



ELECTION FORECASTING

Predicting the Winner Before any Votes are Cast

15.071 – The Analytics Edge

United States Presidential Elections

- A president is elected every four years
- Generally, only two competitive candidates
 - Republican
 - Democratic



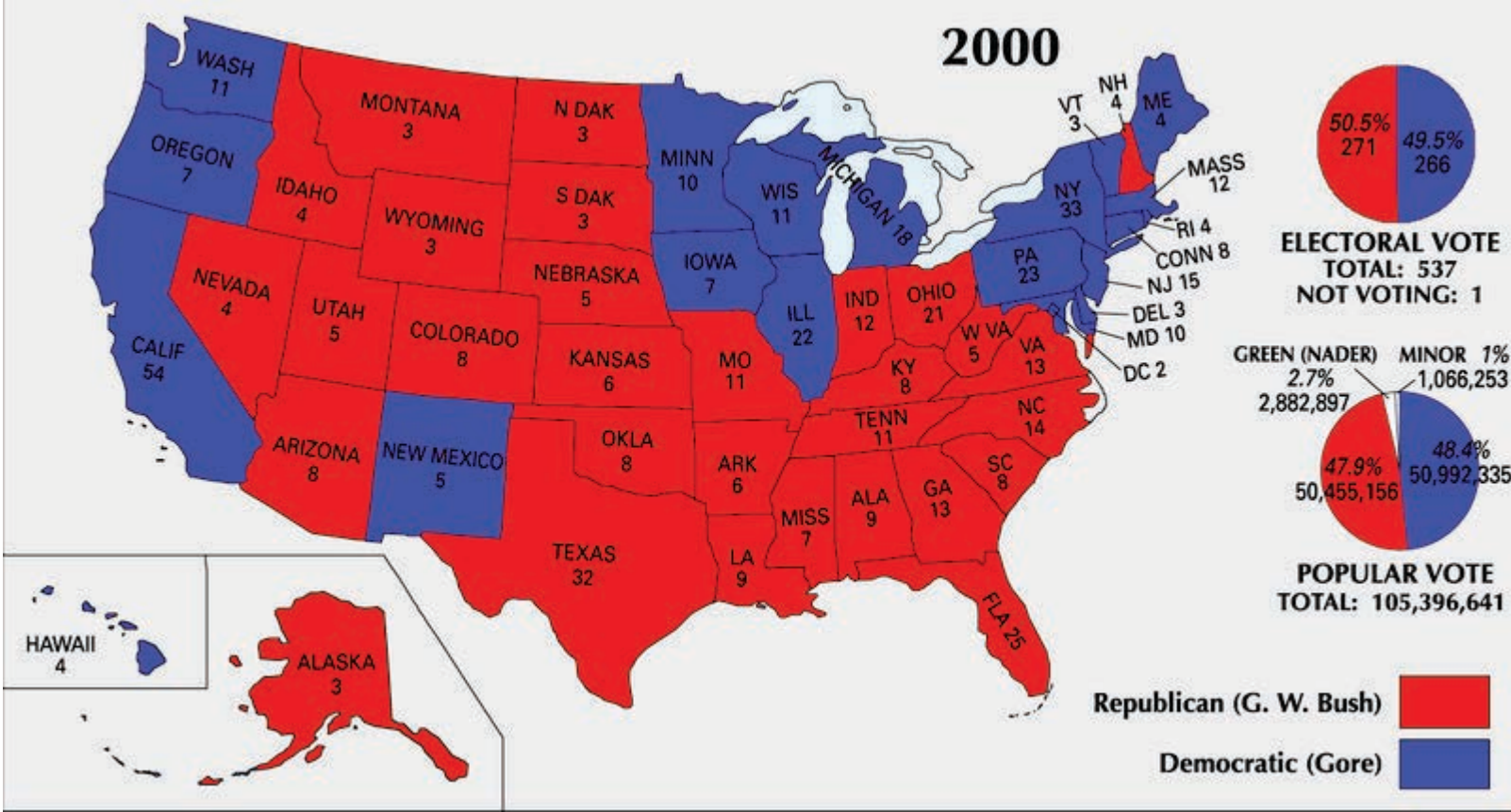
Official presidential photos are in the public domain.

The Electoral College



- The United States have 50 states
- Each assigned a number of *electoral votes* based on population
 - Most votes: 55 (California)
 - Least votes: 3 (multiple states)
 - Reassigned periodically based on population change
- Winner takes all: candidate with the most votes in a state gets all its electoral votes
- Candidate with most electoral votes wins election

2000 Election: Bush vs. Gore



2000 U.S. election map is in the public domain. Source: [Wikimedia Commons](https://commons.wikimedia.org/wiki/File:2000_US_election_map).

Election Prediction

- Goal: Use polling data to predict state winners
- Then-*New York Times* columnist Nate Silver famously took on this task for the 2012 election

[Image of Nate Silver](#) removed due to copyright restrictions.

The Dataset

- Data from RealClearPolitics.com
- Instances represent a state in a given election
 - *State*: Name of state
 - *Year*: Election year (2004, 2008, 2012)
- Dependent variable
 - *Republican*: 1 if Republican won state, 0 if Democrat won
- Independent variables
 - *Rasmussen, SurveyUSA*: Polled R% - Polled D%
 - *DiffCount*: Polls with R winner – Polls with D winner
 - *PropR*: Polls with R winner / # polls

Simple Approaches to Missing Data

- Delete the missing observations
 - We would be throwing away more than 50% of the data
 - We want to predict for all states
- Delete variables with missing values
 - We want to retain data from Rasmussen/SurveyUSA
- Fill missing data points with average values
 - The average value for a poll will be close to 0 (tie between Democrat and Republican)
 - If other polls in a state favor one candidate, the missing one probably would have, too

Multiple Imputation

- Fill in missing values based on non-missing values
 - If Rasmussen is very negative, then a missing SurveyUSA value will likely be negative
 - Just like *sample.split*, results will differ between runs unless you fix the random seed
- Although the method is complicated, we can use it easily through R's libraries
- We will use Multiple Imputation by Chained Equations (mice) package

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