

IE6600 Computation and Visualization SEC 01 Fall 2024

Project 2

Data Visualization Project on analyzes various regional
data based on zip codes

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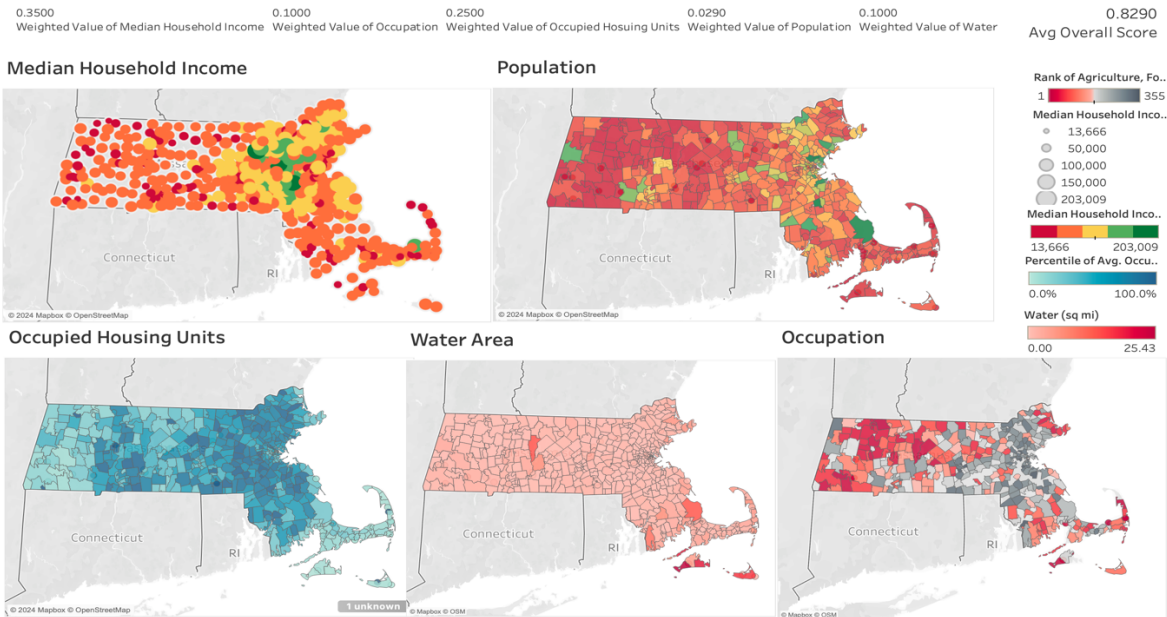
Submission Date: 10 December 2024

Report
Tableau Visualization
Reference

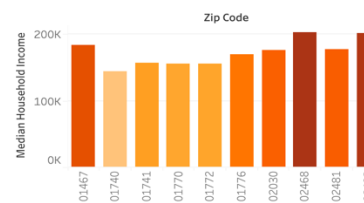
Tableau Visualizations

State used for this task is Massachusetts.

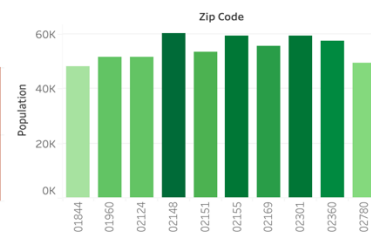
Analyzes Various Regional Data



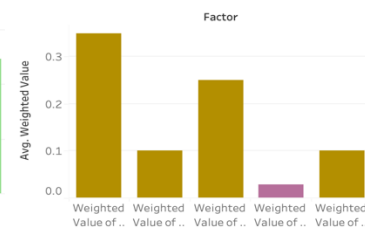
Top 10 zipcodes with Median Household Income



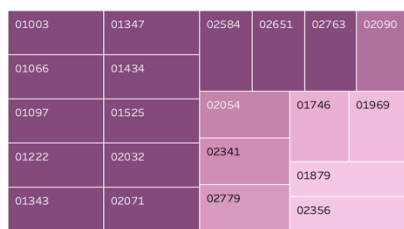
Top 10 population



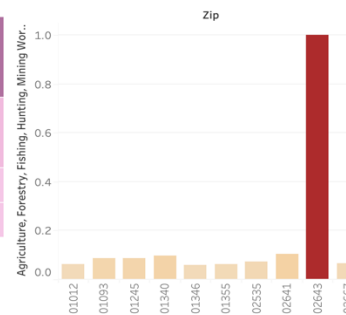
Overall Score of all the variables



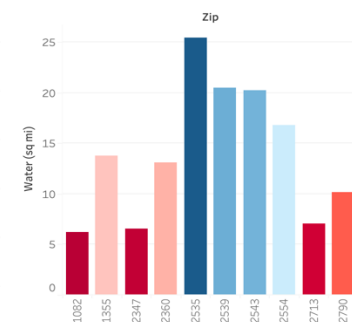
Top 20 of housing occupied



Top 10 with High Occupation

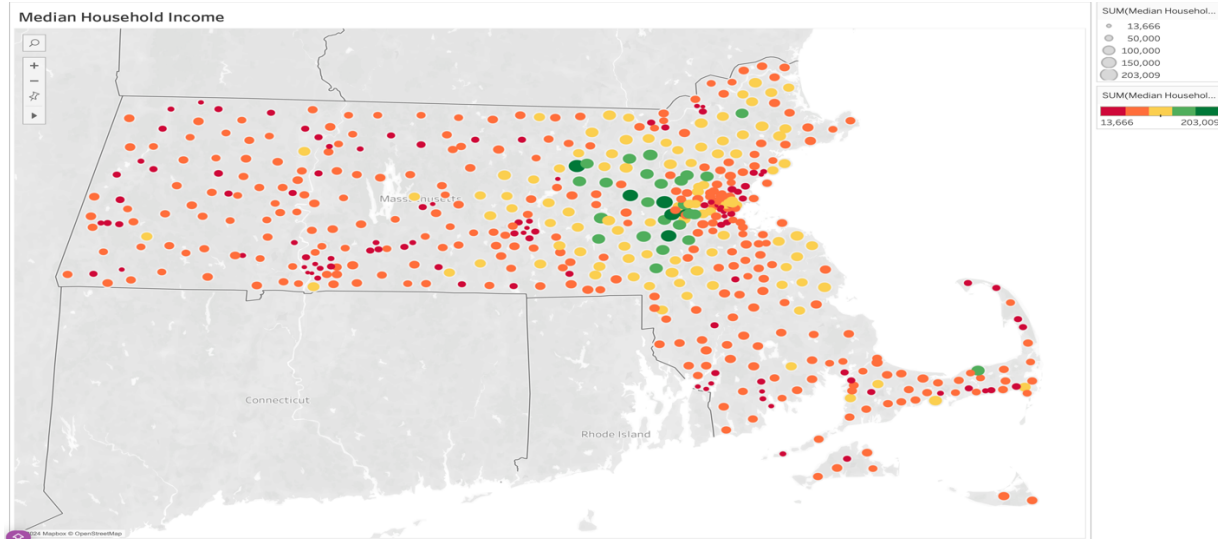


Top 10 Areas covered with Water



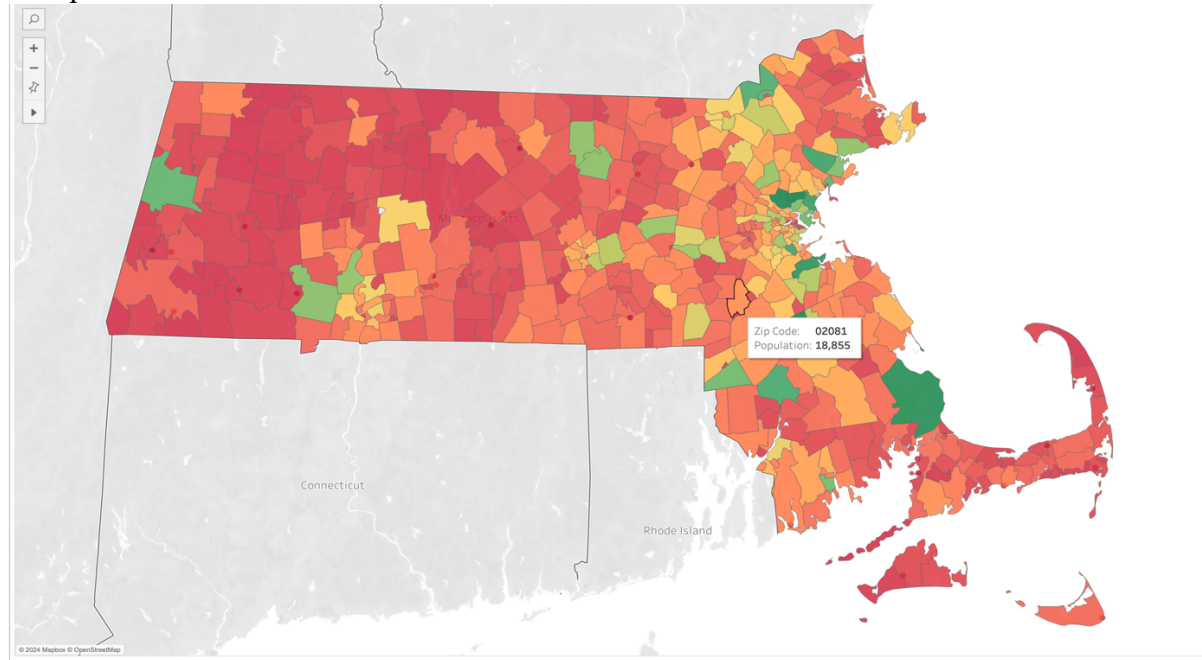
Report

1. Median Household Income:



The above map visualizes the median household income across Massachusetts. The color gradients from red (lower income) to green (higher income) shows income levels. The data points are distributed across the state. The Greater Boston (urban area) shows clusters with higher income, indicated by green dots, while ruler and western region has lower income levels in red and orange. This visualization provides an overview of income level and regional economic. This map shows economic diversity and potential inequalities across Massachusetts

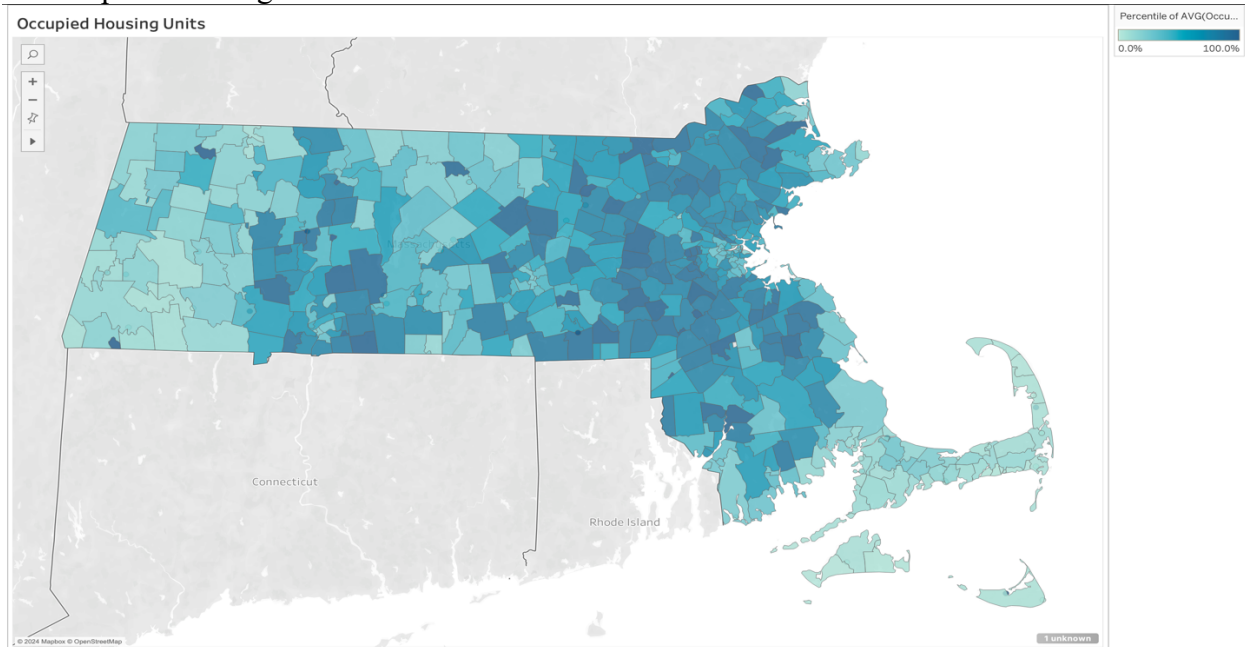
2. Population:



The above Population map shows the distribution of people across the state of Massachusetts, where different colors represent the different population densities. Areas like Boston and the

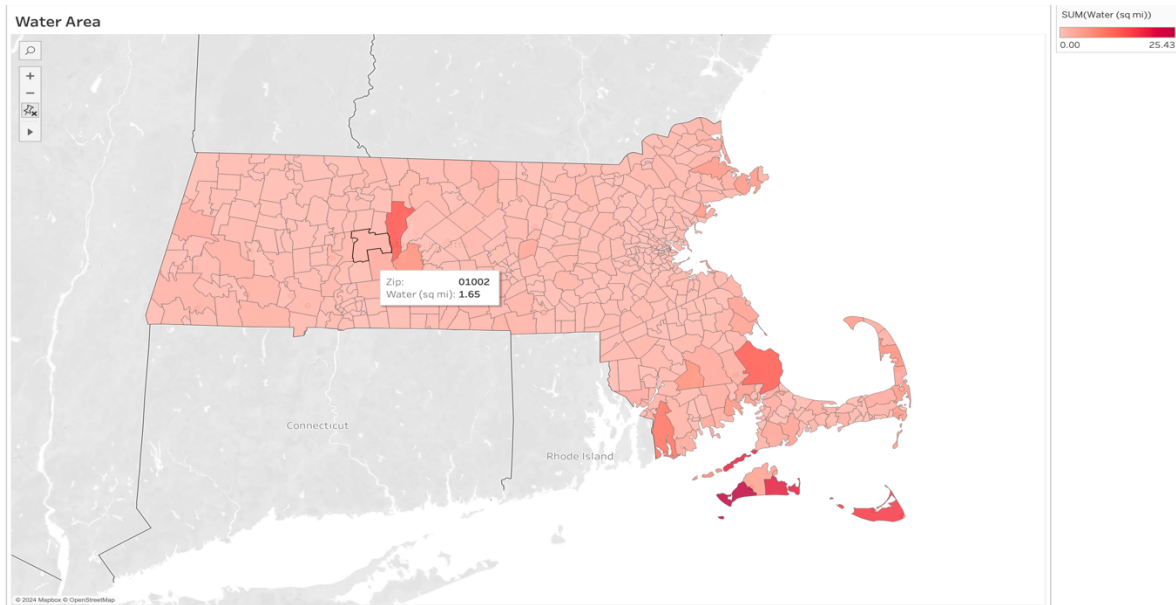
surrounding sub-urban areas are shown in red which indicates higher population concentration. The western parts of the state are in a lighter shade as the population density is lesser in those areas. The population density is very essential for urban planning and identifying the areas essential for growth and building transportation and services such as schools and hospitals. The above heatmap visualization provides an overview of population density.

3. Occupied Housing Units



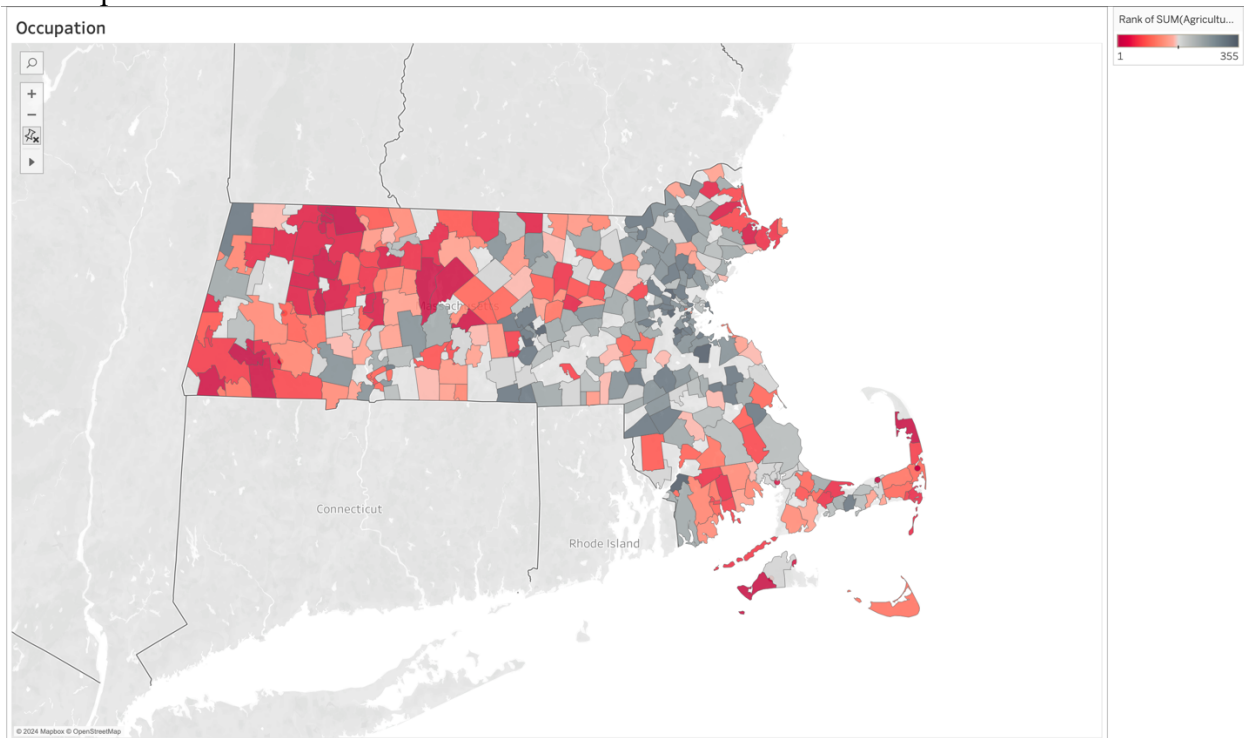
The darker regions in blue represent that the houses are occupied most in that region, whereas the lighter regions represent areas with lower occupancy. Urban areas on the east side show higher occupancy due to high population while rural areas on the east side show low occupants. The regions with higher occupancy might face housing shortages or higher price of houses. The regions with lower shows a potential for growth and availability of properties. The above map represents occupancy rates across Massachusetts.

4. Water Area



The above water area map shows the distribution of water bodies present in each area. The map also gives an idea of the water sources present due to the geographical features. The lighter shade represents areas with where there are lower number of water bodies. There are only few regions with a darker shade rest are only lighter shades which indicates that there are only few regions which has higher number of water bodies.

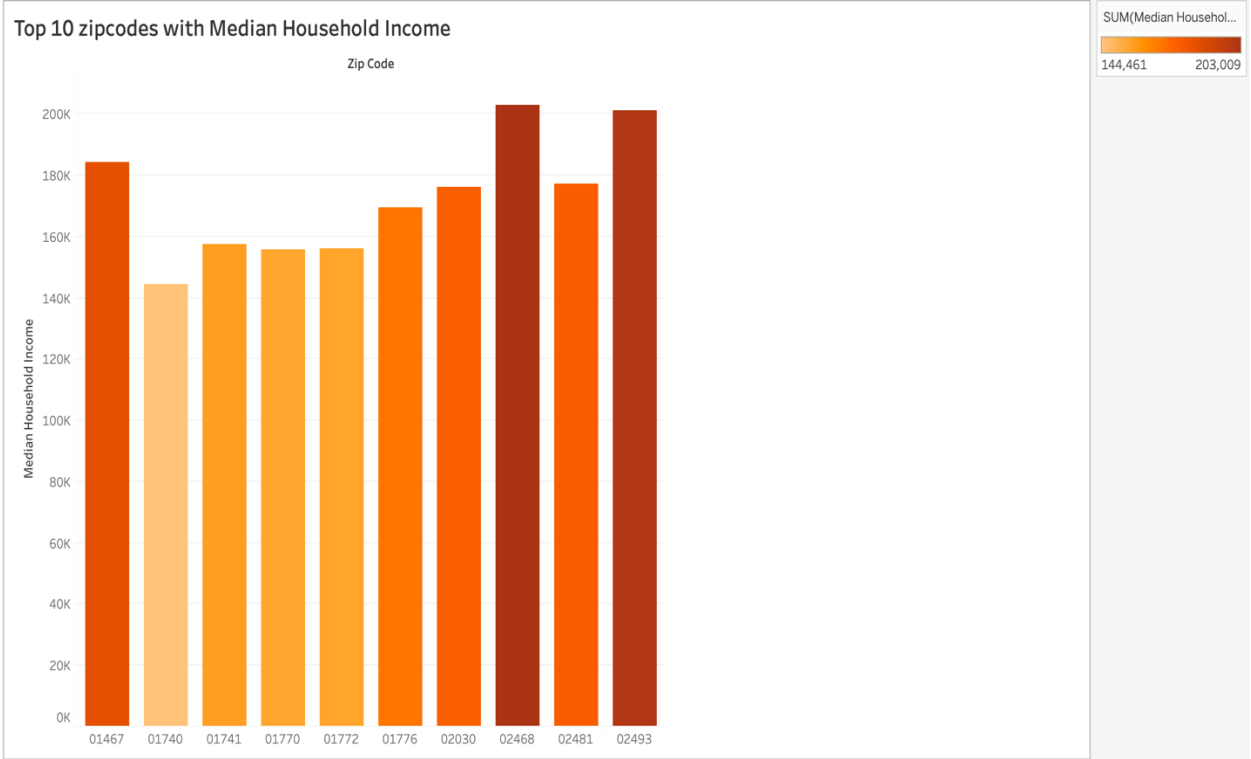
5. Occupation



The above occupation map shows the distribution of occupations across the state. Occupations include Agriculture, Forestry, Fishing, Hunting, Mining. Urban and suburban areas show higher

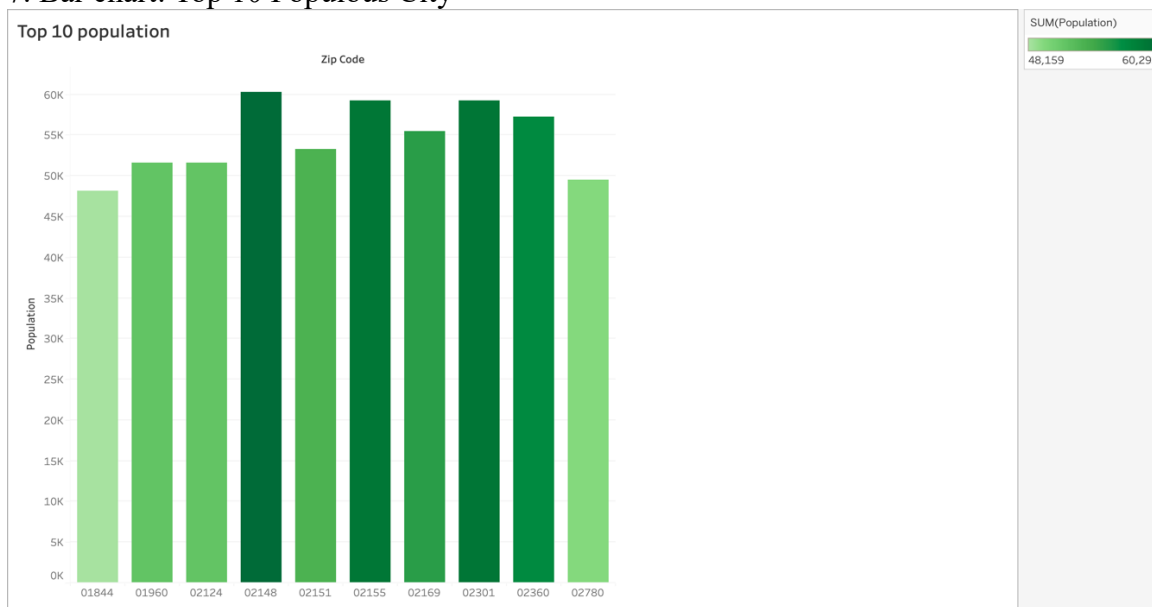
employment concentration due to presence of large number of industries and businesses. On the other hand, the lighter regions show less economic activity. The areas are ranked accordingly using colors where red color shows the highest rank and grey shows the lowest. By addressing disparities in employment opportunities, Massachusetts can work toward fostering economic development and reducing regional inequalities.

6. Bar chart: Top 10 with Highest median Household income



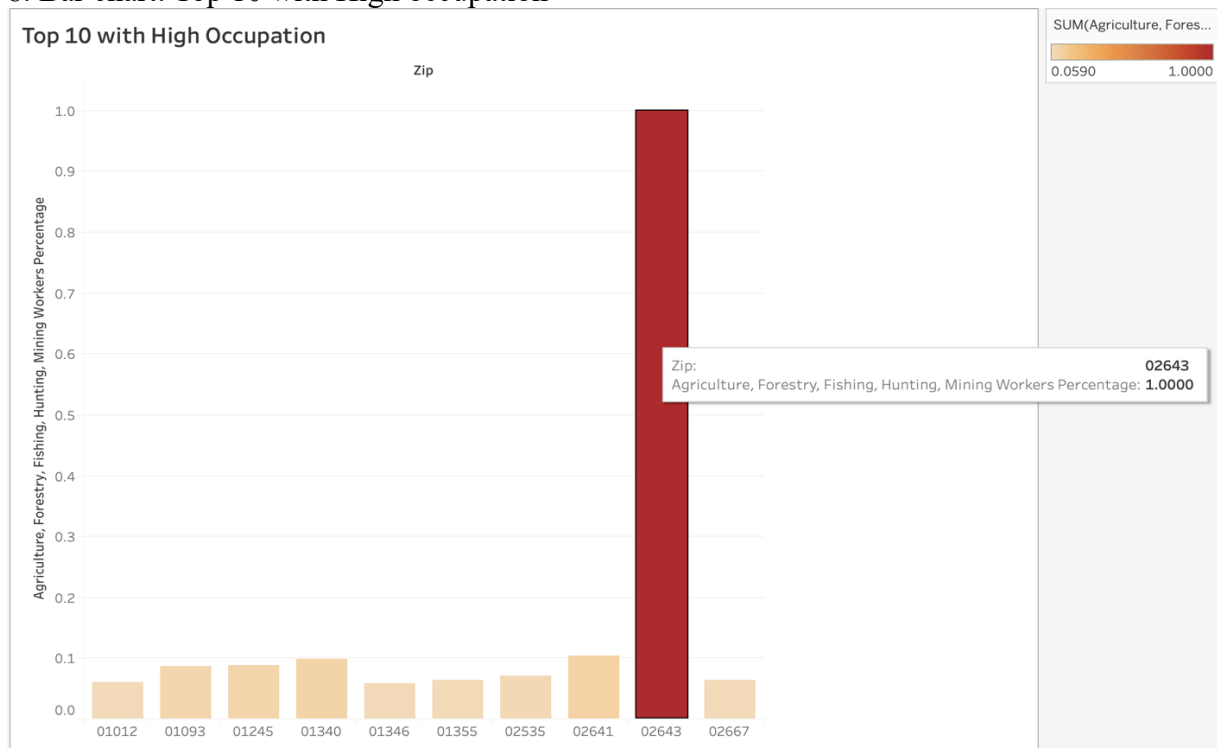
The above bar chart shows the Top 10 zip codes of Massachusetts with the highest median household income. The area like Harvard (01467), Wellesley Hills (02481) and Weston (02493) has median income is more than \$170,000. These cities are typically characterized by higher property value and have more resources. The data shows regional economic disparities. This area may also have present opportunities for luxury markets and business of higher income groups. The areas with lower median household income have chances to overtake the other cities. The following chart gives a gist of economic in Massachusetts’ wealthiest neighborhoods.

7. Bar chart: Top 10 Populous City



The above bar chart shows the Top 10 most populous city in Massachusetts. The areas like Somerville, Medford and Revere have significant population density. Each of the following cities has over 50,000 residents. High population rates indicates that those areas while be more developed. Understanding population trends helps identify growth areas, allowing for strategic planning to accommodate expanding communities while maintaining quality of life.

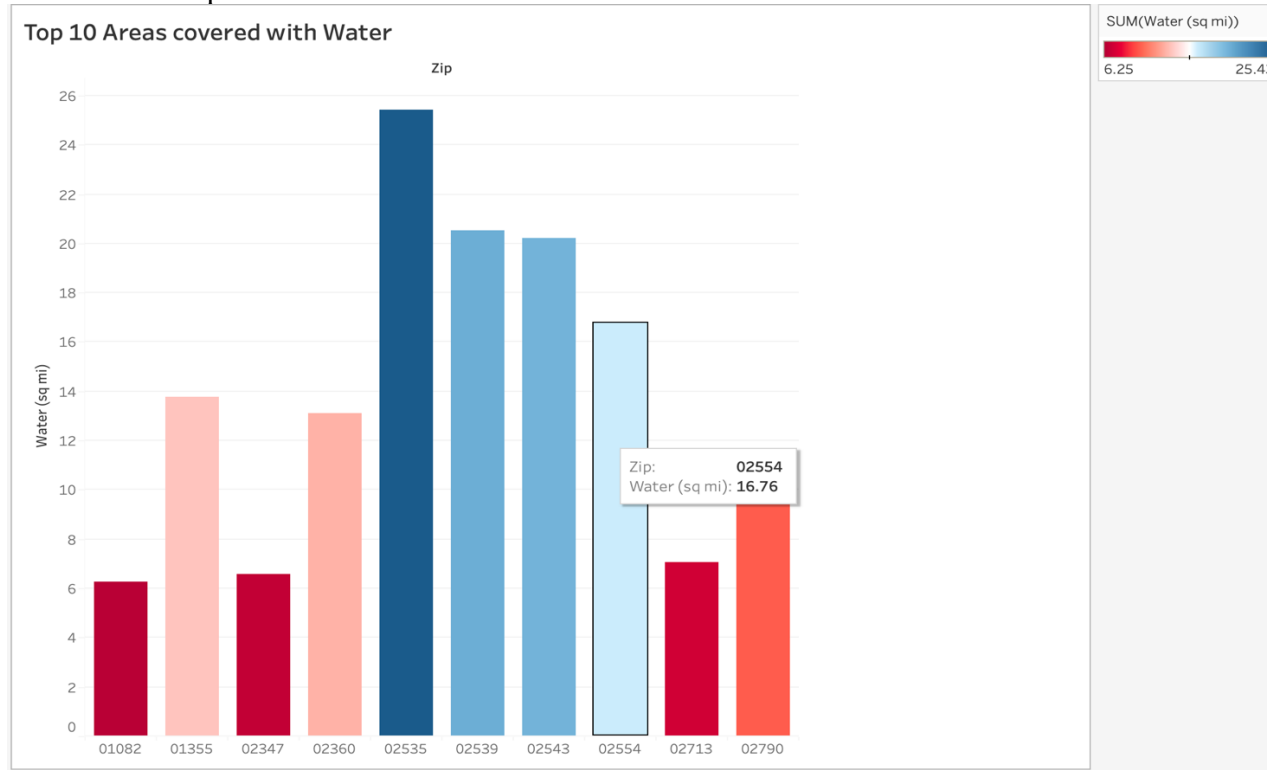
8. Bar chart: Top 10 with High occupation



The above bar chart shows the Top 10 cities with high occupation levels in Massachusetts. Industries include are agriculture, fishing, mining, Hunting and forestry. The city Woods Hole

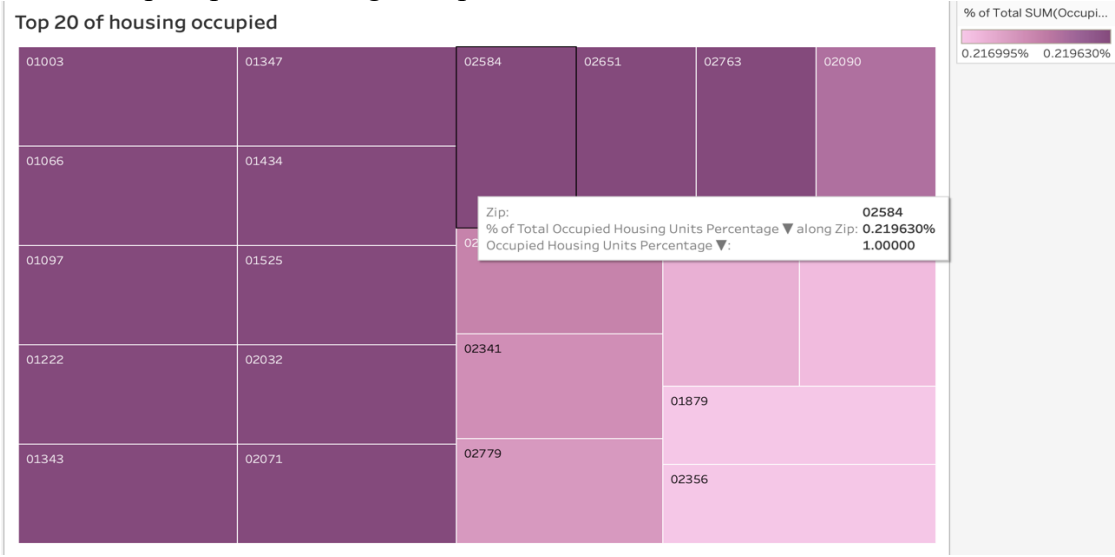
(02543) stand out with the highest occupation score, showing a strong reliance on industry specific economic activities. Other cities also show moderate employment activity. These places play important role in workplace development on specialized sectors.

9. Bar chart: Top 10 Areas covered with water



The above bar chart shows the Top 10 areas with water bodies. The zip code like 02535, 02554, 02554 and 02539. These areas have more water bodies such as lakes, rivers and coastal regions. The presence of water plays an important role in ecological conservation and urban planning. This chart emphasizes the vital role water resources play in shaping economic and environmental strategies for Massachusetts.

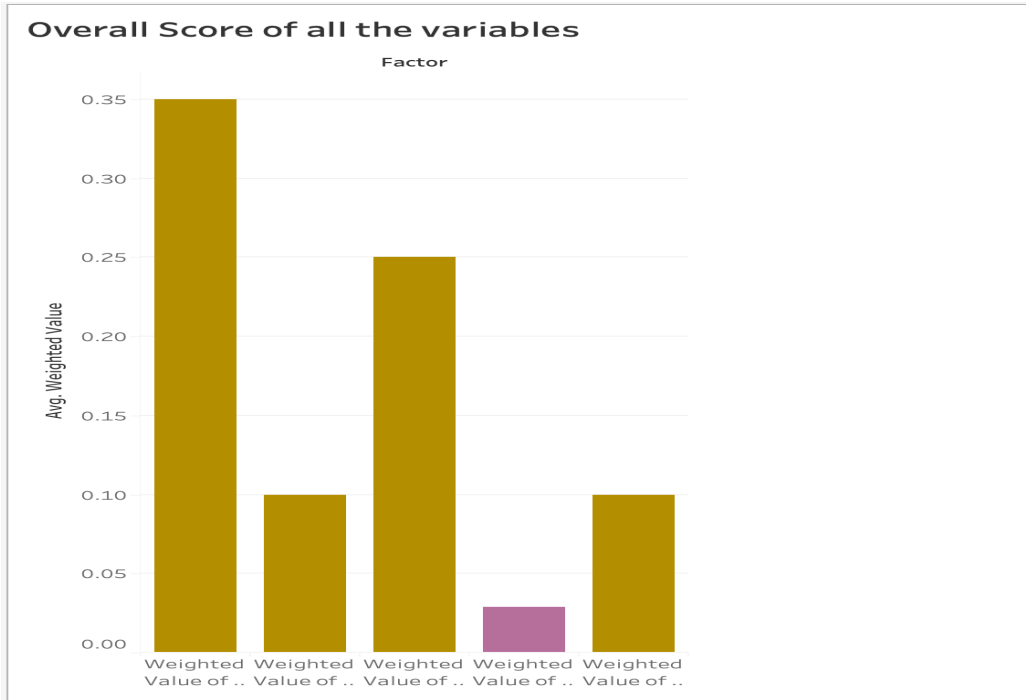
10. Treemap: Top 20 Housing Occupied



The image displays a treemap visualization showcasing the top 20 zip codes with the highest housing unit occupancy percentages. Each tile represents a specific zip code, with the size and shading of the tiles proportional to their occupancy rates. Darker colors show higher occupancy percentages.

It shows that the zip code 02584, which accounts for 0.219630% of the total housing occupancy, achieving the highest normalized value (1.0000) among the listed zip codes. The visualization effectively compares occupancy distributions across regions, with key insights into geographic housing trends.

11. Bar chart: Overall Score of all the variables



The Overall Score of Variables chart shows Massachusetts regions based on weighted metrics,

including median household income, occupation, housing, population, and water area. Median income and occupation significantly influence the average score, contributing to an overall weighted value of 0.8290. This score reflects a balanced performance across multiple socio-economic dimensions. It also helps to identifying areas of improvement, fostering equitable growth, and reducing disparities among communities. The chart underscores the importance of integrating diverse variables for a nuanced understanding of regional performance.

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