Chick-fil-A in Central Virginia

Sarah Back

January 2021

Coursera Capstone: IBM Data Science Course

Introduction

Virginia population growth has been slower than the national average over the past six years due to a larger number of residents moving out of state than those migrating in. Virginia's population has grown a mere 6.7% in the last decade according to census information for 2010-2020, the state's slowest rate of population growth in nearly a century. During this time Virginia's cities, barring its three largest, experienced slower growth and even decline while some suburban counties incurred accelerated population growth. Small businesses make up 99.5% of Virginia's businesses overall and in the 4th quarter of 2019 Virginia's overall economy ran parallel with the national average around 2%. Virginia unemployment more than tripled from 2.9% to 10.6% since April 2019 however, the state's rate is still lower than the national average by over 4%. This final project will explore central Virginia for the best location to build a new Chick-fil-A enterprise. With start-up fees being highly minimal compared to other franchises, a motivated entrepreneur could potentially leverage a Virginia suburban population for profit. As with all reality, location is the largest and most critical factor in determining success or failure of a new small business. Unfortunately, the Chick-fil-A franchise limits new owners to only maintaining one establishment so choosing where to invest carries even greater risk to those concerned with failure. Many other factors must be considered as well making a path to a sagacious decision more complicated and meticulous. This project will attempt to answer, "What is the best suited location to a new Chick-fil-A venture."

Business Problem

The objective of this Capstone project is to analyze and select the best location in central Virginia to open a new Chick-fil-A establishment. Using Data Science methodology including data analysis and data visualization, this project aims to provide a solution to answer the business question, "Where in central Virginia is the best location suited to a new Chick-fil-A venture."

Chick-fil-A in Central Virginia

Target Audience

This project is particularly useful to developers, investors, or entrepreneurs looking to open a Chick-fil-A in central Virginia or at least develop a business plan to gain franchise approval. Why focus specifically on a Chick-fil-A enterprise? With a claimed $10,000 needed to invest in building your own location and the franchise earning more per store than any other restaurant as of 2018, hoping on board becomes a very tantalizing opportunity. The franchise ranking 21st nationwide for number of locations implies such a venture is nearly fool-proof. And with the Chick-fil-A franchise nearly tripling its annual sales in the last decade, it is very likely that such an endeavor would prove to be a prosperous one.

Data

To solve the problem, we will need the following data:

- Central Virginia, specifically a 40-mile radius centering just southeast of Charlottesville, data containing counties and populations
- Latitude and Longitude coordinates of those counties, required for visual display of data.
- Venue data related to other fast-food locations, used to further analyze counties.
- Venue data of other Chick-fil-A locations, used to determine possible success rate of a potential new location.

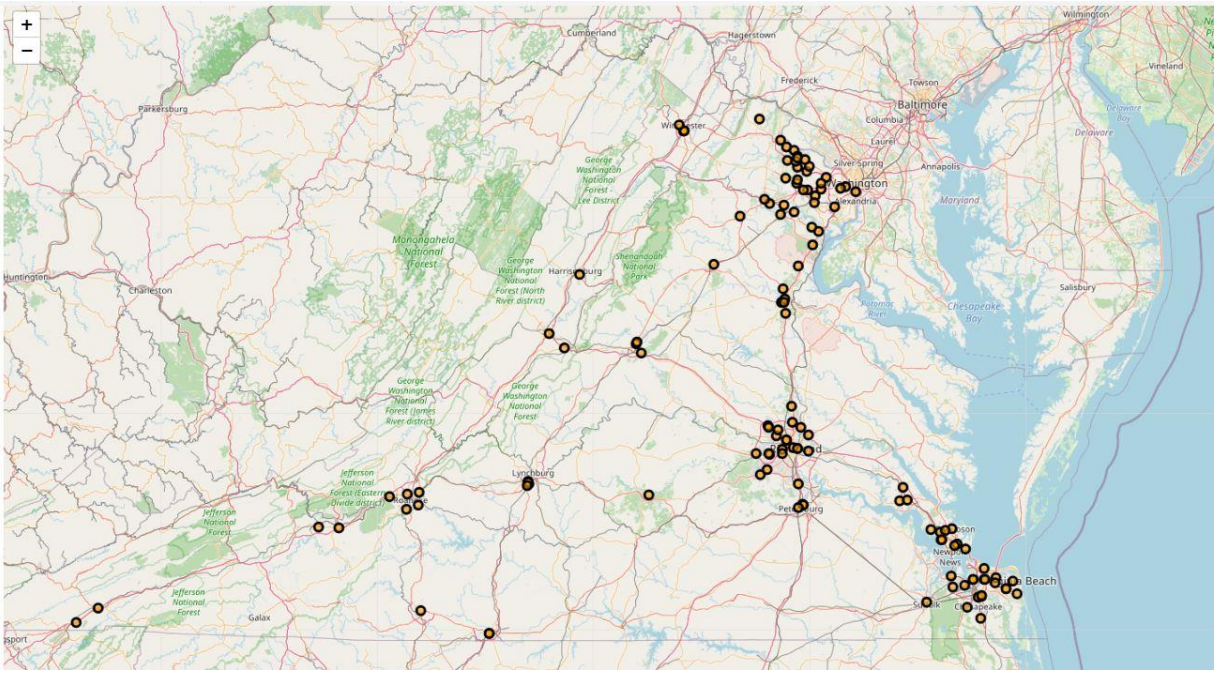
Data Source and Methodology

Virginia data containing counties will be obtained from the open data source: https://cbb.census.gov/. Geographical coordinates of the regions (latitude and longitude) will be obtained using the Python Geocoder package. Foursquare API will be used to gain venue data for other fast-food and Chick-fil-A locations for the county neighborhoods within the target area. While Foursquare provides many categories of data, this project will focus specifically on fast-food venues to solve the business problem. This project will require using many data science skills including web scrapping of open-source datasets, data cleaning, data wrangling, working with an API (Foursquare), machine-learning techniques and inferential statistical testing, and data visualizations (Folium).

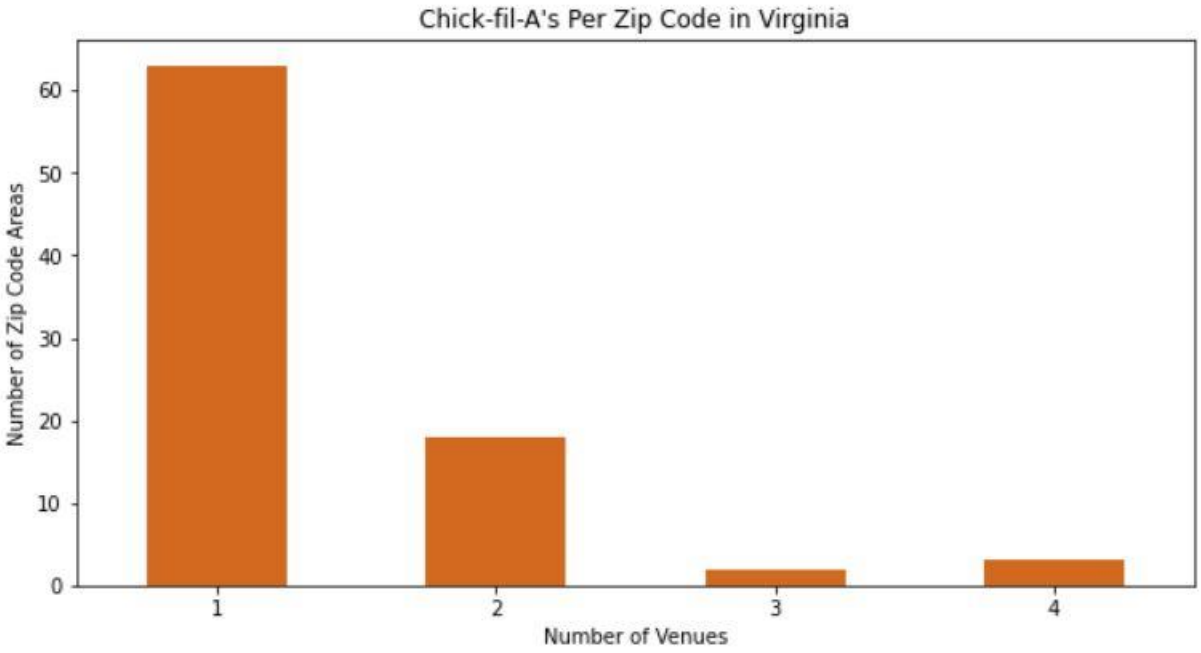
Results

The results of our analysis produced the following results.

1. There are 126 Chick-fil-A locations within Virginia.

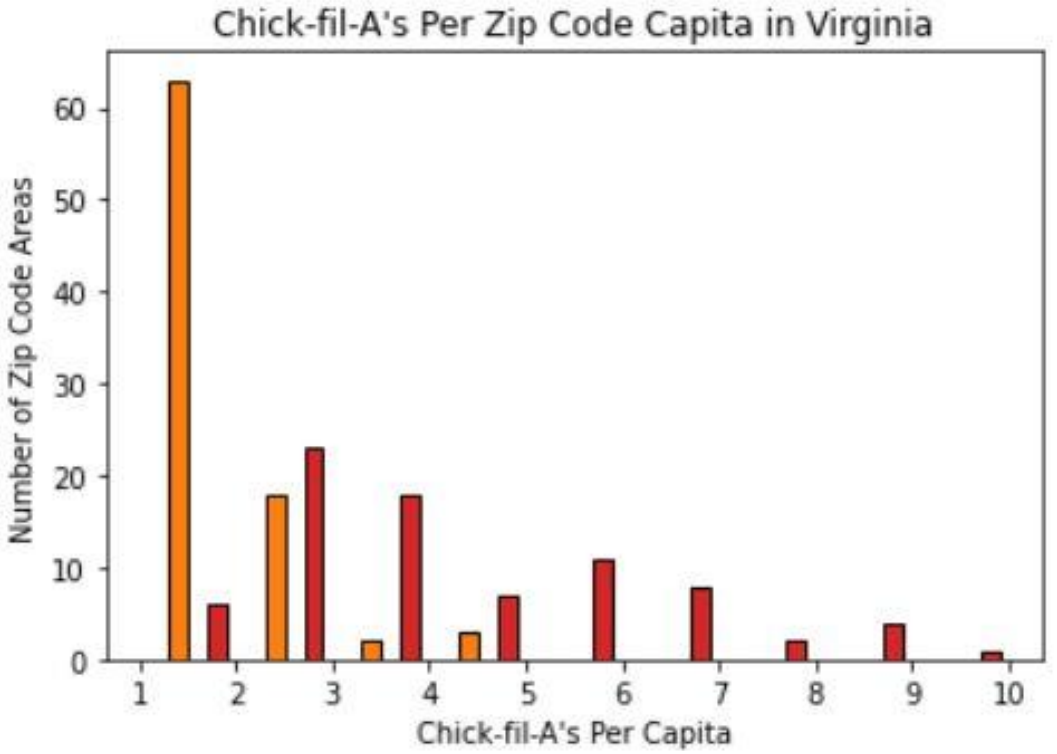


2. Although only 41 of Virginia's counties have Chick-fil-A's out of 133 counties. Of the zip codes with Chick-fil-A locations, most only one location and up to 4 locations at the most.

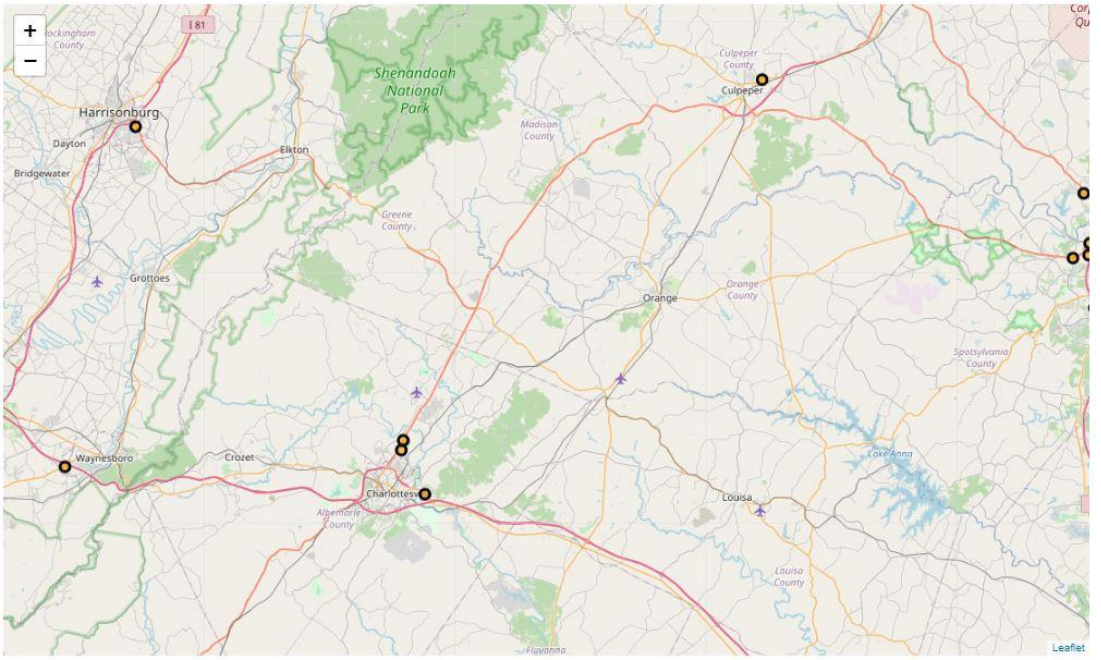


Results – Continued:

3. Chick-fil-A locations were calculated per capita based on the estimated population per zip code within Virginia.

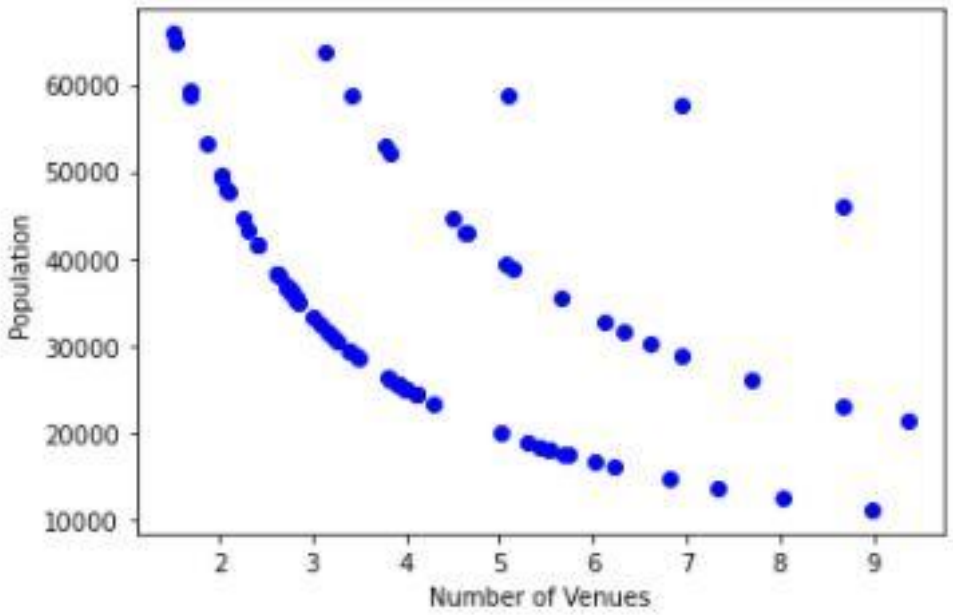


4. The focus area of this research included zip codes within the map area below that do not currently contain Chick-fil-A locations.



Results – Continued:

5. A polynomial regression model was chosen for the training and prediction model due to the curved nature of the plotted data.



6. Zip Codes 22903, 22902, and 22963 are the top 3 best areas (zip codes) to build Chick-fil-As based on current locations versus population.

	Zip	Population	Venues
42	22903	40652	NaN
126	22902	25245	NaN
181	22963	16571	NaN
200	23093	13992	NaN
231	22968	10562	NaN

Discussion Section

Based on the results of our analysis, I would state that the most ideal areas in central Virginia to build new Chick-fil-A locations would be within zip codes 22903, 22902, and 22963 are the top 3 best areas (zip codes) to build Chick-fil-As based on existing locations per capita in other zip codes. In addition, building only one location per zip code area will likely bring the most success, based on population numbers within these three zip codes and the current trends of currently franchised areas. Following these suggestions will likely induce minimal competitions and increased potential profits for new franchises.

Limitations and suggestions for future research

The above analysis is dependent on the accuracy of Four Square and estimated population data. Though small inaccuracies are possible, it is unlikely they would affect the results. Further research is suggested to support investors or developers interested in developing franchises outside of central Virginia. Currently known opportunities, though not mentioned previously due to being outside of the research focus area, is Alexandria County which has the highest population of any area within Virginia without a current Chick-fil-A location.

Conclusion

During this research project we have identified the business problem, specified the data required, extracted and prepared the data, performed data analysis, and finally provided recommendations to investors and/or developers. During this project, we applied different data science methods and instruments to answer, “Where in central Virginia is the best location suited to a new Chick-fil-A venture.” The findings of this project will help the relevant investor better understand the advantages and disadvantages of different zip code areas in terms of opening a new Chick-fil-A location.