Northeastern University

IE6600: Computation and Visualization

Project 1

Farmer's Market Growth in the U.S.

By

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Background:

The United States Department of Agriculture (USDA) has recognized the importance of farmers markets. Through its many programs, USDA has helped the growth of farmers markets across the country. As on date 8,791 farmers markets are listed in USDA's National Farmers Market Directory.

The data is stored in **" fmarket.csv "**. The data file contains the following details:

1. Variables indicating the geographical location of the farmers market (lat, long,

street, county, state etc.)

2. Variables indicating types of products (herbs, vegetables, seafood etc.)

3. Variables indicating type of payment accepted (cash, WIC, SNAP, SFMNP etc.)

4. Variables indicating online social media presence

5. Variables indicating date and time

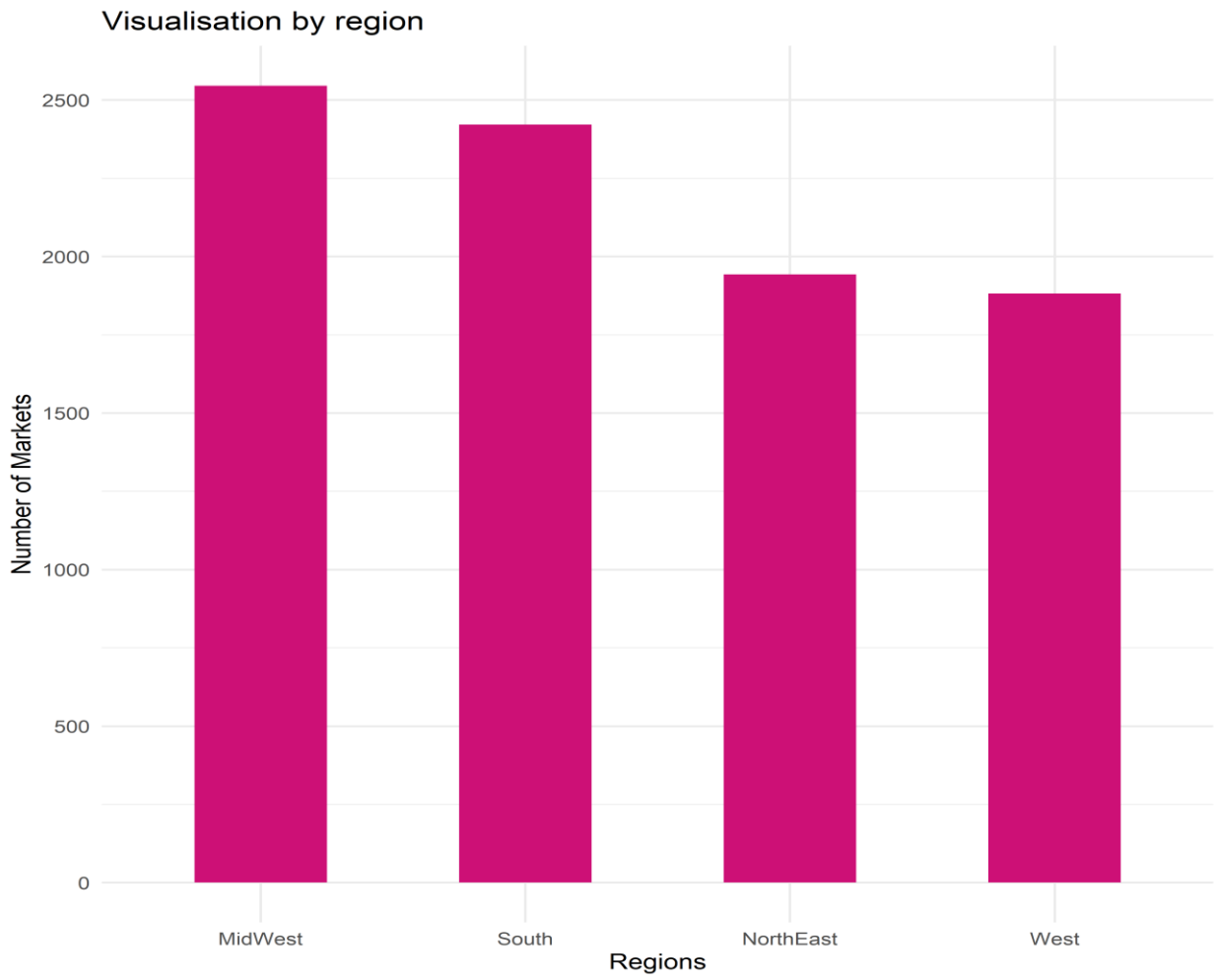
Advice for Investors Looking to Enter the Market

Introduction:

As the American population strives to become healthier, consumers must look to improve not just the types of foods they eat but how what they consume is sourced. Eating locally sourced products has a number of added benefits which large supermarket chains cannot provide customers with. Food that is sourced close to where it is consumed can have a lower carbon footprint, include pollen from local plants that helps with allergies, and supports local business. In addition, the farmer's market provides minimally processed foods that are better for gut health.

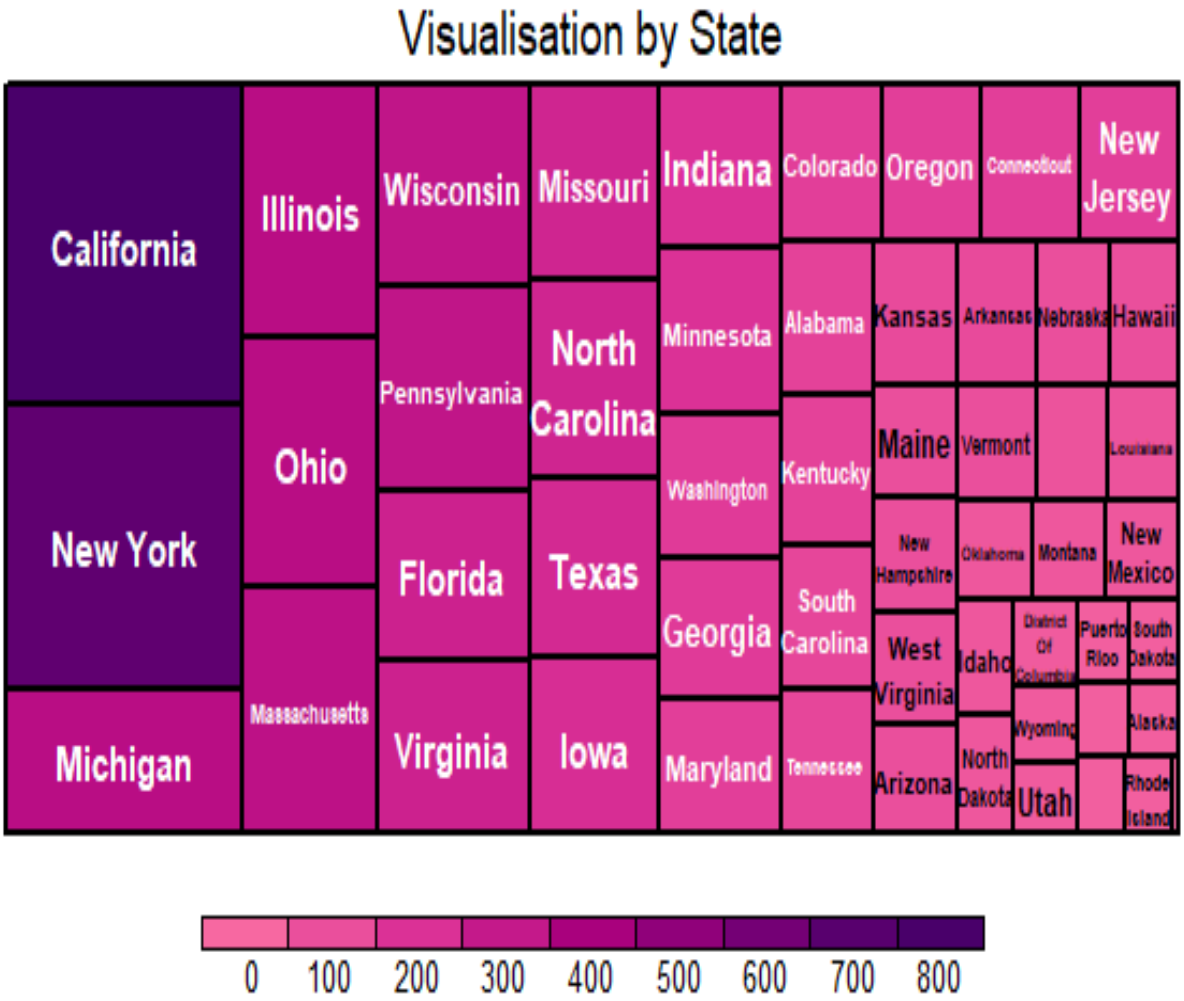
For investors, there are a number of strategies for entering this market, which has experienced a massive growth in the past 10 years. One where they find a more underdeveloped region in the space, inject money, and bring the already proven success of farmer's markets to a new population. The other is to consider entering an already saturated and mature market. This report will inform investors on where their money is best put to use.

Region wise distribution of markets:



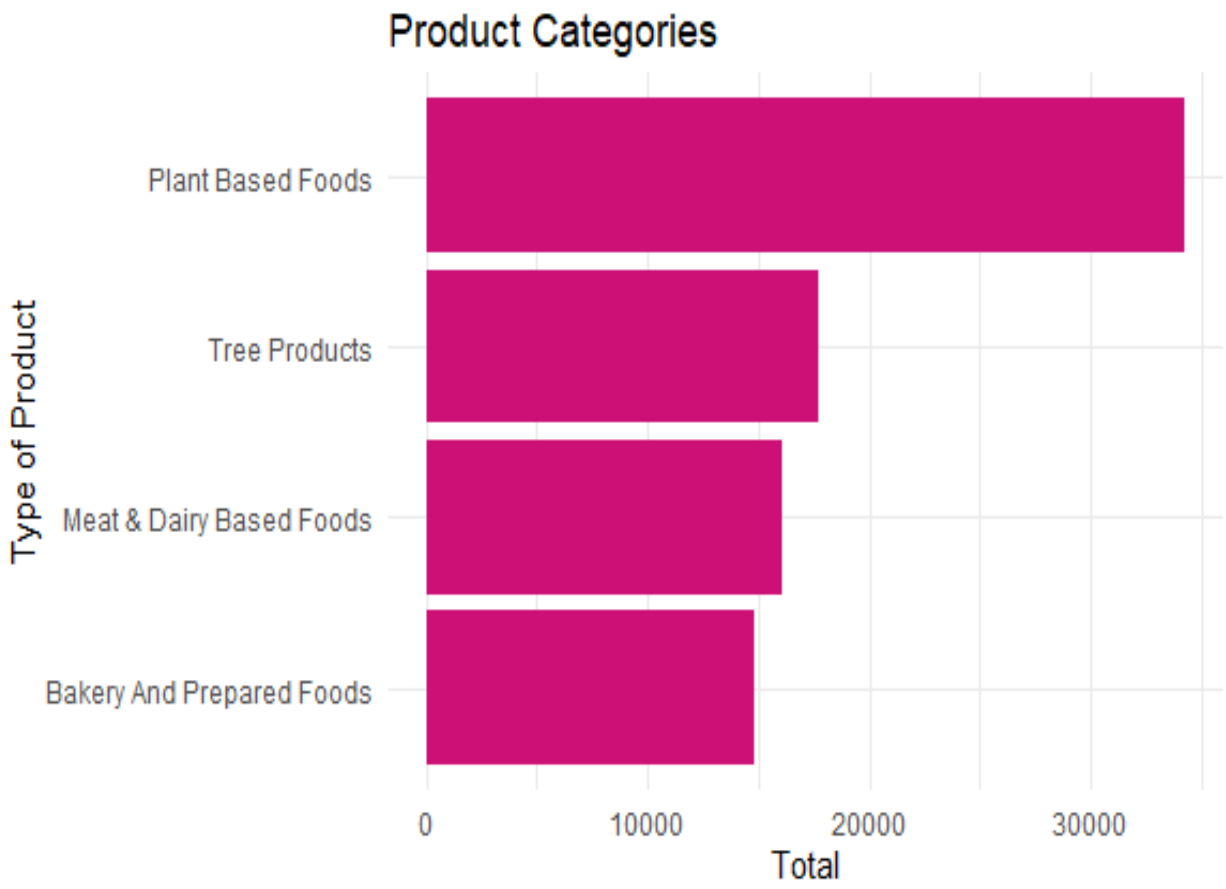
Based on states, region wise vectors were created incorporating the name of states where they belong. Unnecessary columns were deleted in order to retain only relevant information. A new column of “Regions” is added to the data frame. Thus, it was possible to summarize the data by grouping by the entries on the basis of different regions and visualizing the same using Bar Graph.

State wise distribution of markets:



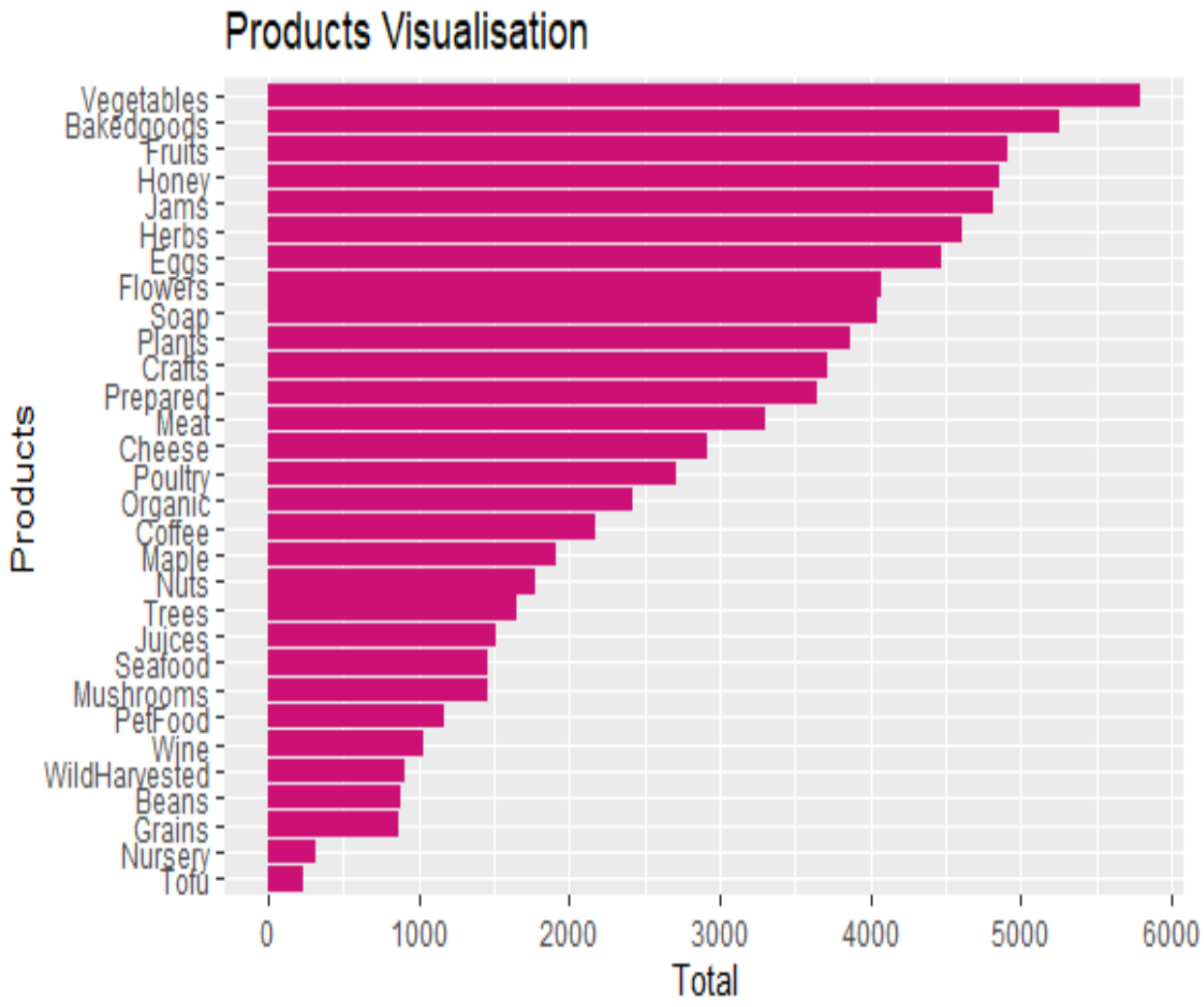
With the help of previous visualization, we categorized every state into its respective regions. Now, to create a tree map, every state in front of its region is given a value of "1". So, in the end when we sum the values on the basis of states we can conclude which state has how much total value indicating the comparative distribution of markets across different states.

Product Categories:



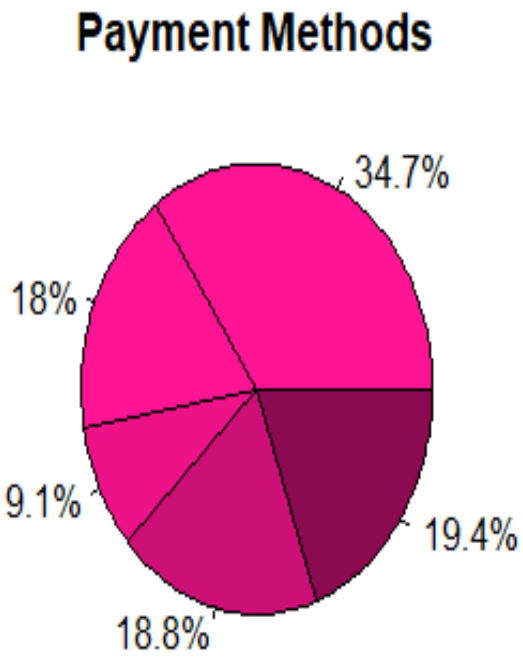
Began with cleaning the data thereby removing the irrelevant columns. To summarize the data, all the columns were converted to numeric and their sum of each instance was stored in a different column where the type of food belongs. A new data frame is created containing only the categories of “type of products” and its respective sum obtained by adding up all the numeric data which helped in creating this bar graph.

Product Count:



Just wanted to showcase and compare the products amongst themselves on the basis of their count. To do this, a new data frame “Indi_Products” is created having columns of only these products and a column for maintaining the counter.

Payment Methods:



A new data frame “Pay_methods” is creted by removing columns which do not support information related to payment. All the entries of “Y” and “N” was summed according to the payment method. For creating a pie chart, relative percentage was taken.

Categories of Products (Region wise):

Following the same logic as used for creating these graphs separately, there was just a need to melt and cast a new data frame which could hold the values of category wise products segregated into regions which helps in depicting their count too.

Conclusion:

This report serves as an introduction for investors on the growth and current status of farmer's markets in the United States. While it does provide suggestions to investors, ultimately, it is up to them to evaluate the strategies which they choose to enter the market with. While there are a number of factors at play, there are two main strategies that present themselves:

Low Risk - Entering a mature market and profit off of an already farmer's market. This is a lower risk investment because there is less work to be done on the markets with regards to product offering, customers acquisition, and overall profitability. Here, an investor can be more confident that their money will be used to continue to provide a high level of service. This is also a more expensive investment and therefore will most likely provide less overall profit.

High Risk – Entering a less popular market and use funds to improve the market's offering to grow. Here there is a higher possibility of profit because there is a lower initial investment and the growth of the market's size and customer base will provide the funds in the future. There is more risk in this situation however as there could be obstacles such as organic certifications, government regulations, and reluctant customers.

Ultimately, an investment into farmer's markets is an investment into growing communities, reducing carbon footprint in our food supply chain, and supporting small businesses. If investors consider the topics discussed in this report, as well as do further research into trends such as weather patterns necessary for different products, specific crop types in regions, specific government regulations in each state, and sentiment analysis on farmers markets in given regions, they can make informed financial decisions and maximize their return on investment.