US Election Analysis

Federal Election 2020

50 states (+ Delegate to Congress from American Samoa, District of Columbia, Guam, Northern Mariana Islands, U.S. Virgin Islands, Puerto Rico)
※ Runoff - A system in which, if no candidate meets the required percentage of votes to win, a second round of voting is held among the top candidates to determine the winner.
※ Washington, D.C. - An independent administrative district. It does not have two Senators like each state. It has one representative in the House, but without voting rights.
※ In the U.S., the president is elected not by the candidate who wins the most votes from voters but by the candidate who secures the majority of electoral votes. While the candidate with the most popular votes generally wins the most electoral votes, there are cases where this does not happen.
※ U.S. Electoral College: 538 members

- Senate seats: 100 (2 per state across 50 states)
- House seats: 435 (allocated based on population)
- Washington, D.C. electors: 3 (As a special district without congressional representation, it is allocated the same number of electors as the least populated state)
  ※ Winner takes all → Candidates focus their efforts on swing states rather than states with clear political leanings (e.g., political advertisements).
  ⇒ PA / GA / MI / AZ / WI / NV (6 states in 2020) (+ commonly NC)
  → Electoral votes of these 6 states: 77 (In a battle to secure 270 out of 538 electoral votes, 77 is a decisive number.)
  → In 2016, Trump won 5 of these states (except NV).
  ※ Electoral Vote vs. Popular Vote → In 2016, Hillary Clinton won the popular vote, but Donald Trump won the electoral vote and became president.
  ※ Primary - Preliminary election / General - Main election (general election)
  ※ Senate - Senators (2 per state) / House - House Representatives (allocated based on population)

Biden’s Victory Record

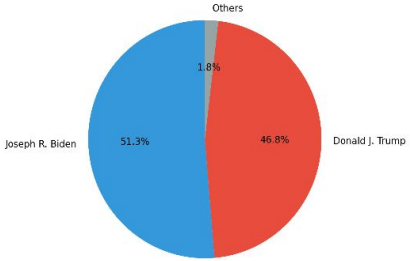
- The first candidate in history to receive over 80 million votes, setting a record for the highest number of votes ever received.
- Won the presidency despite losing in Texas, Ohio, and Florida.

Trump’s Defeat Record

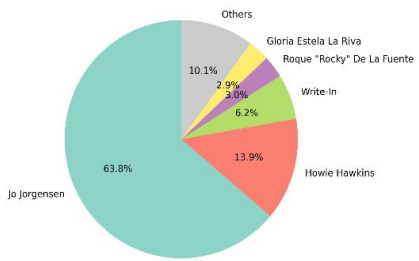
- First candidate in 60 years, since Richard Nixon, to win Ohio but still lose the overall election.
- First in history to win Texas, Florida, and Ohio but still lose the election.
- Lost reelection despite receiving more total votes and a higher vote percentage than in his first election.
- Lost the election despite winning 2 out of the 3 traditionally largest swing states.

US Presidential Election Results 2004-2020

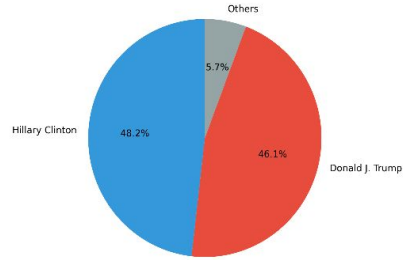
2020 Main Party Chart



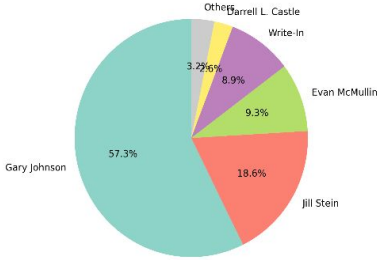
2020 Others Chart



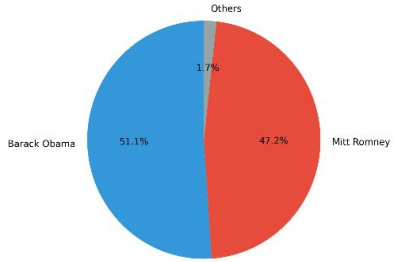
2016 Main Party Chart



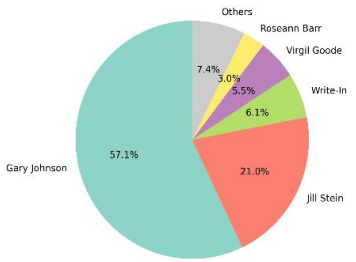
2016 Others Chart



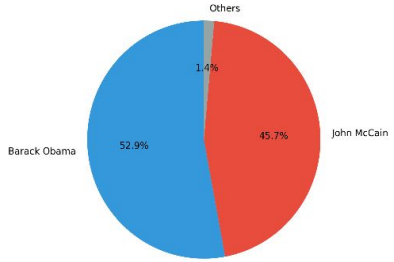
2012 Main Party Chart



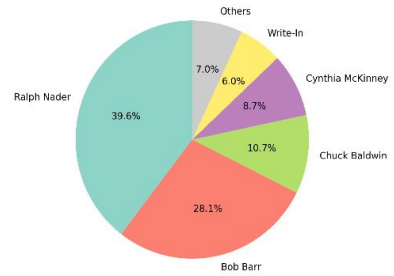
2012 Others Chart



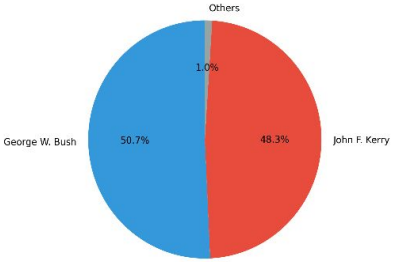
2008 Main Party Chart



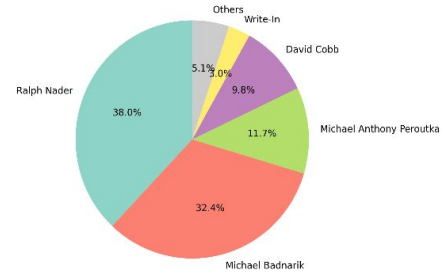
2008 Others Chart



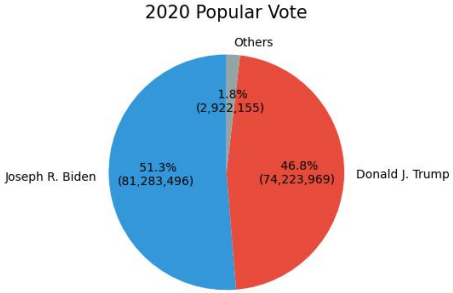
2004 Main Party Chart

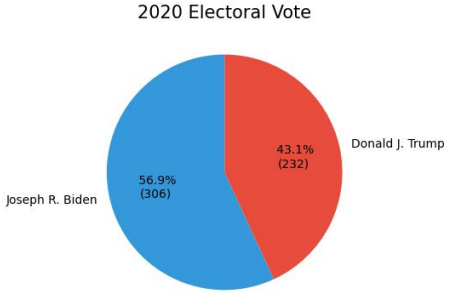


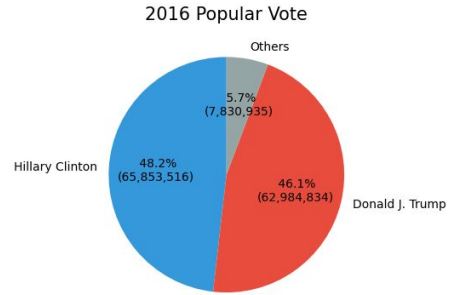
2004 Others Chart

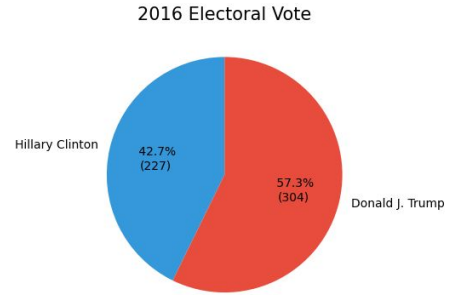


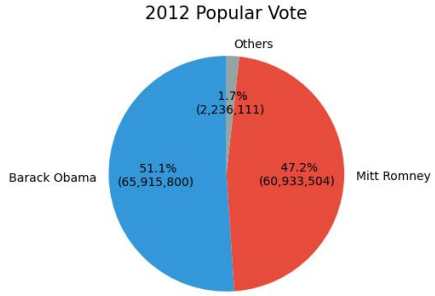
US Presidential Electoral/Popular Vote 2004-2020

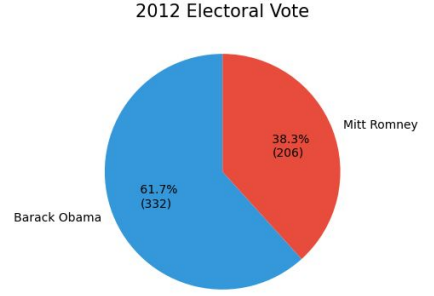


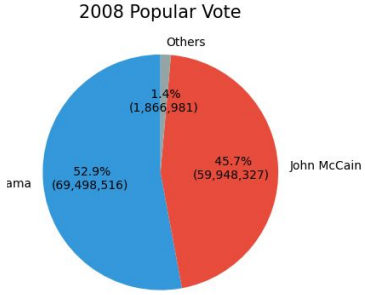


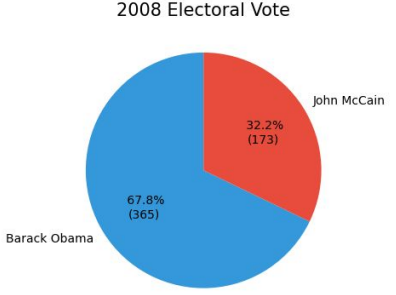


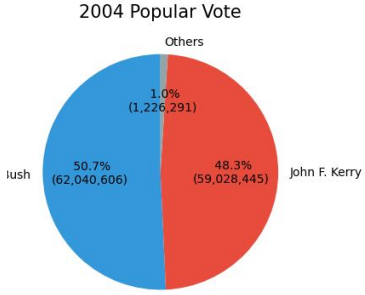


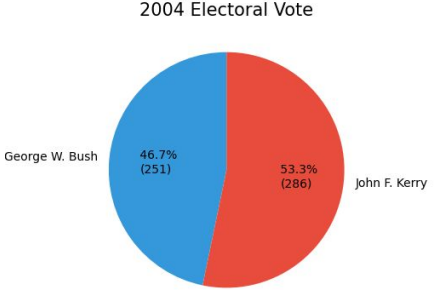


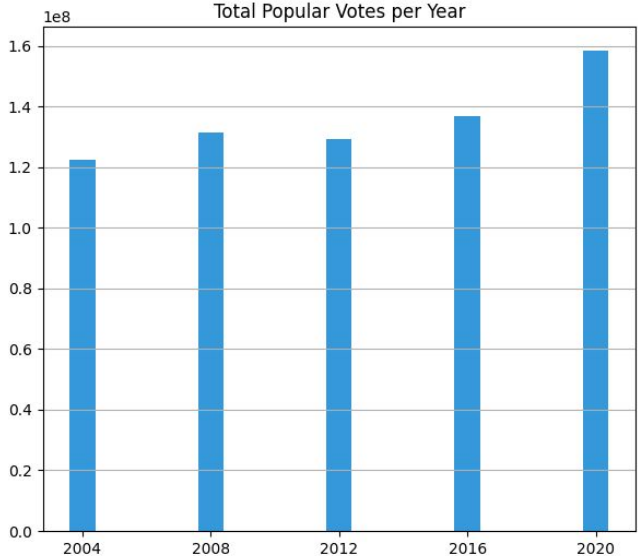


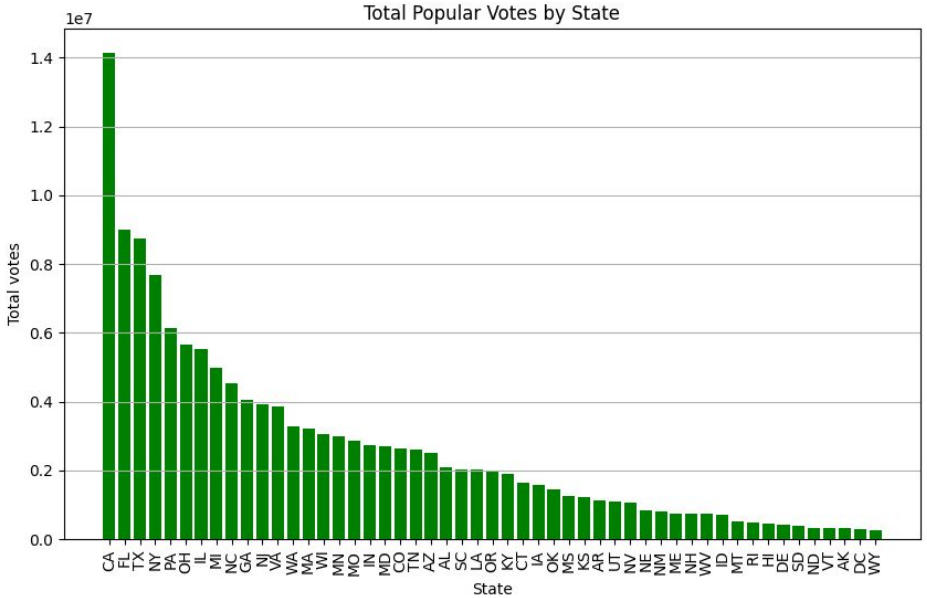




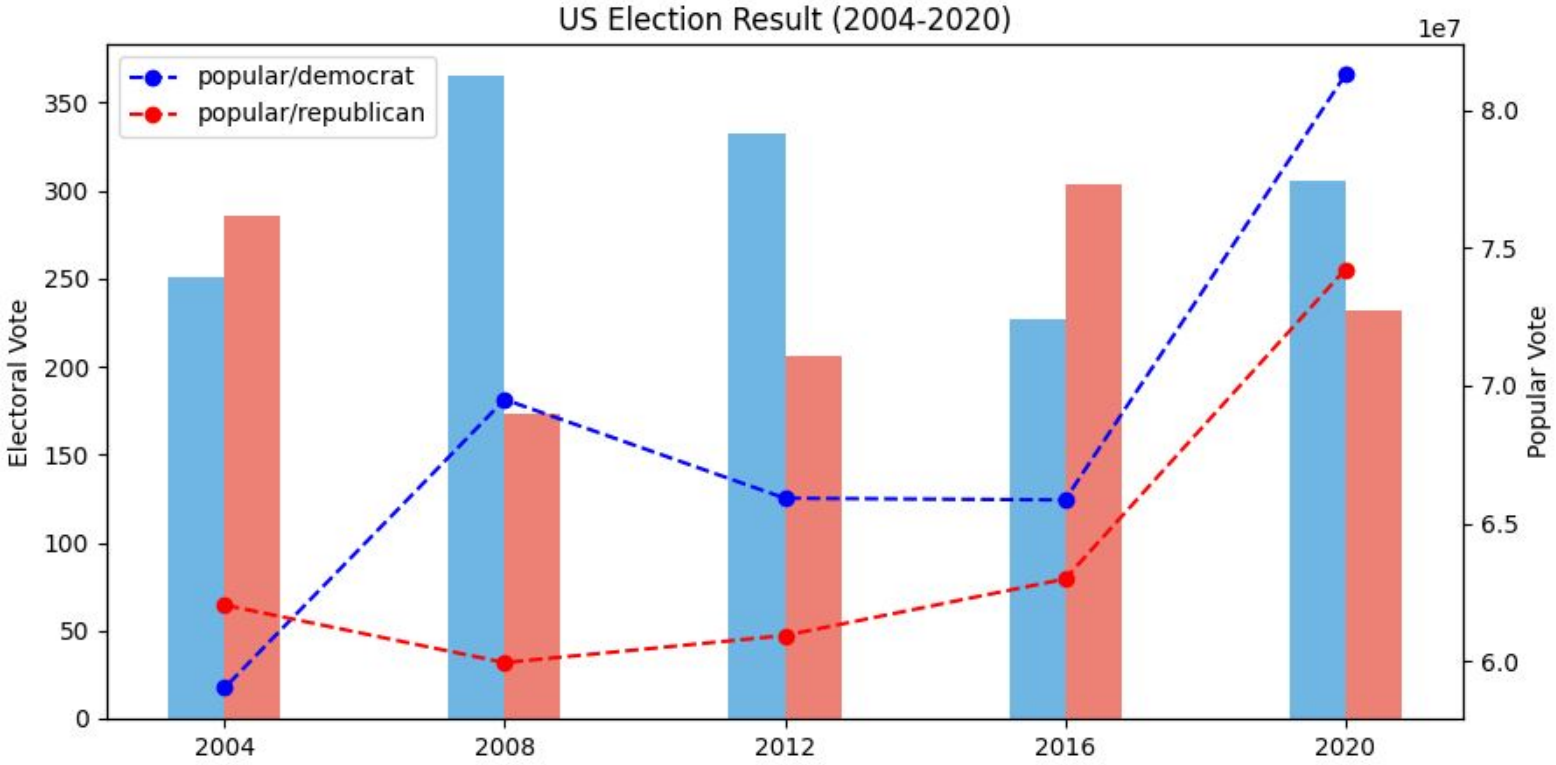




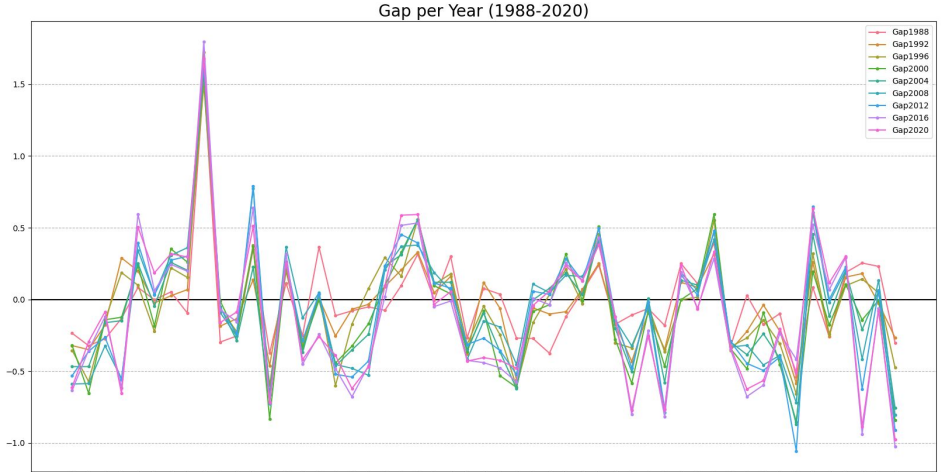


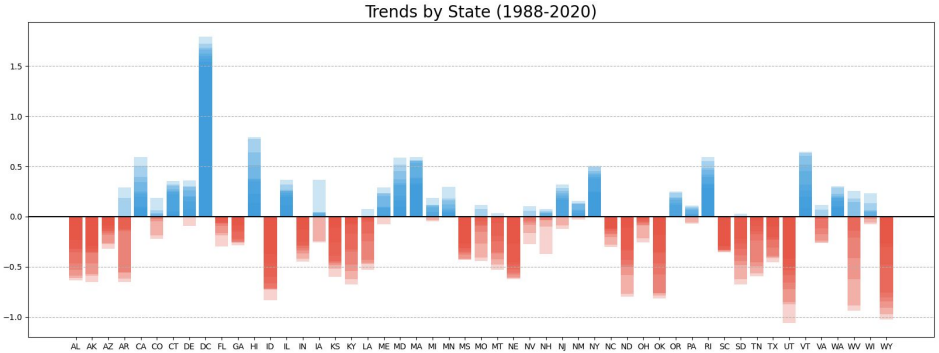


- As each year passes, the number of voters votes increases.
- Top 7 states with highest votes: CA, FL, TX, NY, PA, OH, IL



- The party with the upper hand wins the election.
- In 2016, Trump was elected due to his superiority in the Electoral College votes, despite Hillary Clinton's voter turnout being high.

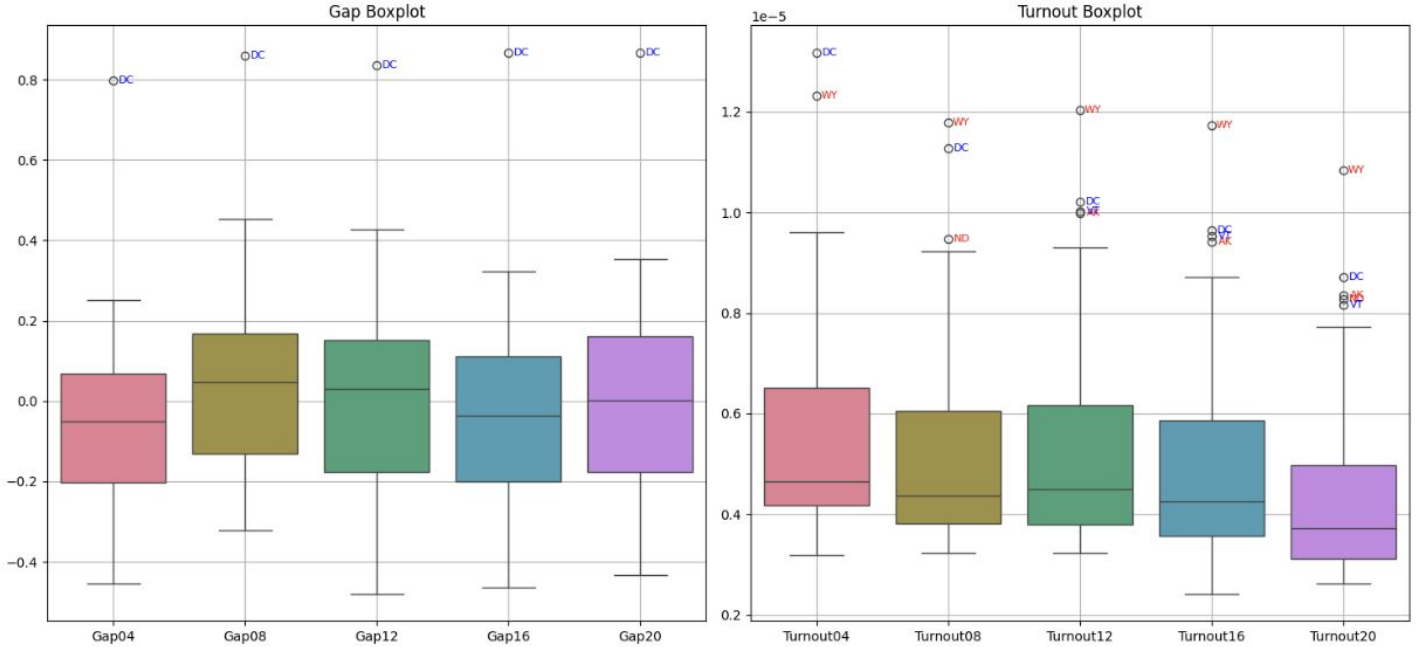




Gap = Democrat Popular Vote - Repulican Popular Vote

- Through the graph above, you can see that there is a strong bias towards the two political parties in 2020 and (2016).
- In the graph below, you can check the dominant party by state cumulatively from 2004 to 2020.
- States with similar colors of blue and red can be thought of as competing states.

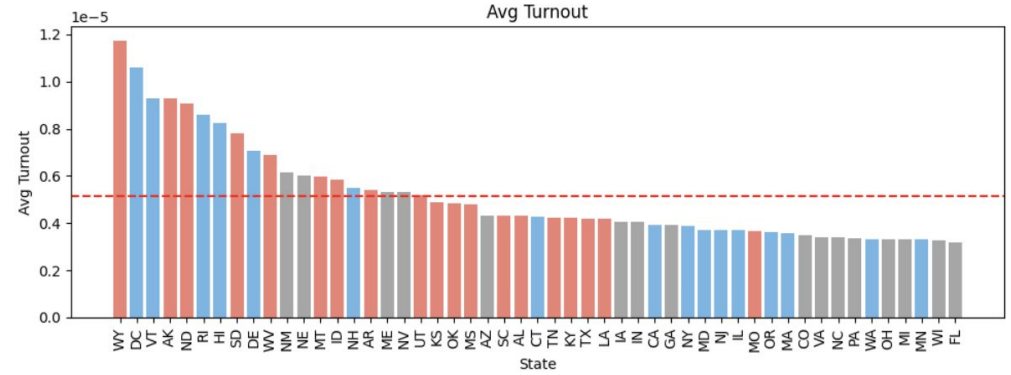
Gap/Turnout Distribution(2004-2020)

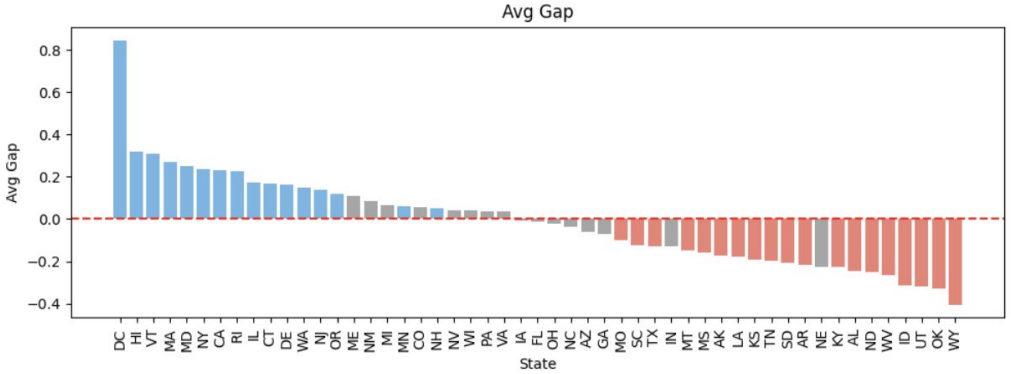


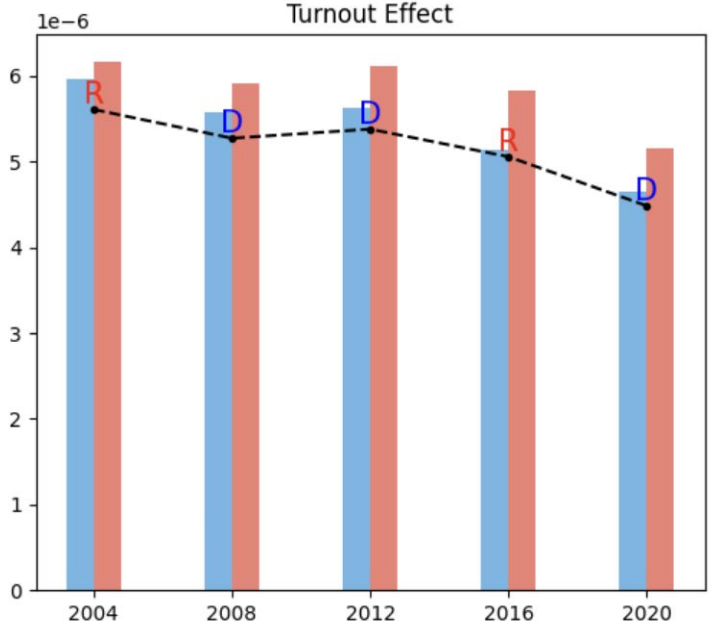
Turnout = (Total Electoral Vote) / (Total Popular Vote) (However, DC must judge differently)

- To check for outliers, i.e. outside the IQR confidence interval, use the figure.
- States that exist outside the given range in the left graph are assumed to have a strong preference for a specific party.
- In the graph on the right, the number of votes relative to population is high in WY, (DC), AK, ND, and VT, with the highest in 2004 and the lowest in 2020.
  → Although the number of votes has increased over the years, the number of votes relative to the population appears to be low ⇒ It is assumed that the population itself has increased over the years.

2004-2020



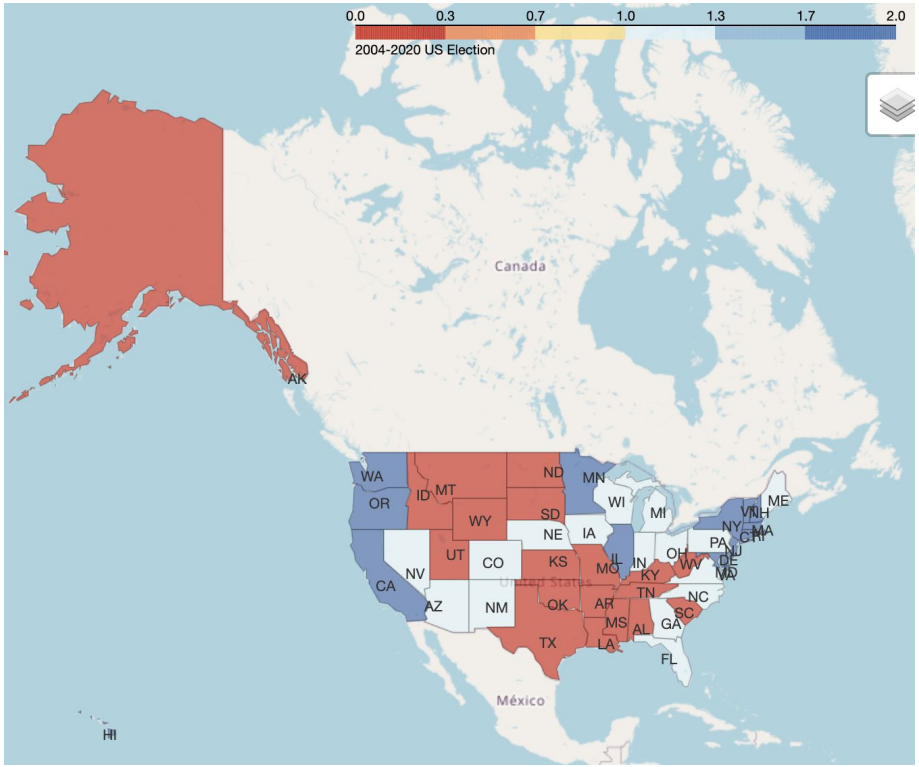




Calculation method

- Finding average turnout within groups labeled Blue/Red
- Dashed line: Total Turnout

file:///Users/songsooyeoun/Desktop/USElection/us_map.html



Blue/Red/Swing States(2004-2020)

If the parties elected every year are the same, Labeled as Blue/Red, and other areas are labeled as Swing.

```
R        19
Swing    16
D        16
Name: count, dtype: int64

Democrat/    CA CT DE DC HI IL MD MA MN NH NJ NY OR RI VT WA
Republican/  AL AK AR ID KS KY LA MS MO MT ND OK SC SD TN TX UT WV WY
Swing/       AZ CO FL GA IN IA ME MI NE NV NM NC OH PA VA WI
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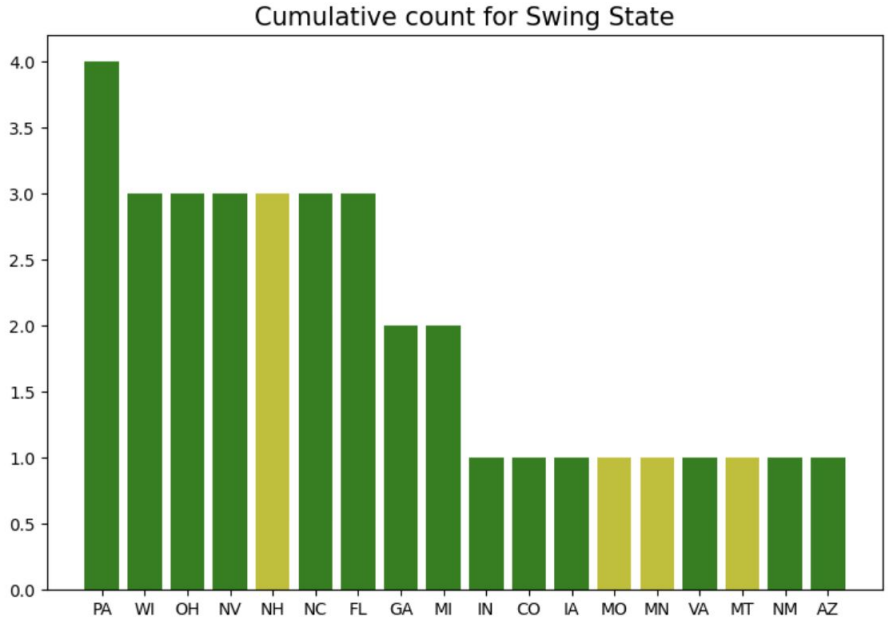
2004-2020

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ELECTORAL VOTE BASED:
AZ CO FL GA IN IA ME MI NE NV NM NC OH PA VA WI

POPULAR VOTE(Small Gap) BASED:
2020: GA AZ WI PA NC NV MI
2016: MI NH PA WI FL MN NV
2012: FL NC OH VA CO PA NH
2008: MO NC IN MT FL OH GA
2004: WI IA NM NH OH PA NV

==== Possible Swing states(7) ====
Wisconsin
Florida
Pennsylvania
North Carolina
Nevada
Michigan
Arizona
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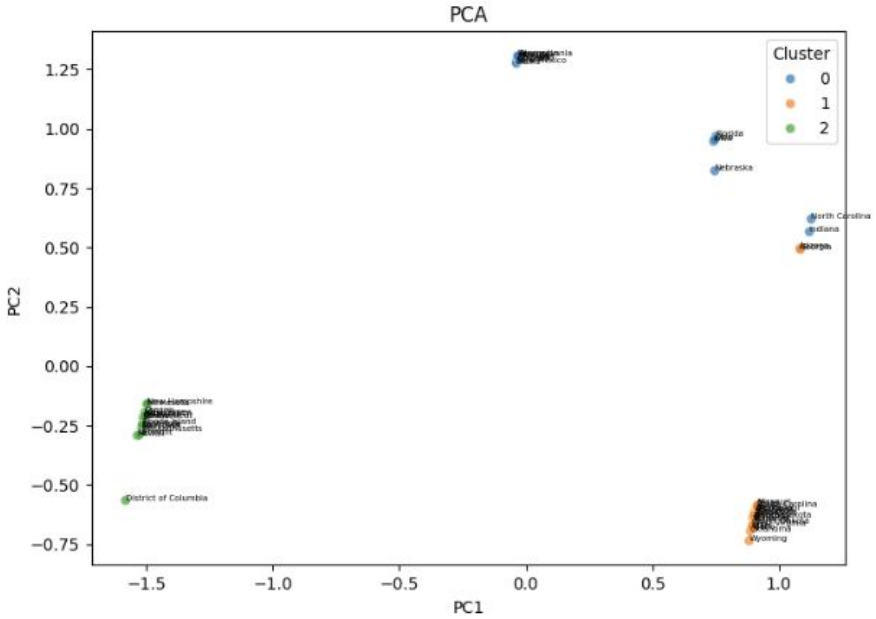
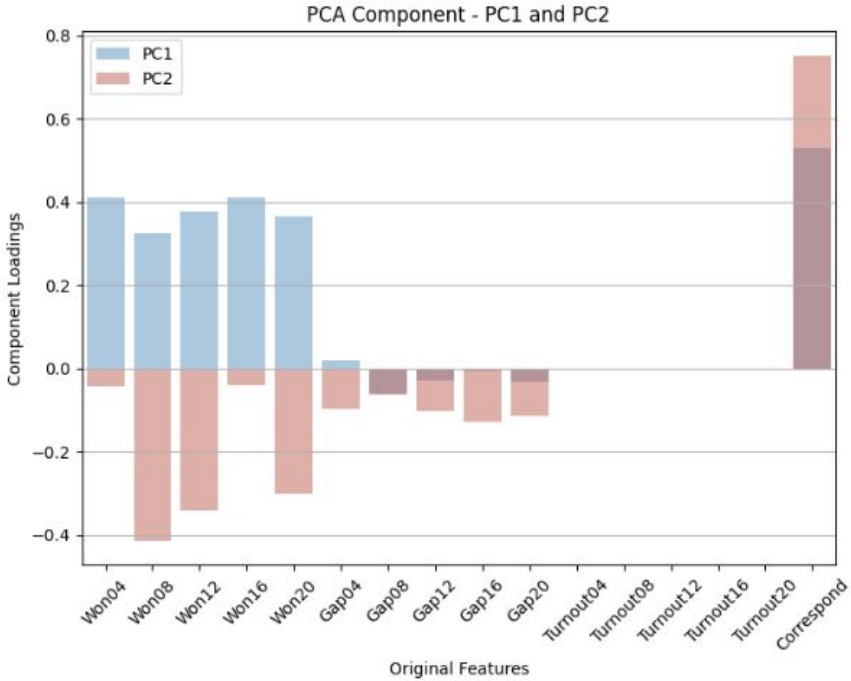
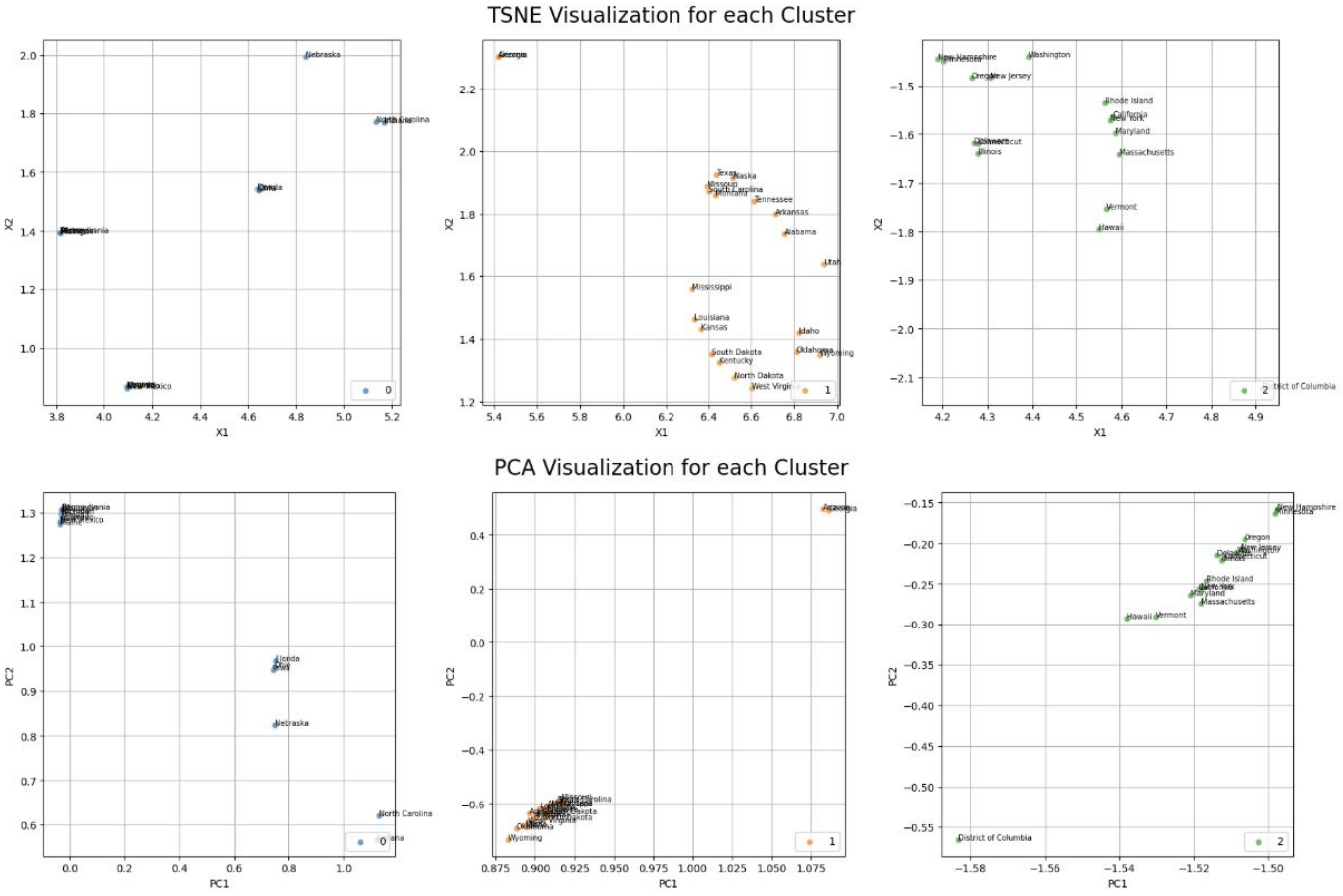
The graph above shows the cumulative number of times the stock was in the top 10 with a low Gap from 2004 to 2020, of which the green ones are the states labeled as ‘Swing’.
⇒ In this way, the extent of the gap and the actual results are combined to identify seven states that are presumed to be contenders. (Of course, even in competitive states, they appear to be slightly tilted toward a specific political party.)

PCA





- PC1 mainly reflects the winning result and Correspond.
- PC2 reflects the winning result and voter turnout relative to the population as a negative value, and Correspond as a positive value.



TSNE, PCA Visualization