Voting Equipment used in the U.S.

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Overview and Motivation:

As the upcoming 2024 elections are coming up in America, I decided to create an interactive visualization showcasing the election day equipment used across the U.S. states from 2006 to 2024. The motivation behind this project comes from the importance of transparency and accessibility in the electoral processes. By visualizing the data on election day equipment, more people will gain insight into the technologies used for election and understand the variations of equipment used across America.

Questions:

Initial Questions:

- What election equipment is used across the United States for elections?
- How does the distribution vary across states?
- When were new election equipment created and used in the United States?

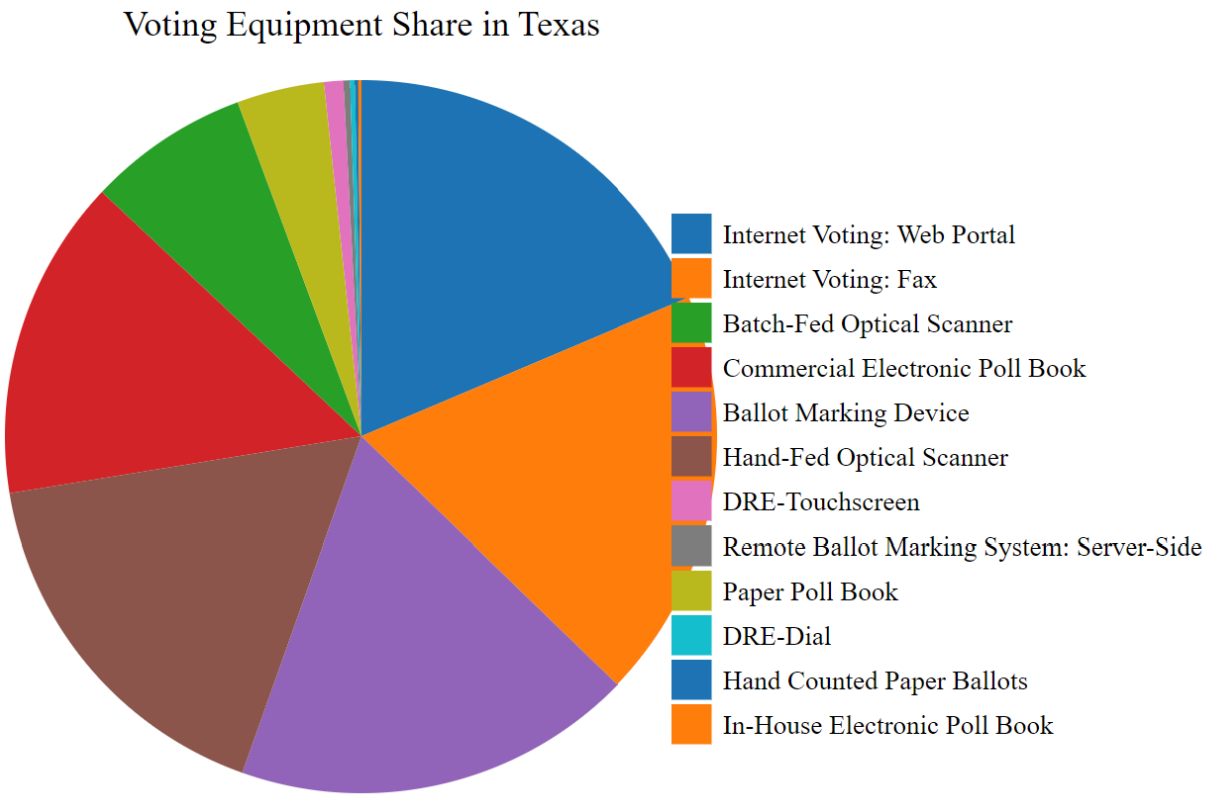
Over the course of the project, my questions were evolved into:

- What additional descriptive information can be associated with each state?
- How can users gain more information when hovering over different states?
- What kind of information should be represented when a state is clicked on?
- What insights can be drawn from comparing the usage of different equipment types?

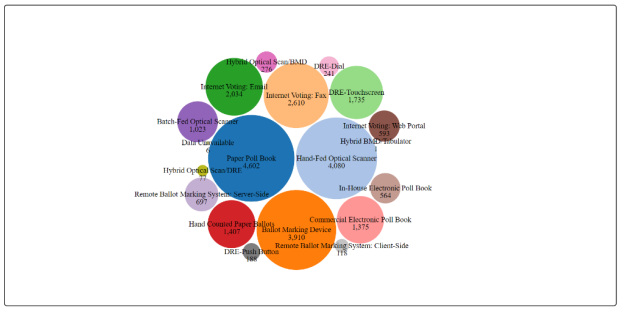
Data:

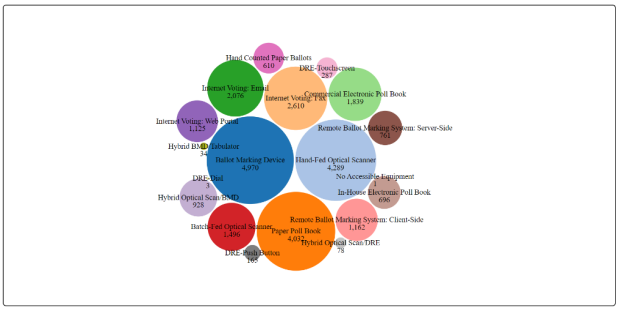
All the data used to create this project came from https://verifiedvoting.org/about/, an open source non-profit organization that promoted the responsible use of voting technology in elections to strengthen democracy for all voters. The dataset included information of voting machines used in all counties across the United States from 2006 to 2024. To maintain the database, Verified Voting liaises with election officials, monitors local news stories, and researches certification documents.

Exploratory Data Analysis:



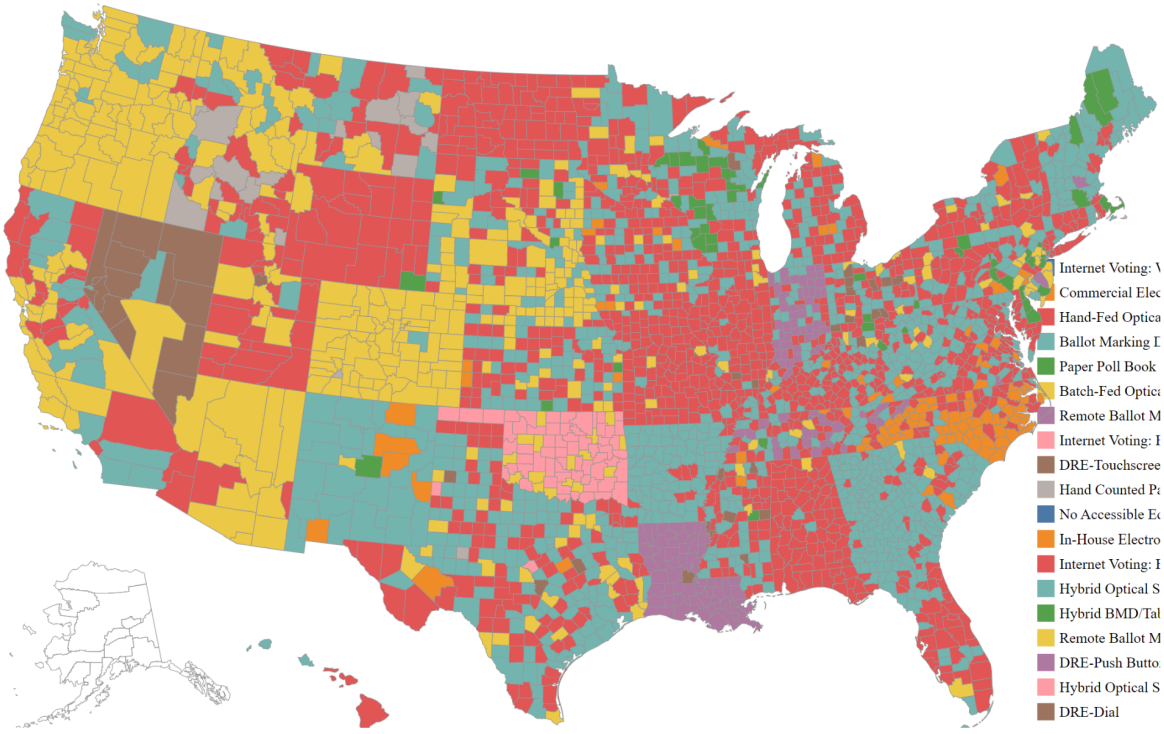
For my initial visuals for the dataset, I created a pie graph of Texas showing percentages of election equipment used in different states. The insight I gained from creating this pie chart was determining the most prevalent types of election equipment used in each state. It also showed the amount of variation in election equipment used throughout America. This information led me to design a way to show the percentages of election equipment used for each state on the map when creating the visualization.





For my next exploratory visual for the dataset, I created bubble charts showing the number of different types of election equipment used across America (Left shows data from 2018 and right from 2024). From this information, I was able to see temporal trends of how the technology for election equipment continued to advance and vary throughout the years of elections. From these insights, I decided to create a design that would also allow the viewer to compare the different types of election equipment used from different years that would also show temporal trends throughout 2006 to 2024.

Design Evolution:



I decided that the best way to display the dataset would be creating a choropleth map. This is because choropleth maps are best used for visualizing spatial data as viewers can easily interpret patterns and variations across the geographic regions. These maps also excel at highlighting areas with higher or lower values, which was useful when trying to display what types of election equipment were used the most or least. As I continued the process of making the visual data, I decided that the visual should show data from the years 2006 to 2024 as choropleth maps are good at conveying visual changes over time which can help the viewer to discover new temporal trends and patterns from the visual.

Implementation:

Map | Description

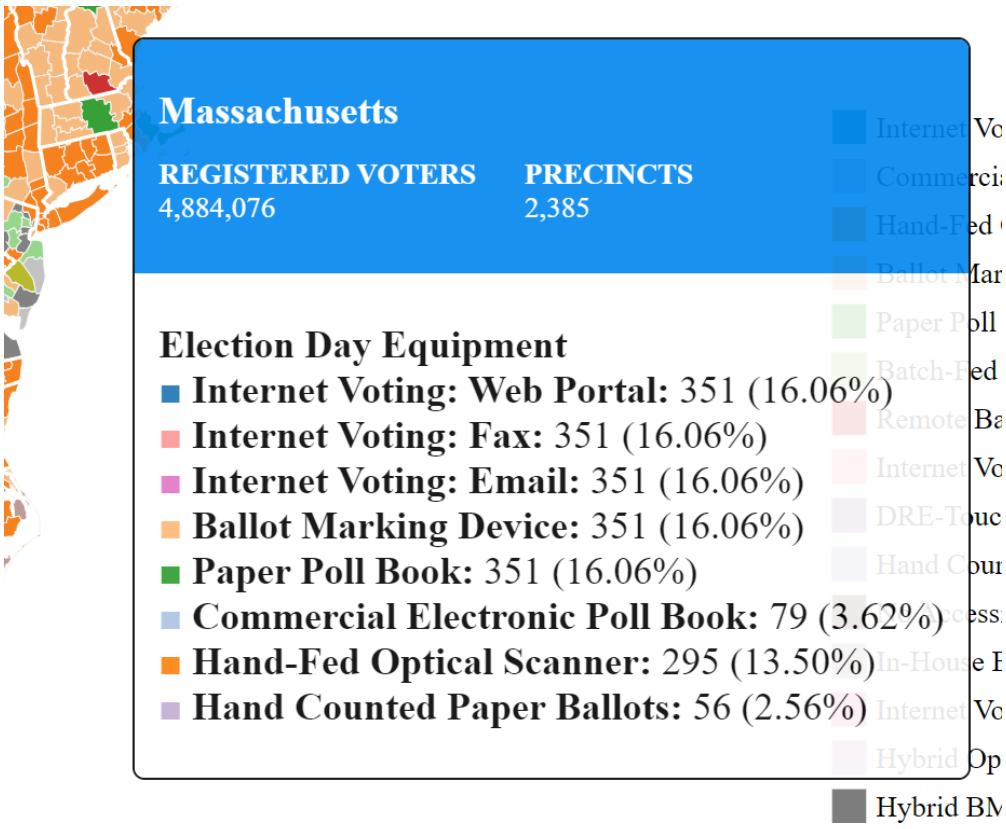
Description

This interactive visualization provides a comprehensive overview of the election day equipment used across the United States from 2006 to 2024. The map visualizes data on the types of voting equipment employed in each state, offering insights into the evolution of election technology over the years.

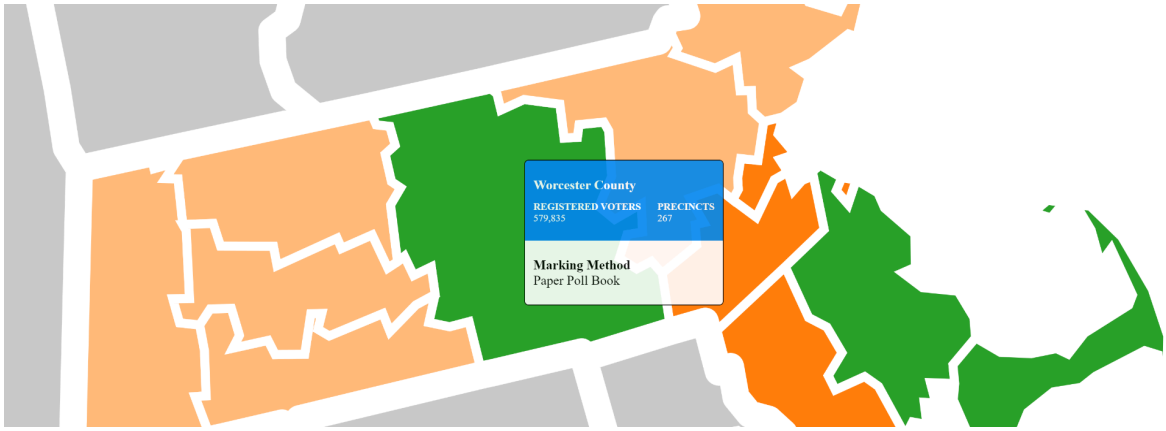
This visualization aims to offer a clear and engaging representation of the diverse election day equipment used across the United States. By combining geographic insights with temporal trends, users can gain a deeper understanding of the evolution of voting technology and its impact on the electoral process.

Whether you're a researcher, policymaker, or an interested citizen, this visualization provides a valuable tool for exploring the intricate details of election equipment deployment, fostering informed discussions about the technological aspects of the democratic process.

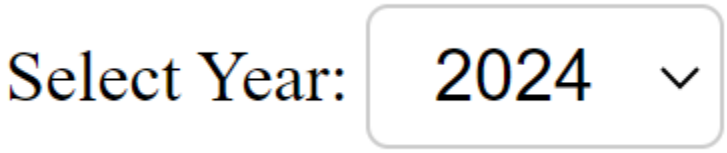
The Description tab provides more information about the visual and explains the purpose and significance of the visualization. The map tab shows the actual visualization of the data which includes the registered voters, precincts, and the type of election equipment used.



The website utilizes the tooltip function to provide information about the counties within each state such as the number of registered voters and precincts within each state as well as the election day equipment used in each state.



The zoom functionality allows the user to click on a state to zoom in for a more detailed view. It does this by checking if the clicked area is the background or the same element then calculates the bounds of the clicked state and adjusts the scale and translation for zooming. There is also a reset function that will transition back to the default view after the initial zooming in function. This gives the viewer more access to more specific information for each county in a certain state.



The year selector is implemented using a dropdown menu in HTML and an event listener that allows the viewer to select the year they desire from 2006 to 2024. Once the viewer changes the selected year, the event listener triggers the loading for new data for that year. This allows for a more interactive experience for the user as they can dynamically update and display the chosen year.

Evaluation:

The visualization helped portray the distribution of voting equipment and revealed that the most common type of election equipment was the paper poll book during the early stages of electronic voting system adoption. However, with more advancements in technology, jurisdictions transitioned to more advanced and varied electronic systems leading to more variety in type of election equipment used. Overall, the visualization works as intended but there can still be improvements to the visualization.

Improvements:

- Filtering options: Include filtering options to allow the viewer to focus on specific regions to get more targeted insights.
- Interactive Legend: Make the legend interactive to highlight specific types of equipment on the map to make the visual more engaging and reduce the visual clutter within the map.
- Comparison Feature: Have a comparison feature such as showing maps or another type of graph displaying the types of election equipment from different years side by side