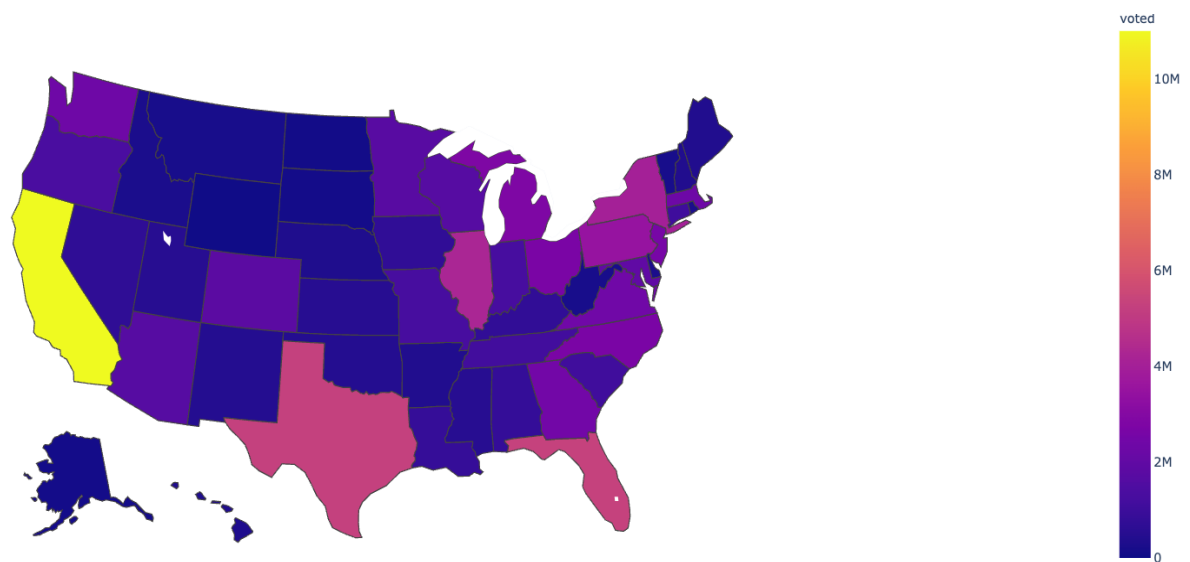


## INFSCI 2415 Final Report

Analysis of USA Presidential and Senate elections from the year 1976 – 2020  
(Democrats vs Republicans, state and federal)

Figure 1: Taking from 2020 Presidential candidate data “Joe Biden” (choropleth map)



### Legend explained:

1. **Geographical Areas (States):** The main component of a choropleth map is the geographical areas, which are clearly depicted by the boundaries of the states in the USA. Each state is color-coded based on the data it represents.
2. **Color Scale:** The right side of the map contains a color scale that represents the number of votes. It ranges from 0 to 10 million votes, with a gradient transitioning from a light shade yellow (indicating fewer votes) to a darker shade purple(indicating more votes).
3. **Colors:**
  - **Blue:** The figure explains that closer it is to color of blue, which ranges from 0-2 million, it means that these states have less than 2 million people voted for Joe Biden.  
**Ex:** States like Idaho

- **Purple:** The figure explains that closer it is to color of purple, which ranges from 2-4 million, it means that these states have less than 4 million people voted for Joe Biden.  
**Ex:** States like Michigan
- **Red:** Few states have a shade of red and orange which means about 5-8 million people have voted for Joe Biden.  
**Ex:** States like Texas and Florida
- **Yellow:** The color explains that closer it is to yellow, the respective states have maximum people voted for Joe Biden i.e. 9 plus million.  
**Ex:** California is shaded yellow.

#### **Findings text introducing highlights of the produced figure in bulletin points**

- The above figure is a choropleth map of United States of America indicating number of people voted for presidential candidate Joe Biden from the year 2020, statewide.
- There is a gradient of color from blue to yellow. Blue indicates fewer votes for Joe Biden in that state to yellow indicating maximum votes for Joe Biden in that respective state.
- The dominant yellow color across the majority of states indicates substantial number of votes for Joe Biden in many parts of the country.
- The legend explains that there are 0-11 million people votes in each state giving them a respective color based on the number of votes.
- The diverse color distribution across the map illustrates the varying levels of support for Joe Biden, indicating the complexity of political leanings and voter preferences within different states and regions.

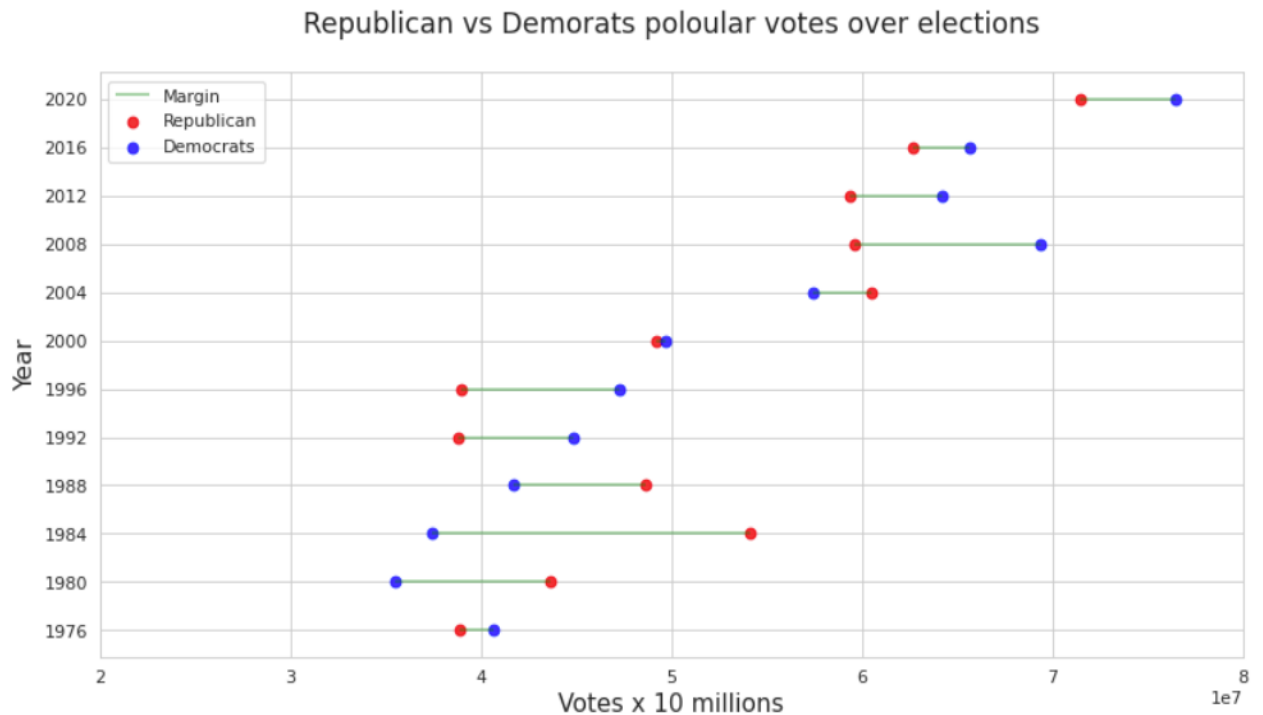
#### **Dataset used:**

<https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/42MVDX>  
<https://www.kaggle.com/datasets/unanimad/us-election-2020>

#### **Github link(code):**

<https://github.com/harshavaidhyam/Analysis-of-USA-Presidential-and-Senate-elections-from-year-1976-2020>

Figure 2: Scatter plot that compares the popular votes received by the Republican and Democratic parties in U.S. presidential elections between 1976-2020



### Legend explained:

- The horizontal axis (x-axis) represents the number of votes in tens of millions.
- The vertical axis (y axis) represents different election years.
- Each point represents the number of votes a party received in a specific election year:
  - (a) **Red dots** These represent the number of popular votes received by the Democratic party in U.S. presidential elections.
  - (b) **Blue dots** These represent the number of popular votes received by the Republican party in U.S. presidential elections.
  - (c) **Green lines** These indicate the margin of votes between the Democratic and Republican parties, essentially showing which party won by how many votes in each election year. The length of the line represents the size of the margin; a longer line indicates a larger margin of victory.

### **Findings text introducing highlights of the produced figure in bulletin points**

- **Temporal Trend:** The scatter plot shows the popular vote trends for both major U.S. parties from 1976 to 2020, providing a historical perspective on voting patterns.
- **Vote Comparison:** By placing Republican and Democratic votes for each election year side by side, the chart facilitates a direct comparison of their popular votes.
- **Victory Margin:** The green lines indicate the margin of victory between the two parties, which helps to quickly assess which elections were closely contested and which had clear winners.
- **Vote Scale:** The x-axis is scaled in tens of millions, demonstrating the magnitude of votes cast in U.S. presidential elections.
- **Election Years:** The y-axis lists election years in chronological order, offering a clear temporal sequence of data points.
- **Popular Vote Growth:** The scatter plot may also indicate the growth in the number of popular votes over time for each party, as seen by the rightward shift of data points.

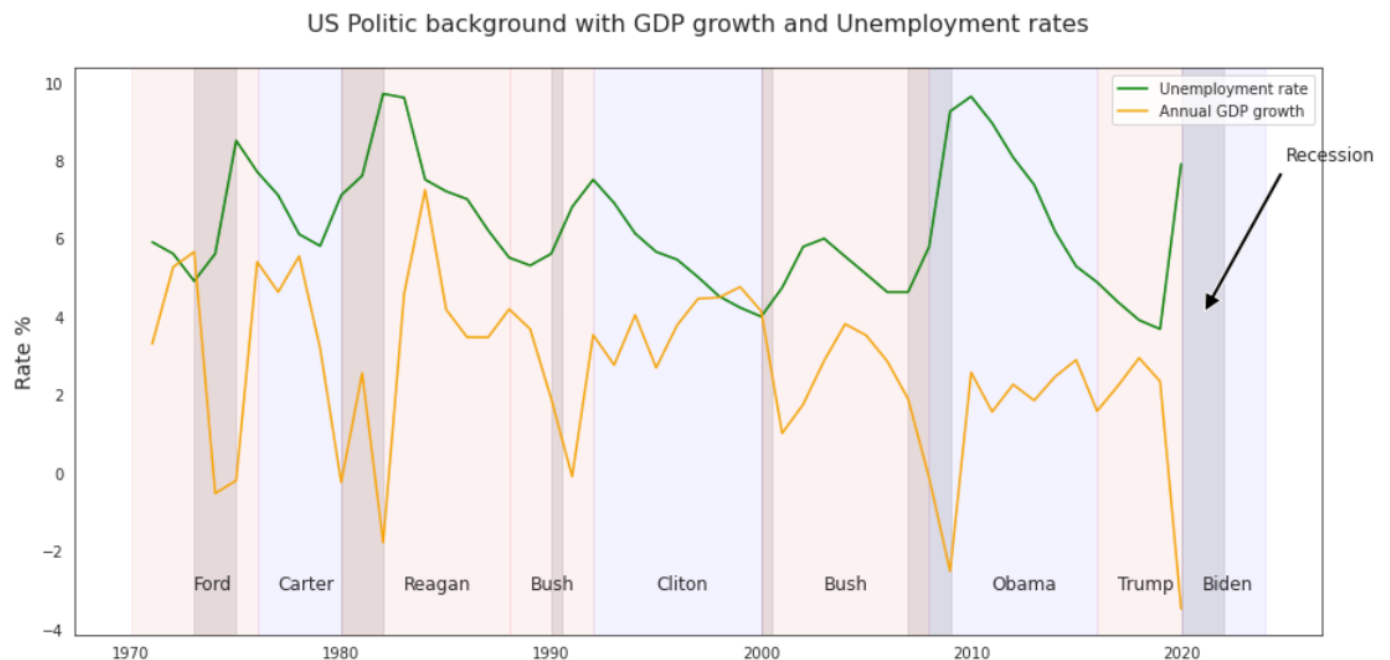
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Figure 3: Time series graph(Line graph) signifying U.S. Economic Trends: Presidential Terms, GDP Growth, and Unemployment Rates (1970 – 2020)



### Legend explained

- **Green Line:** This usually represents the unemployment rate over time. The unemployment rate is often shown on one of the y-axes (vertical axes), expressed as a percentage.
- **Orange Line:** This line typically indicates the annual GDP growth rate. Similar to the unemployment rate, the annual GDP growth rate is shown on the y-axis as a percentage.
- There are two y-axes, one axis shows the unemployment rate, the other shows the annual GDP growth rate.
- The x-axis represents time, showing different years or periods.
- The chart includes the names of U.S. Presidents, providing a political context to the economic data presented.

### Findings text introducing highlights of the produced figure in bulletin points

- **Presidential Impact:** The graph overlays economic data with the terms of U.S. Presidents, suggesting an analysis of how economic trends correlate with political leadership.
- **Unemployment Trends:** The green line indicating the unemployment rate shows fluctuations over the years, with peaks often correlating with economic downturns or recessions.
- **Economic Growth:** The orange line representing annual GDP growth demonstrates periods of economic expansion and contraction, providing insight into the overall economic health during different presidencies.

- **Recessions Marked:** Shaded regions highlight the official recessions, showing their impact on unemployment and GDP growth.
- **Historical Scope:** The data spans from the Ford administration in the 1970s to the Biden administration, showing long-term trends.
- **Political-Economic Narrative:** The chart provides a visual narrative of how the U.S. economy has performed in the context of political leadership, offering a basis for more in-depth analysis of policies and external factors affecting economic indicators.

### Data and method text describing the data and method used in this process

- Visualization modules used: Matplotlib, NumPy, Pandas.
- IDE: Google Collab is an Online Service Provider that provide online version of Jupiter Notebook.
- fig=px.choropleth() for choropleth map, Matplot.plot() was used to create line plot. Plt.scatter() for scatter plot.
- Title, x axis, y axis and legend for all visualizations are tuned individually to give a better and aesthetic look.
- The title, x-axis, y-axis and legend of each visualization are individually adjusted to enhance visual appeal and clarity.

### Significance statement on why the presented figures are important

1. **Electoral Engagement:** The choropleth map of the United States based on popular votes highlights voter engagement across different states, emphasizing the scale of participation in national elections, which is fundamental to the democratic process.
2. **Economic and Political Correlation:** The line graph correlating GDP growth and unemployment rates with presidential terms illustrates the impact of political leadership and policies on the country's economic health, providing a visual tool to analyze potential causation or simply correlation between governance and economic indicators.
3. **Historical Voting Patterns:** The scatter plot detailing popular votes over several election years offers a historical perspective on the changing political inclinations of the electorate, useful for understanding long-term shifts in party dominance and voter behavior.
4. **Economic Trend Visualization:** The combined graph of GDP and unemployment over time, against the backdrop of presidential terms, serves as a visual encapsulation of economic performance over decades, allowing for a nuanced understanding of how economies react to different administrations.

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