571 - PROJECT DELIVERABLE 2

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Prototype Design

The following are the Users, their corresponding Tasks and the chart which would best describe/ achieve the goal of the user. Following which, we have our sample visualizations implemented in D3.

1. **Public Affairs Research Analyst -**
    a. **Gain an understanding of poverty rate trends over the years.**

        To facilitate visualization we will use a geographical map with line plots indicating historical poverty trends over the years in each state. Each state will have a line plot of poverty rate in the state over the years. We will be using color saturation in each state to represent the level of poverty.

    b. **Study the correlation between income and expenditure.**
        In order to visualize this task better, we will be using a grouped bar chart. We can group the bars corresponding to income and aggregate expenditure for a particular state.

    c. **Distribution of people across different education levels.**

        Here we can use a line chart to visualize the people across different education levels. On the X axis, we have Years and on the Y axis we have the number of people for a particular state. Every line will correspond to a particular education level and have a different color. We will be using state as a filter for this task.

2. **A worker being transferred to US as part of their job -**
    a. **Identify candidate areas suited to comfortably live with their current income.**

        This can be answered with a grouped bar chart with State on X-axis and Income, Expenditure bars grouped for each state. This would help us look up the candidate areas to comfortably live with their current income.

    b. **Is it more economic to buy a house or instead rent a house, in the long run?**

        To decide on this, we can use a grouped bar chart which has income, expenditure and housing prices represented for each state and compare if it is economic to buy a house or not.

c. **For each state, what is the most frequent reason for a person to move from their current locality?**

   To visualize this, we can take the most frequent reason in each state and represent that in the geographical map as a tooltip when clicked on a particular state.

3. **Real Estate Analyst -**
   a. **Examine the price of properties in a region over the years, to decide whether to sell a property or not.**

      Here we will be mainly using Year, Housing Price and State. A time series line chart will be able to nicely denote the housing trends.

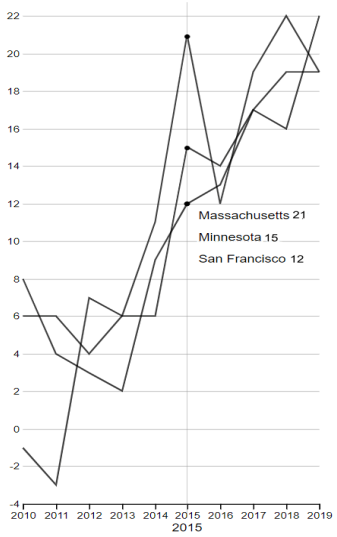
   b. **Check if there is a correlation between the income, income tax and housing prices**

      We will be using Income, Income Tax, Housing Price, State and Year for our main variables. The number of state and year combinations will be high, so we will need to use one of these attributes as a filter. The other columns are quantitative, so we can analyze them side by side in a grouped bar chart.

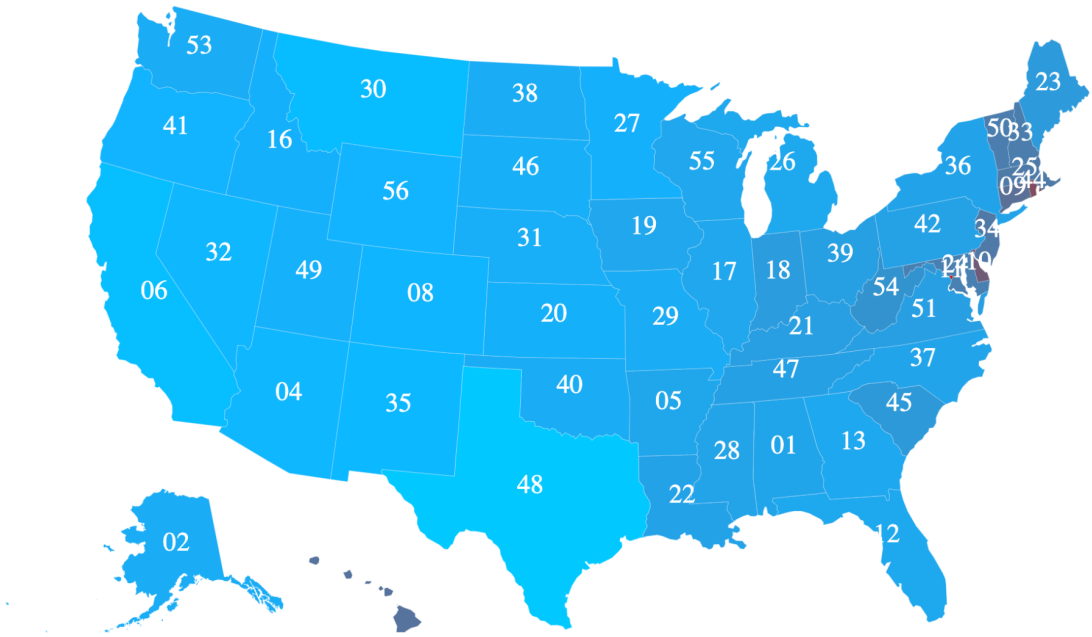
   c. **To analyze the number of people migrating from a region so as to avoid investing much in such regions**

      Using a geographical map we will show migration amount and property value trends over the years in each state. We will use a line plot to display the trends for a particular state.

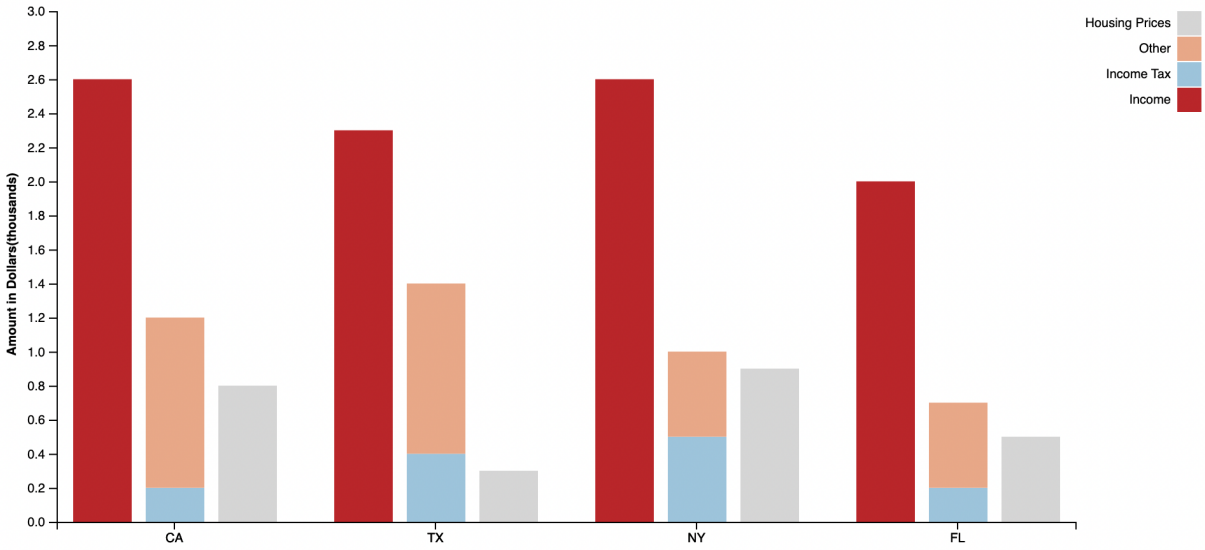
From the above inferences, it can be seen that we can group few of the visualizations and hence we have finalized on 3 different types of visualizations broadly. The Line Chart, the Geographical Map and the Grouped Stacked Bar Chart.



The line charts will be able to represent the poverty rates, education levels and housing prices. In poverty rates and housing prices, each continuous line will represent a state. For education levels, the graph will show the cumulative values across the country as default, with an option to filter by state.



The map above with line plots inset over each state will display trends of different socioeconomic variables (such as poverty rate, education levels, property values, migration numbers) over the years.

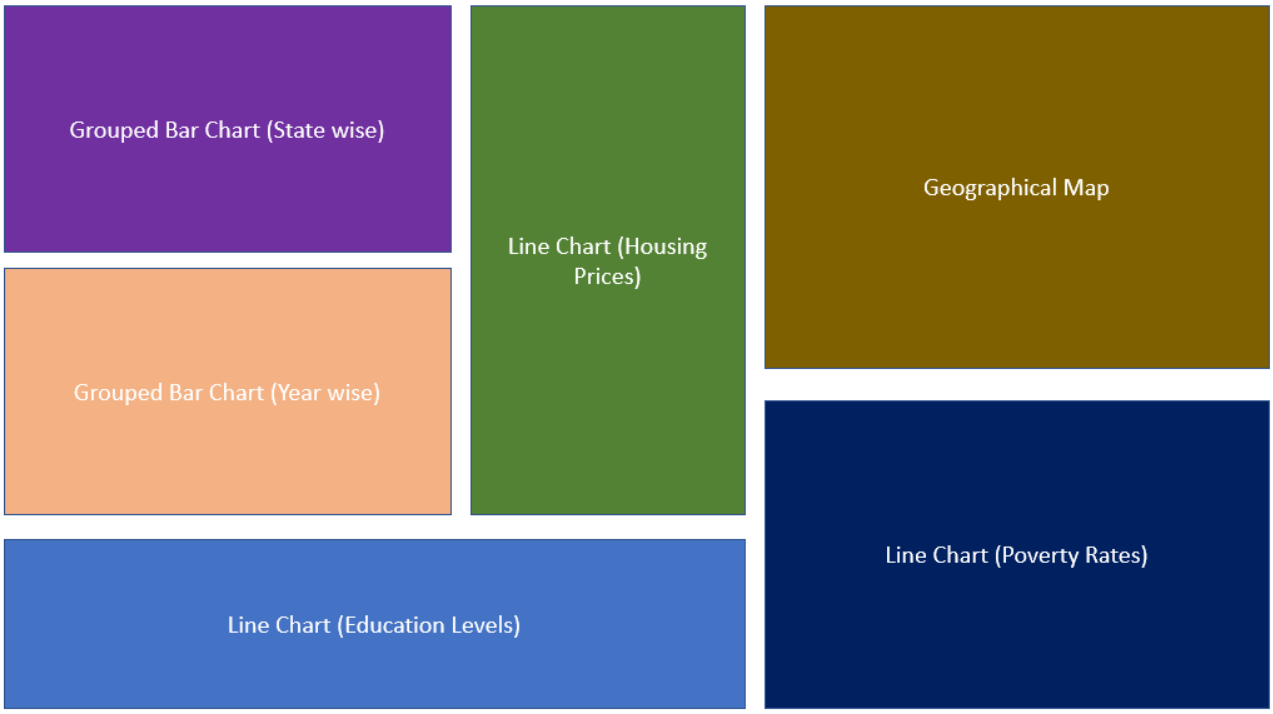


The above represented Grouped Stacked Bar Chart would help us in visualizing correlation between the income, income tax, expenditure and housing prices for each state. To visualize the expenditure, we have used a stacked bar chart as it helps in getting a clear understanding of the

various types of expenses within the total expenditure. In order to combine multiple visualizations into a single one, we have grouped the bars corresponding to income, aggregate expenditure and housing price for a particular state.

We have used mock data temporarily and plotted the above visualizations in D3. For the final deliverable, we would be using the actual data.

A prototype of our dashboard is as below



Dashboard Interactions

- Clicking on a state on the map will act as a filter for the rest of the graphs.
- If the dashboard is being filtered by state, then
    - State wise bar chart - Selected state bar is highlighted.
    - Year wise bar chart - Chart shows the data for that particular state.
    - Housing prices line chart - Line corresponding to selected state is highlighted.
    - Education level line chart - Chart shows the data for that particular state.
    - Poverty rate line chart - Line corresponding to selected state is highlighted.
    - Map - Selected state is highlighted and tooltip show the most frequent reason for migration