

Executive Economics

An Interactive Dashboard

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Outline

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

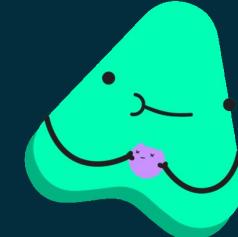


- **Motivation (Research Question)**
 - Determine if economic indicators (GDP, inflation, unemployment) effectively drive presidential support.
 - Can economic data alone forecast a President's future popularity?
- **Goals:**
 - Create an interactive dashboard to compare historical approval ratings against 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/>

Welcome to Executive Economics!

This dashboard is designed to provide an accessible overview of historical presidential approval ratings, and explore how different economic indicators may play a role in a leader's public perception. The dashboard is interactive and user-friendly, allowing users to select different presidents, toggle between economic indicators of interest, and even modify values of economic indicators to predict how they will influence the approval rating of the current U.S. president.

TUTORIAL

1. Historical Data

- Select a U.S. president you would like to examine.
- The graph immediately below your selection will display all available approval ratings over the course of the president's term(s). This graph also includes important historical events to give context to potential changes in ratings.
- On the bottom graph, you can toggle between economic indicators which will display how those indicators changed over the course of the president's term(s).
- Since both the approval rating graph and indicator graph span the same time frame, you can directly compare the two.
- See how approval ratings and economic indicators were different between various presidents.
- A summary table and party affiliation banner are also provided to the left for reference.

2. Comparing Presidents

- Select two or more U.S. presidents to compare.
- The graphs below will display approval, disapproval, and unsure ratings respectively for all presidents over their time in office (measured in months).
- Because presidents' data are displayed together, you can easily compare differences in approval ratings between leaders.

3. Prediction and Modeling

- The graph displays our pre-trained model's prediction for the current president's approval rating for the next 6 months (status quo). This model was trained based on the historical approval ratings and economic indicators from the dashboard's previous page.
- The dotted blue line shows the status quo which is predicted approval rating assuming most recent economic data stays consistent indefinitely.
- The red line shows the simulated prediction based on your own "what-if" scenarios. You can modify the economic indicators in the side panel to the left to see how each one may change the president's approval rating.
- You can see summaries of these predicted approval ratings in the right-most panels for the status quo and the simulation (6-month and long-term predictions).



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?