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Executive Economics

An Interactive Dashboard

Team Gold MagiKarp

Mia Silva, Louise Oh, Lidio Jaimes, Oliver Brown

Outline

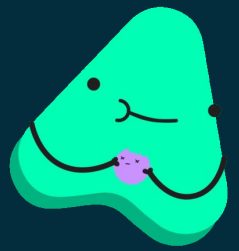
- Motivation, Goals, & Existing Work
- The Data
- Analysis & Paradigms
- Challenges
- Demo
- Questions

Motivation & Goals

- **Motivation (Research Question)**
  - Determine if economic indicators (GDP, inflation, unemployment) effectively drive presidential support.
  - Can economic data alone forecast a President's future popularity?

- **Goals:**
  - Create an interactive dashboard to compare historical approval ratings against economic cycles.
  - Train a machine learning regression model to predict approval ratings based on economic trends.
  - Implement a "What If" interface, allowing the dashboard users to tweak economic levers (eg. rising inflation) to see the impact on approval.

Existing Work



- Two categories of Presidential Approval Research
  - Public Dashboards
  - Academic statistical modeling

- Public Dashboards
  - Examples: FiveThirtyEight, The Economist, Gallup, RealClearPolitics
  - Function: Aggregate polls or use weighted averaging models to track current trends in approval.

- Academic Models
  - Initial findings: Approval is predictable and is primarily driven by economics factors (GDP growth, inflation).
  - Later findings: Non-economic factors also influence approval such as a major crisis (“rally ‘round the flag” effect) and the general decline of approval over time (“erosion of support”).

The Data

Approval Ratings 

The American Presidency Project

Source of historical and current presidential approval ratings, dating back to 1941. Includes, percentage of approval, disapproval, and unsure ratings collected by Gallup.

Method of data extraction: HTML scraping

Link to original data: https://www.presidency.ucsb.edu/statistics/data/presidential-job-approval-all-data

Economic Data 

The Bureau of Labor Statistics

Source of unemployment rate, consumer price index (inflation), total nonfarm employment (jobs), and average hourly earnings.

Method of data extraction: Grabbing data from API

Link to API site: https://www.bls.gov/bls/api_features.htm

The Bureau of Economic Analysis

Source of GDP, government spending, disposable income, personal savings rate, corporate profits, and healthcare price index.

Method of data extraction: Grabbing data from API

Link to API site: https://apps.bea.gov/api/signup/

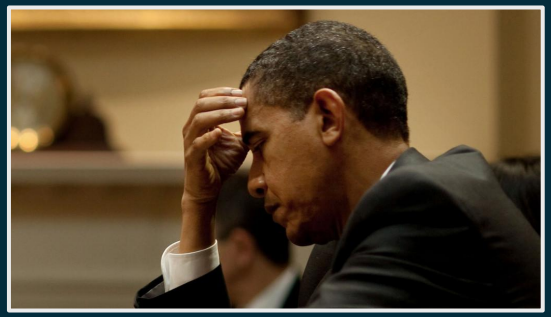
Challenges/Limitations

Data Sourcing and Cleaning

- Finding sources of data for different economic indicators → lack of access and/or less frequent data collections over time.
    - E.g., U.S. Census and ANES data only have annual data → less useful for tracking changes over time so we did not included
- When cleaning data, we had several instances of missing and/or “misaligned” dates.
- Data constrained by available approval ratings, so earliest president we have is Franklin D. Roosevelt (1941 - third term).

Visualizations

- Discovering the best way to display historical events.
- Comparison of approval ratings for presidents (linetype vs color).



Machine Learning and Prediction Modeling

- Choosing a model capable of understanding how economic variables interact to influence approval.
- Ensuring the model learns general trends for prediction rather than just memorizing the historical data.
- Accounting for the “stickiness” of public perception.

Analysis & Paradigms

1. Data Exploration

HTML web scraping and application programming interfaces (APIs) to pull all of our data

Functional and pipeline programming for wrangling.

Used dplyr, tidyr, lubridate, purr, stringr

2. Visualizations

Plotted presidential approval ratings over time and labeled key historical events

Plotted economic data overtime and subsetted it for the president selected

Used ggplot2

3. Machine Learning

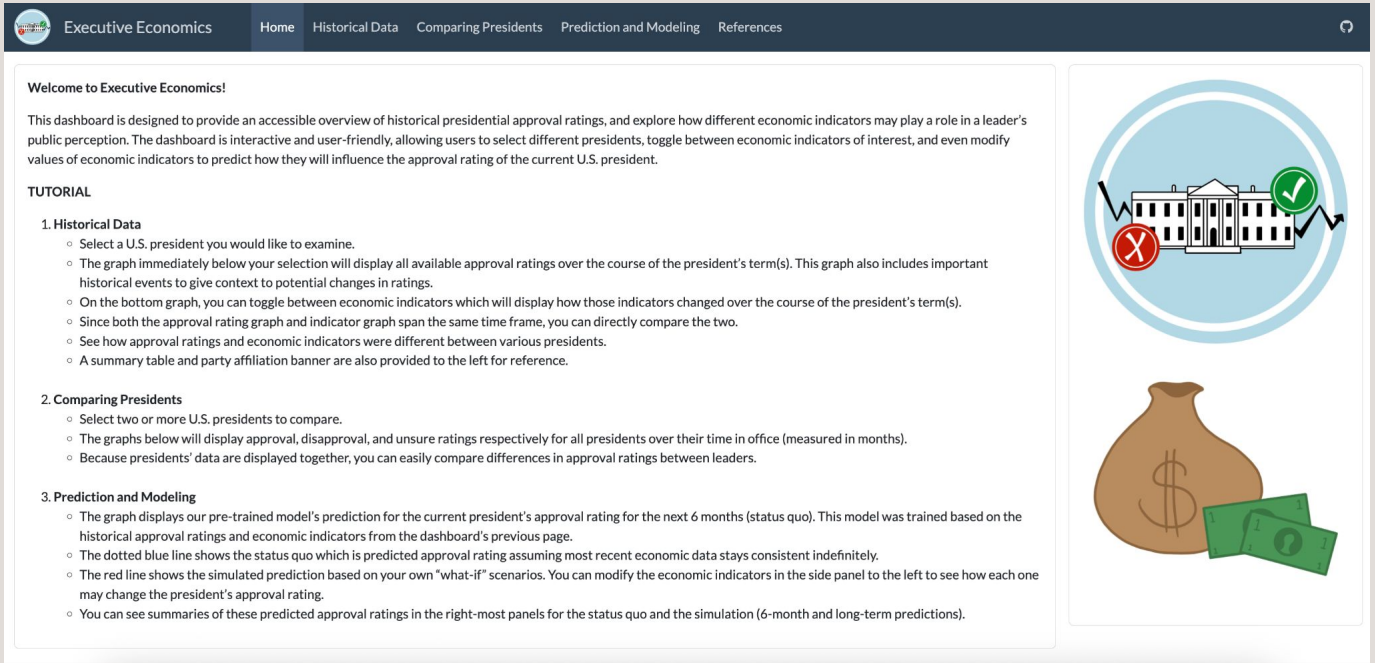
We use a recursive random forest regressor for our prediction model, which creates a function of our economic variables and time in office with public approval as our output

Used randomForest

Live Demo

Link to Dashboard

https://msilva21-jh.shinyapps.io/2-dashboard/



Further Work

COMING SOON

1

Better real-time data:

Access to more up-to-date data would improve the accuracy and relevance of the dashboard's visualizations and predictions.

Incorporating real-time economic and approval data could make the tool more responsive to current events.

2

More functionalities:

Additional interactive features, such as filtering by specific events or economic conditions, could enhance user exploration.

Integrating more visualization types, like heatmaps or correlation plots, would allow deeper insights.

3

Advanced predictive models:

Using more sophisticated models, such as time-series or machine learning ensembles, could improve forecast accuracy.

Incorporating uncertainty estimates would also provide users with a clearer sense of confidence in predictions.

4

Customization for users:

User-specific settings and saved scenario profiles could make the tool more practical for repeated use.

Tailoring the dashboard for different audiences, such as students, analysts, or policymakers, would also increase accessibility.

Thank you!

Questions?