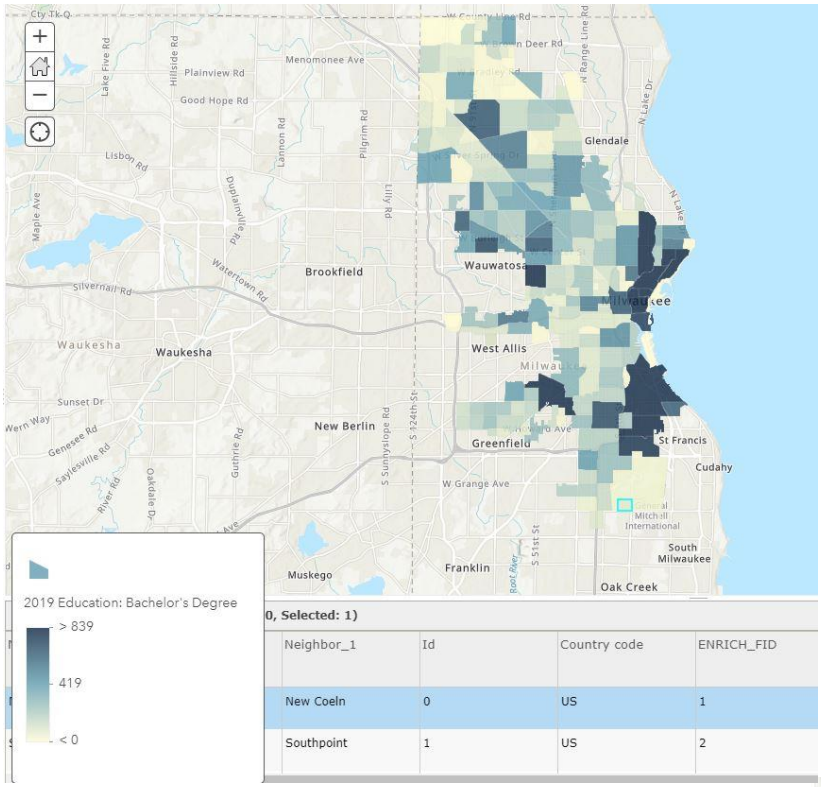
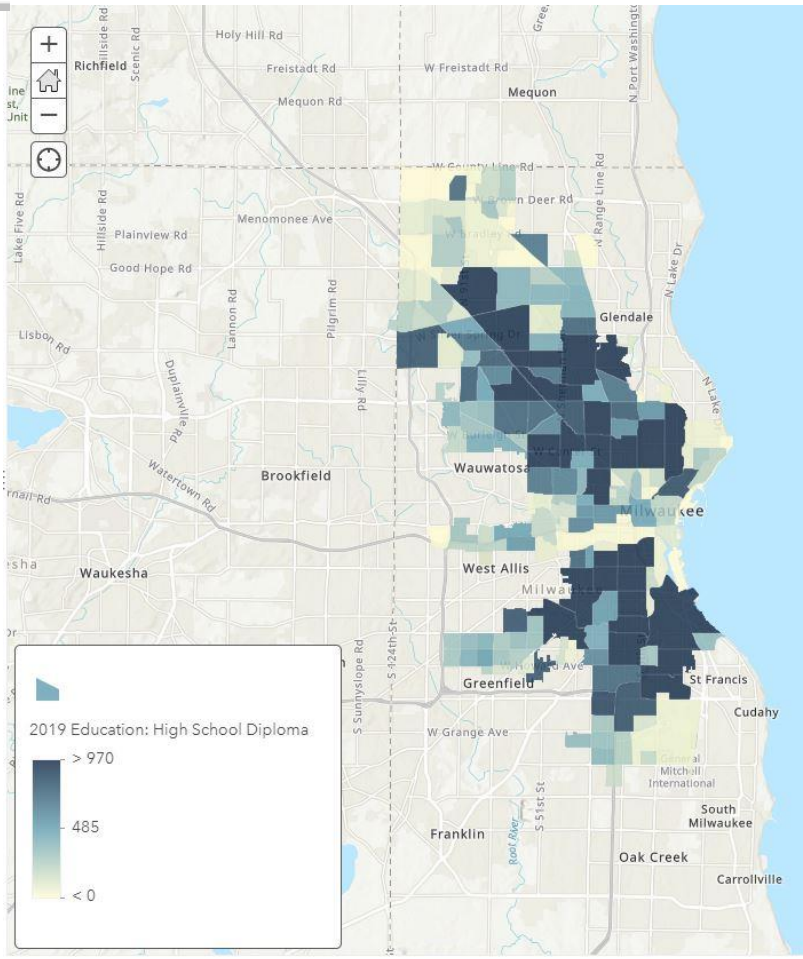


Fig. 2. A map depicting Milwaukee neighborhoods and population with bachelor's degree

Fig. 3. A map depicting Milwaukee neighborhoods and population with high school degree



Methodology

I put all that neighborhood data into pandas dataframe. I then merged that dataframe with the CSV I created containing the geospatial data that I calculated. This data then was used to build a folium map, that when you click on a neighborhood marker it would show the name of the neighborhood and the poverty score it received. I then used the Foursquare API to create a dataframe that contained all the venues of each individual neighborhood. I wrote a method that would display the top five venues in each neighborhood. I used k-means-clustering to to group together neighborhoods based on similar venues. I then displayed this information on another folium map. The next objective was to find if there was a relationship between metrics used for determining poverty levels and the access to grocery stores. This was done by using the venue dataframe and keeping only the data on grocery stores. I then dropped all neighborhoods that did not contain grocery stores because it seems like the foursquare API did not return all grocery stores. In two separate tests I combined this data with the Poverty Index and the total population that had high school diplomas. I normalized the data so that it could be used in a simple regression method to determine if there was an association between poverty and a lack of access to grocery stores.

Results

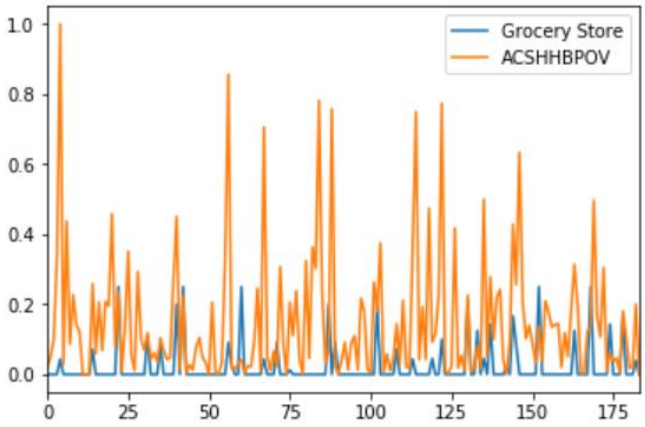


Fig. 4. A graph showing the relationship between grocery stores and the poverty metric

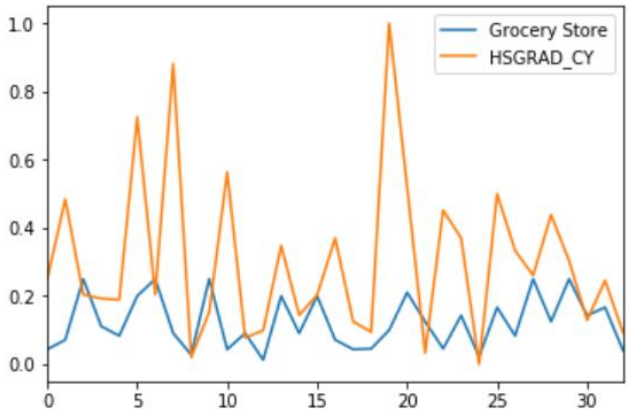


Fig. 5. A graph showing the relationship between grocery stores and the population with high school degree

I ran the data three times with random training sets and testing sets. The results for poverty of a neighborhood being a factor in the number of grocery stores was not very promising with the results being [-0.06572541373902241, -0.25104290658195527, 0.04004430511345258]. The graph for this data is also available below. These results were not what I was expecting. It has been documented in other cities that food deserts are a thing. I believe this result is due to not having great data. The results of running the same tests but using population with a high school degree was much more of what I was expecting. Although these results also did not show as big of results as I was expecting. The results for this test was [0.12778523442855816,

0.26521306121069865, 0.11520186421134104]. This shows that there is some sort of correlation between poverty and food deserts. Another part of the project was clustering neighborhoods. Based off my knowledge of living in Milwaukee these results seemed correct. Unsurprisingly neighborhoods that are known for their bar scenes got clustered together in group three. Grouping one consisted mostly of places with a large number of restaurants. Grouping two contained venues associated with recreation.

Discussion

I believe that the results could be pinned to not the best data. Milwaukee has many neighborhoods, and this led to very small areas being used to locate shortages. I think if I were to do this again, I would use something larger like Alderman Districts to locate deficiencies. Also, to better be able to analyze this information I think it would be beneficial to have access to actual demographical data. The data that I was able to collect did not reflect the segregation problem that Milwaukee has. Potentially using the clustered neighborhoods as larger sections to run that venue analysis on would have been better. Those results seemed to properly show neighborhoods that were similar. I had to drop neighborhoods without any grocery stores because of the large number of them. I believe this also led the data to move the wrong direction because there certainly is neighborhoods without grocery stores but I a comparison could not be made with such a large set of the data showing as no grocery stores.

Conclusion

While the results did not conclusively determine the presence of food deserts based off of poverty levels, they did show some promise. The data showed that there is some correlation and from personal experience I think the data might have not been the most accurate. The fact that it does show some correlation shows more research should be done into determining the access of food to Milwaukeeans