

Capstone Project: Final Report

Introduction

The Rocket (The Rocket Gifts & Candy) is a popular novelty store that currently has two locations in Michigan: Ypsilanti and Ferndale. The store has become so popular that the owners want to open up another venue in a new location within Southeast Michigan. The store seems to be most popular with customers in their early twenties to mid-thirties and sells toys, candy, stationary, stickers, puzzles, and other novelty items.

Based on this information, the owners have asked for a recommendation on where to open a new location. This recommendation will be presented to the owners and members of the management team in a formal company meeting.

Data

To explore and analyze the relevant data on which to base this recommendation, various sources were used from the Michigan Department of Technology, Management & Budget; Foursquare; and the United States Census Bureau. Population data by city and county were analyzed to determine the most populous regions of the state, and age data were analyzed to determine where most young people in the targeted age range reside. Custom tables from the United States Census Bureau were designed and downloaded from the agency's website. The data was then reviewed and compiled prior to analysis.

Methodology

Data Cleaning

Prior to importing the final CSV file into a Jupyter Notebook to analyze the data using Python, I first opened the CSV file to delete any columns that were not needed for the final analysis, such as older age ranges and data analyzed by sex. I also separated city and county into separate columns for readability.

Data Analysis

Within the Jupyter Notebook, I added a column for a total of the populations for each relevant age group. The original data provided age ranges in separate columns for ages 20 to 24, 25 to 29, 30 to 34, 35 to 39, and 18 to 24, as well as median age. This column was the sum of the populations for each city for ages 20 to 34. Next, I sorted this column to obtain the top five cities in terms of population for this age range and then plotted these cities on a map using folium.

Results

Based on the data, the top five cities with the highest populations of residents between the ages of 20 and 34 are Detroit (102,047); Grand Rapids (40,227); Ann Arbor (21,316); Warren (20,671); and Lansing (20,089). This is the age group that The Rocket wants to target. These locations were then plotted on a map to further examine the data, as shown in Figure 1.

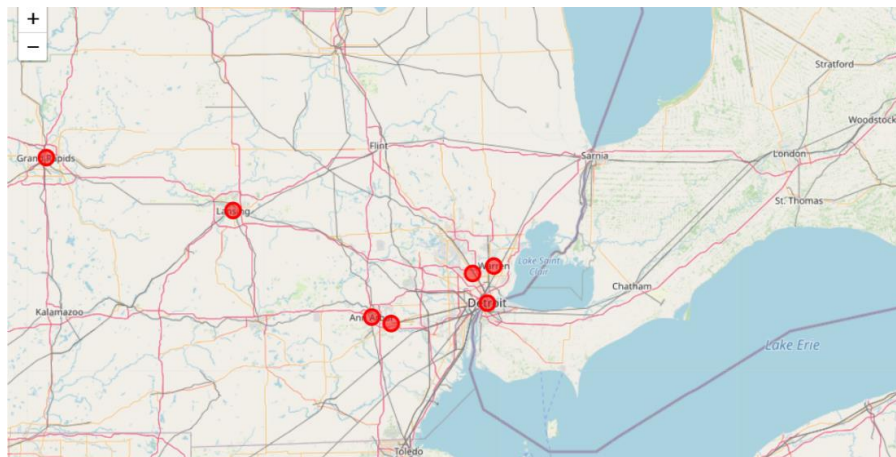


Figure 1: Map of top five cities

Because the owners want to stay in the metro Detroit area, it can be seen from the map that Grand Rapids and Lansing would not be good choices for their next venue. This leaves Ann Arbor, Detroit, and Warren. However, Ann Arbor is very close to their existing venue in Ypsilanti, so the logical choices would be either Detroit or Warren.

Discussion

Analyzing these cities on a map certainly supports the final recommendation, but additional factors could be considered as well. Unfortunately, the Foursquare API did not provide much useful data to support this analysis. For example, one could consider the overall geographic characteristics of each city: Is there a thriving downtown? What are the most popular venues? Does the area see a lot of foot traffic? How many customers could be expected to visit the store on a given day? Analyzing these factors would also be helpful if additional data could be found. Drilling down to a specific location within the city could be helpful as well.

Conclusion

The final two logical choices came down to either Detroit or Warren. Based on this data analysis, my final recommendation for the owners would be open up their next new venue in Detroit. It has a higher population of the targeted age range and is also larger in terms of area.

Sources

- 2018: American Community Survey 1-Year Estimates Detailed Tables: Total Population
- Michigan Total Population 2010-2019 (xlsx)
- Michigan Population by Age and Sex 2010-2019 (xlsx)
- Michigan Counties Total Population 2010-2019 (xlsx)
- Michigan Counties Population by Age and Sex 2010-2019 (csv)