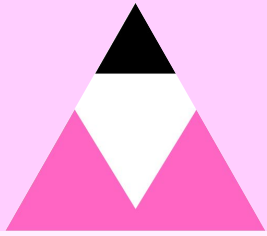


A stylized logo consisting of a black triangle at the top, followed by two pink triangles pointing upwards, and a larger pink triangle at the bottom, all centered above the title.

FIVEFORTYONE

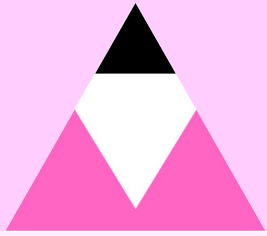
Analyzing and Visualizing Legislative and Congressional Data

Michael Ryvin and Anitej Biradar



Goals

See **how congress works,**
how it has changed, and
where it is heading



Data Selection

- Congressional Data from Library of Congress
- Nearly every single piece of legislation Congress has handled
- Nearly every single member of Congress to serve in recent history

CONGRESS.GOV
United States Legislative Information



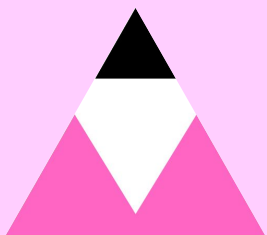


Data Description

- Unknown (VERY large) amount of GB for total possible collected data
 - 79 possible API requests, only small subset used
- 500k records total
 - 75k collected
 - ~1.3 GB
- 19 or 15 data points per record
 - 19 for bills
 - 15 for members

```
<api-root>
  <bill>
    <number> 3076 </number>
    <updateDate> 2023-03-08T20:26:30Z </updateDate>
    <updateDateIncludingText> 2023-03-08T20:26:30Z </updateDateIncludingText>
    <originChamber> House </originChamber>
    <type> HR </type>
    <introducedDate> 2021-05-11 </introducedDate>
    <congress> 117 </congress>
    <constitutionalAuthorityStatementText>
      <![CDATA[ <pre>[Congressional Record Volume 167, Number 81 (Tuesday, May 11, 2021)]]
      CAROLYN B. MALONEY of New York:H.R. 3076.Congress has the power to enact this legisla
      </constitutionalAuthorityStatementText>
    </constitutionalAuthorityStatementText>
    <committees>
      <count> 3 </count>
      <url> https://api.congress.gov/v3/bill/117/hr/3076/committees?format=xml </url>
    </committees>
    <committeeReports>
      <committeeReport>
        <citation> H. Rept. 117-89, Part 1 </citation>
        <url> https://api.congress.gov/v3/committee-report/117/HRPT/89?format=xml </url>
      </committeeReport>
      <committeeReport>
        <citation> H. Rept. 117-89, Part 2 </citation>
        <url> https://api.congress.gov/v3/committee-report/117/HRPT/89?format=xml </url>
      </committeeReport>
    </committeeReports>
    <relatedBills>
      <count> 4 </count>
      <url> https://api.congress.gov/v3/bill/117/hr/3076/relatedbills?format=xml </url>
    </relatedBills>
    <actions>
      <count> 74 </count>
      <url> https://api.congress.gov/v3/bill/117/hr/3076/actions?format=xml </url>
    </actions>
    <sponsors>
      <item>
        <bioguideId> M000087 </bioguideId>
        <fullName> Rep. Maloney, Carolyn B. [D-NY-12] </fullName>
        <firstName> CAROLYN </firstName>
        <lastName> MALONEY </lastName>
        <party> D </party>
        <state> NY </state>
        <url> https://api.congress.gov/v3/member/M000087?format=xml </url>
        <middleName> B. </middleName>
        <district> 12 </district>
        <isByRequest> N </isByRequest>
      </item>
    </sponsors>
  </bill>
</api-root>
```

And so
much
more!



Processing Congress Data

- Multiple API requests running at once, done in **Python**
 - Limited to 1000 per hour per API key
 - Hundreds of Thousands of API requests required
- Data on Members
 - Easy, one API request each
- Data on Bills
 - Multiple API requests each
- Displayed later using **Plotly**

GET /member/{bioguideId} Returns detailed information for a specified congressional member.

GET /bill/{congress}/{billType}/{billNumber} Returns detailed information for a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/actions Returns the list of actions on a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/amendments Returns the list of amendments to a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/committees Returns the list of committees associated with a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/cosponsors Returns the list of cosponsors on a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/relatedbills Returns the list of related bills to a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/subjects Returns the list of legislative subjects on a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/summaries Returns the list of summaries for a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/text Returns the list of text versions for a specified bill.

GET /bill/{congress}/{billType}/{billNumber}/titles Returns the list of titles for a specified bill.



Data for Bills (1/2)

- Bill Type
- Bill Number
- Congress
- Title
- Origin Chamber
- Policy Area
- Introduction Date
- Sponsor(s)
- Cosponsor(s)

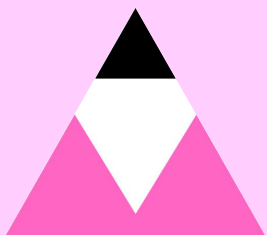
- “HR”
- 3962
- Congress
- “Preservation of Access to Care for Medicare Beneficiaries and Pension Relief Act of 2010”
- “House”
- “Health”
- “2009-10-29”
- [“D000355”]
- [“R000053 ”, “W000215 ”, “M000725 ”, “S000810 ”, “P000034 ”, “A000210 ”]



Data for Bills (2/2)

- # of Actions
- # of Amendments
- # of Committees
- # of Cosponsors
- # of Related Bills
- # of Text Versions
- # of Subjects
- # of Titles
- Latest Action Date
- Latest Action Text

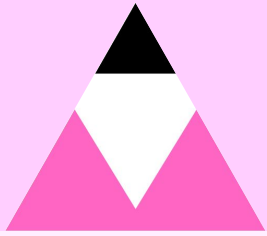
- 49
- 4
- 8
- 6
- 3
- 5
- 110
- 10
- “2010-06-25”
- “Became Public Law No: 111-192.”



Data for Members (1/2)

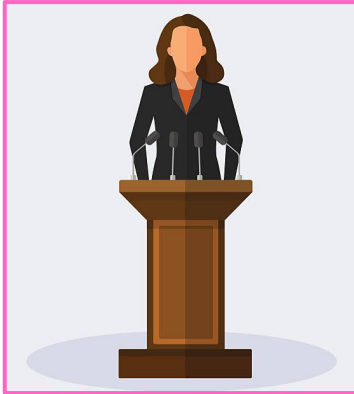
- Bioguide ID
- Full Name
- Honorific Name
- First Name
- Last Name
- Birth Year
- State
- Party
- Current Membership Status
- # of Sponsored Legislation
- # of Cosponsored Legislation

- "C001041"
- "Hillary Rodham Clinton"
- null
- "HILLARY"
- "CLINTON"
- "1947"
- "NY"
- "Democrat"
- null
- 713
- 2678



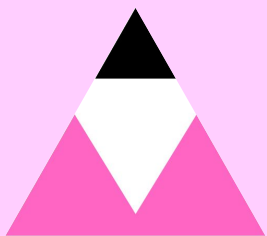
Data for Members (2/2)

- Years served
- First year served
- Last year served
- Photo



- 8
- 2001
- 2009
-





Processing Member Photos

- Beautiful Soup package in **Python**
- Wikipedia URL's crafted using politician full name OR first + last name
 - Additional strings added, such as `'_(U.S._Senator)'`
- ~2280/2515 members found
 - ~90% accuracy
 - Others found manually, though could have been better optimized



WIKIPEDIA
The Free Encyclopedia

URL and
Image

 en.wikipedia.org/wiki/Mike_Pence

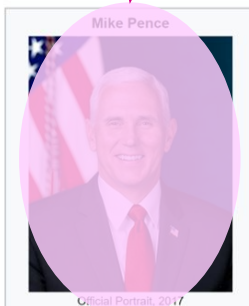
Mike Pence

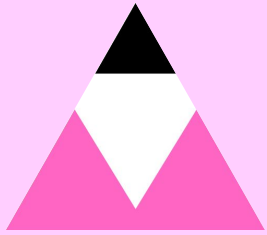
Article Talk

Read View source View history Tools

Michael Richard Pence (born June 7, 1959) is an American politician who served as the 48th [Vice President of the United States](#) from 2017 to 2021 under President [Donald Trump](#). A member of the [Republican Party](#), he previously served as the 50th [governor of Indiana](#) from 2013 to 2017. Pence was also a member of the [U.S. House of Representatives](#) from 2001 to 2013.

Pence was born and raised in [Columbus, Indiana](#), and is the younger brother of U.S. Representative [Greg Pence](#). He graduated from [Hanover College](#) and then graduated from [Indiana University Robert H. McKinney School of Law](#) before entering [private practice](#). After losing two bids for a congressional seat in 1988 and 1990, he became a conservative radio and television talk show host from 1994 to 1999. He was elected to the [U.S. House of Representatives](#) in 2000 and represented the [2nd district](#) of Indiana from 2001 to 2003 and the [6th district](#) of Indiana from 2003 to 2013. He chaired the [Republican Study Committee](#) from 2005 to 2007 and served as the [chairman](#) of the [House Republican Conference](#) from 2009 to 2011, the third-highest position in the House Republican leadership.^[1] Pence described himself as a "principled conservative" and supporter of the [Tea Party movement](#),^[2] saying he was "a Christian, a conservative, and a Republican, in that order."^[3]





Entity Relationship Diagram

Bills

Bill Type
Bill Number
Congress
Title
Origin Chamber
Policy Area
Introduction Date
Sponsor(s)
Cosponsor(s)
of Actions
of Amendments
of Committees
of Cosponsors
of Related Bills
of Text Versions
of Subjects
of Titles
Latest Action Date
Latest Action Text

Members

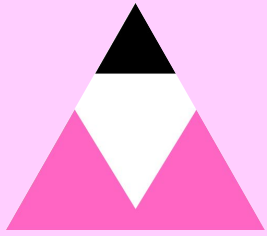
Bioguide ID
Full Name
Honorific Name
First Name
Last Name
Birth Year
State
Party
Current Membership Status
of Sponsored Legislation
of Cosponsored Legislation
Years served
First year served
Last year served
Photo



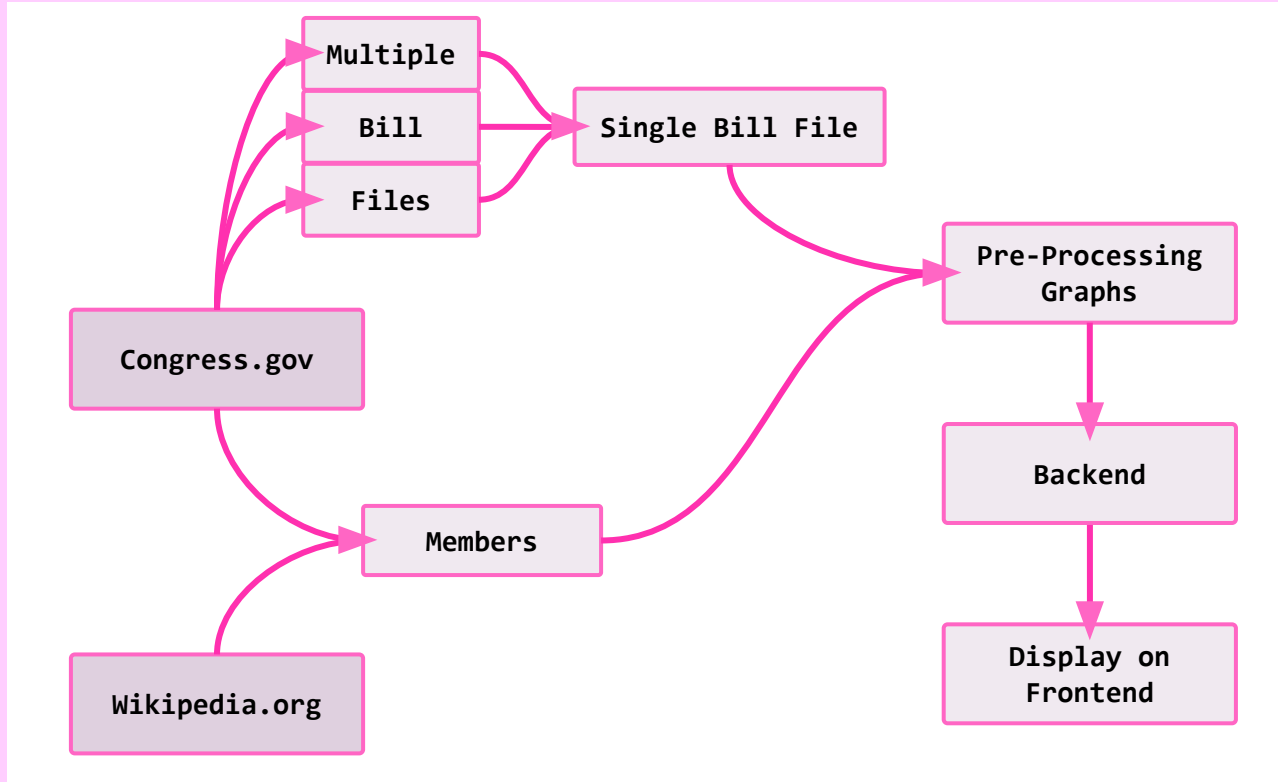
Tech Stack

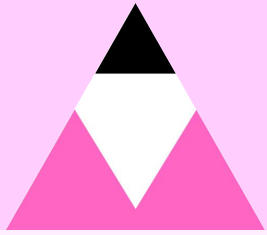
- Backend (port 1089)
 - Python + Flask based REST API
 - /bills, /members
 - Serves GET requests
 - Responses don't exceed 100MB
- Frontend (port 3000)
 - JavaScript + React
 - React Plotly
 - Real time calculations/filtering
 - Hooks for toggles





Data Flow Chart





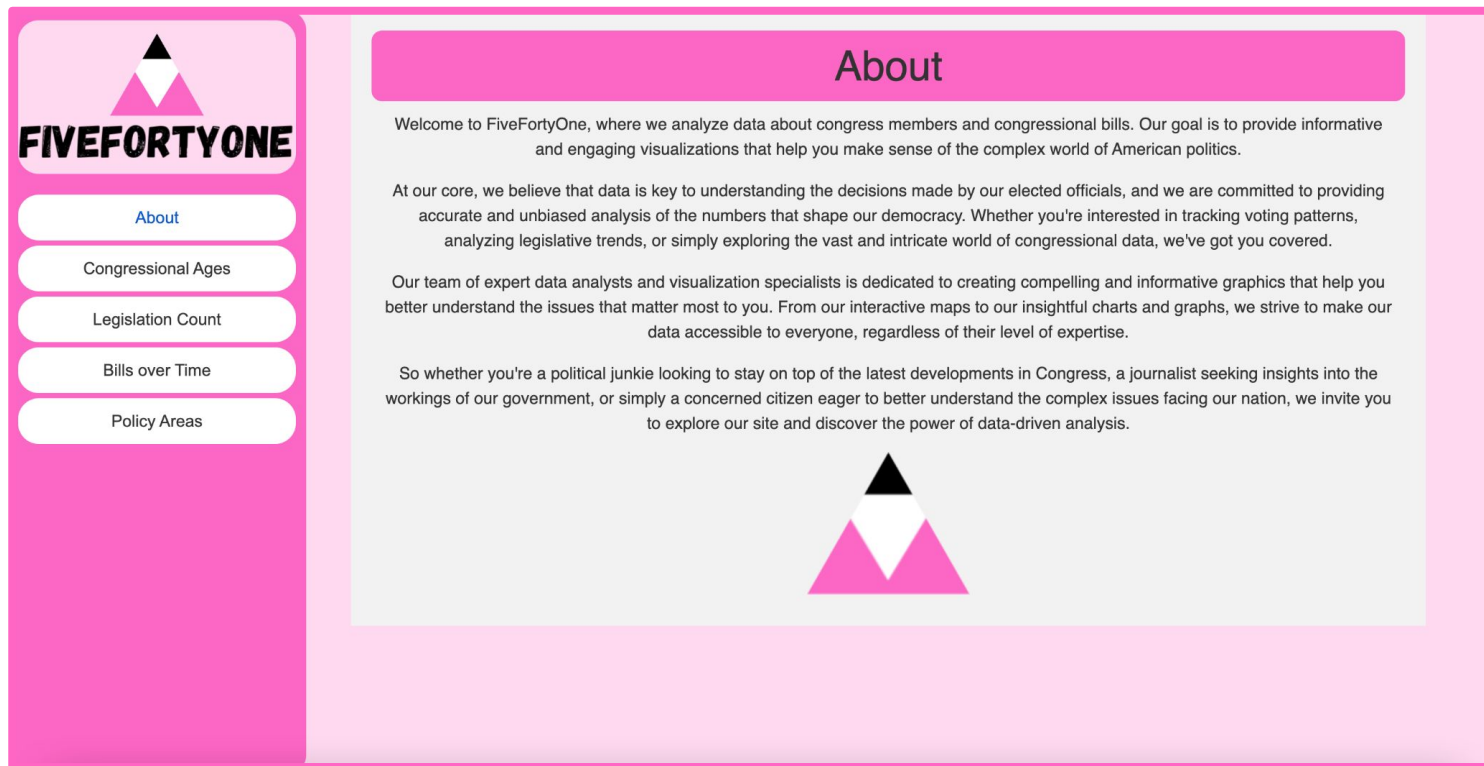
Questions to Ask

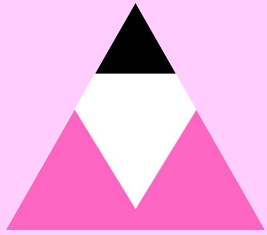
- How has the age of Congress changed over time?
- Which congress members prefer to introduce legislation themselves vs tag along to other members legislation?
- How has the bureaucracy and productivity of Congress changed over time?





Interface Layout (1/5)





Interface Layout (2/5)



About

[Congressional Ages](#)

Legislation Count

Bills over Time

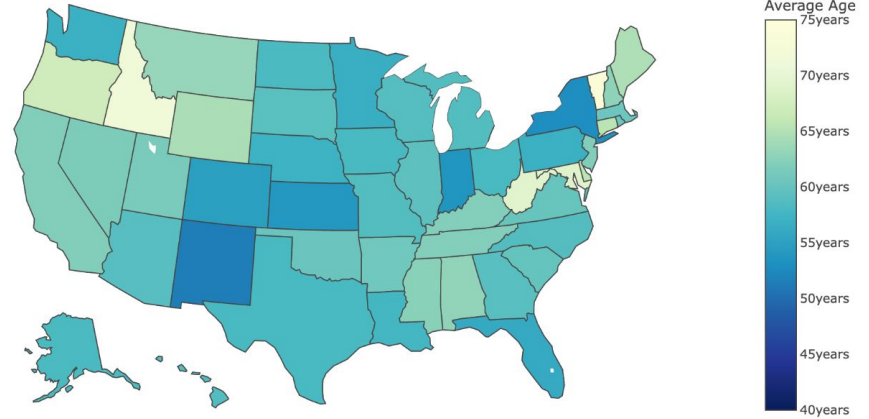
Policy Areas

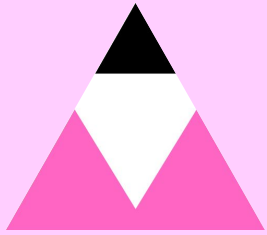
Congressional Ages

Filter by party:

Filter by year: 2023

Average Age of Congresspeople by State





Interface Layout (3/5)



About

Congressional Ages

Legislation Count

Bills over Time

Policy Areas

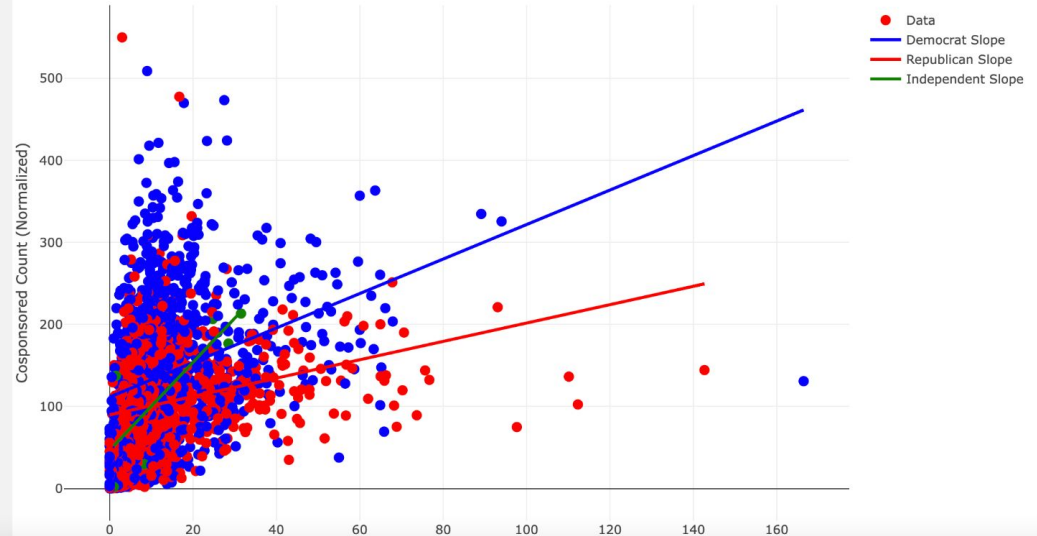
Legislation Count

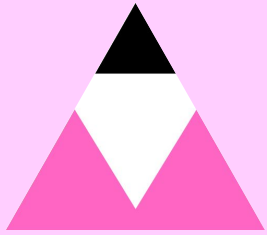
Party: All

State: All

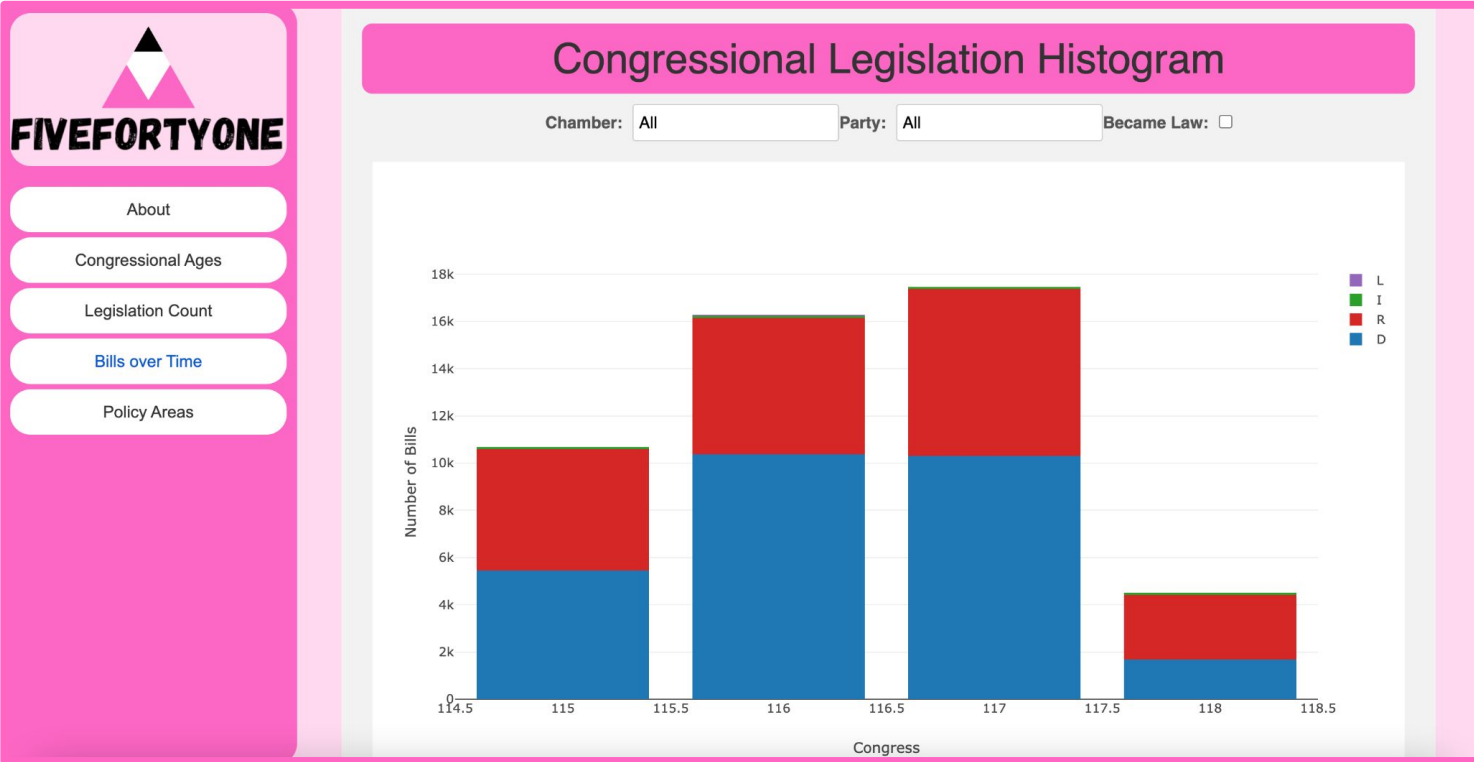
Show Normalized ☒

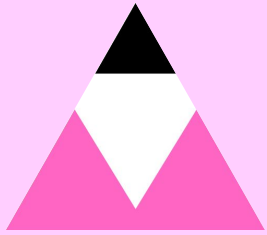
Congressional Scatterplot (Normalized)





Interface Layout (4/5)





Interface Layout (5/5)



FIVEFORTYONE

About

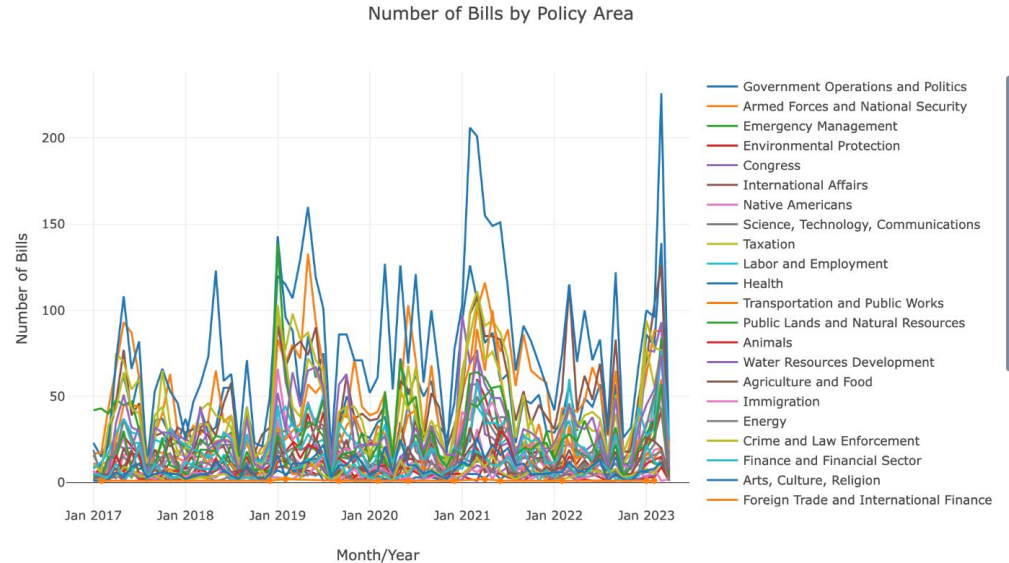
Congressional Ages

Legislation Count

Bills over Time

Policy Areas

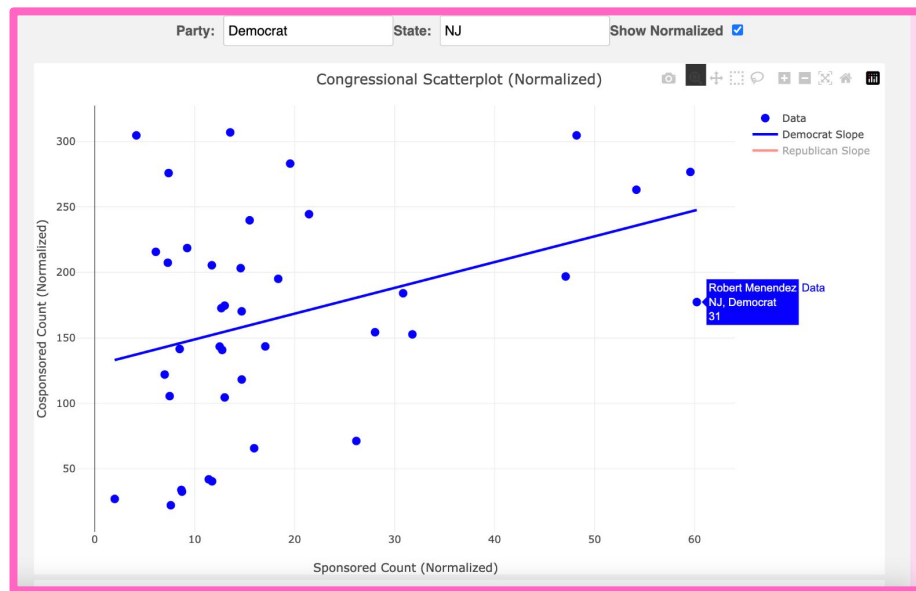
Policy Areas





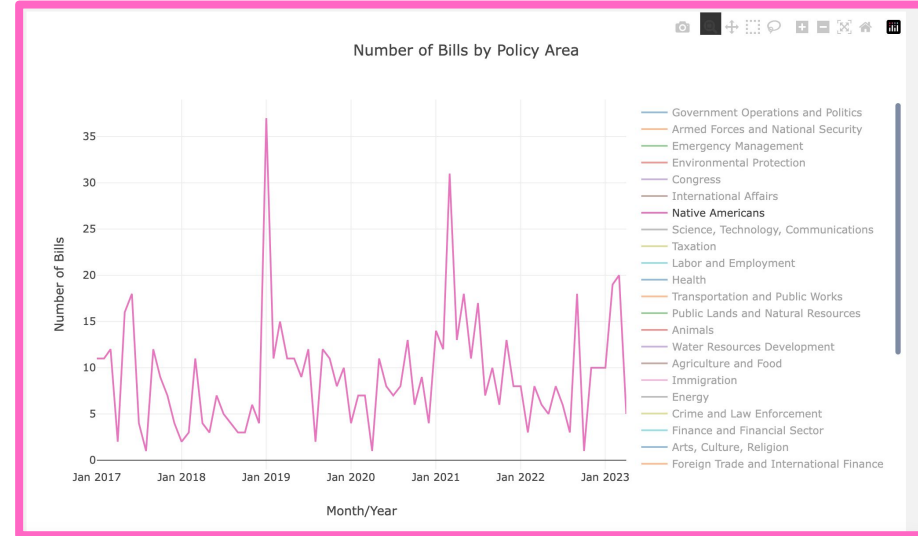
Interactivity

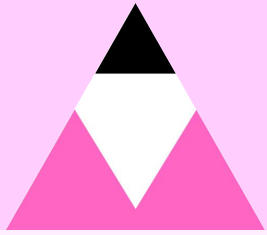
- Page selection buttons
- Interactive plots with...
 - Pan, Zoom, reset axes, etc
 - Time sliders
 - Clicking to select lines
 - Buttons to select how to subset the data
 - Hover data



Use Cases: National Politicians

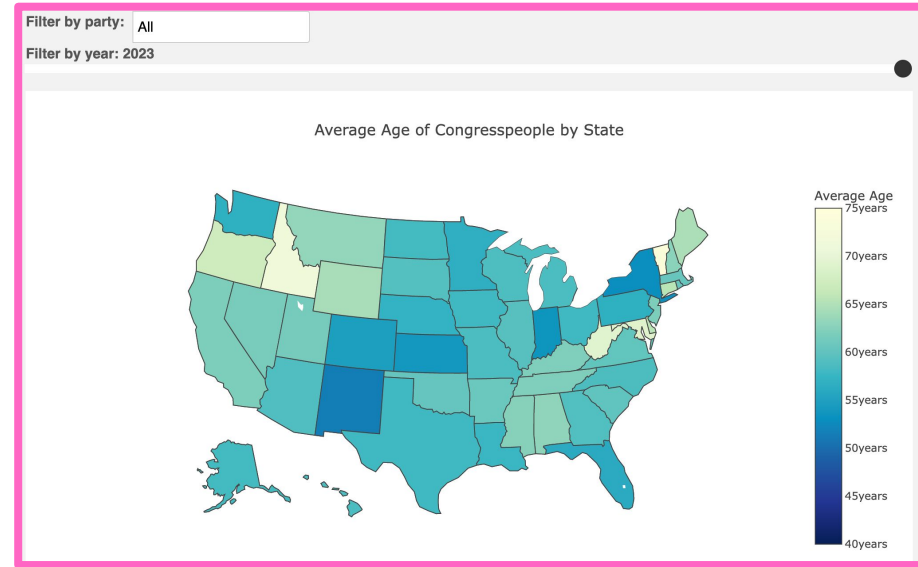
- What policy areas have not been addressed lately that you believe should be?
 - Many other members will introduce bills about taxes, the military, etc
 - What about native americans? Environmental protection?
- What legislation should I introduce?

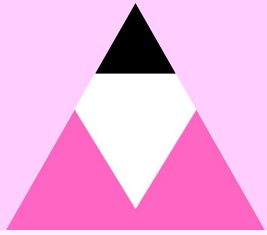




Use Cases: Local Politicians

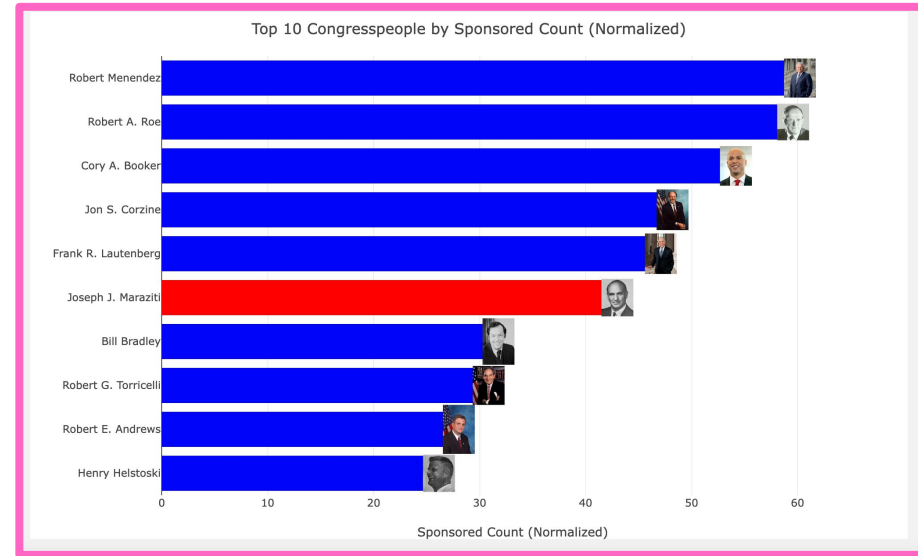
- If I am 25 years old and am aspiring to be a congress member, where should I try to run for office?
 - Which state tends to elect younger politicians to congress?
 - Which state has such old politicians that they will soon need to elect new ones?

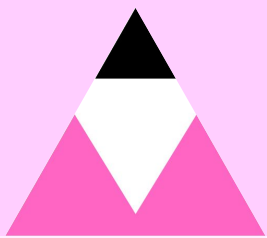




Use Cases: Voters

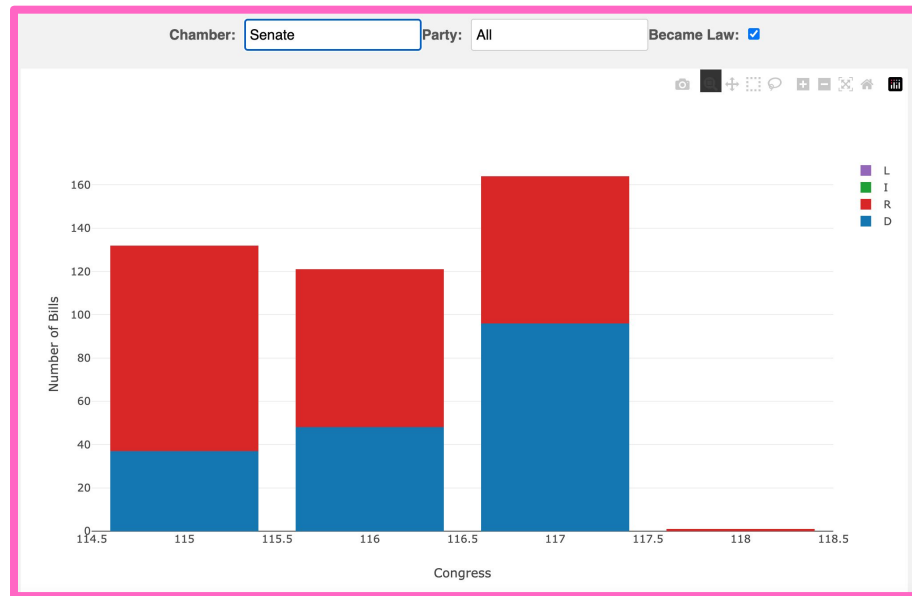
- Has your congressperson been doing anything?
 - Do they sit back and let others do the work?
 - Do they work well with others?
- Should you re elect them?

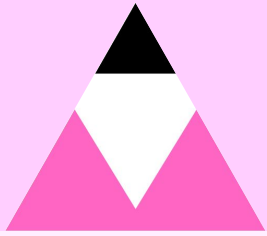




Use Cases: Political Scientists

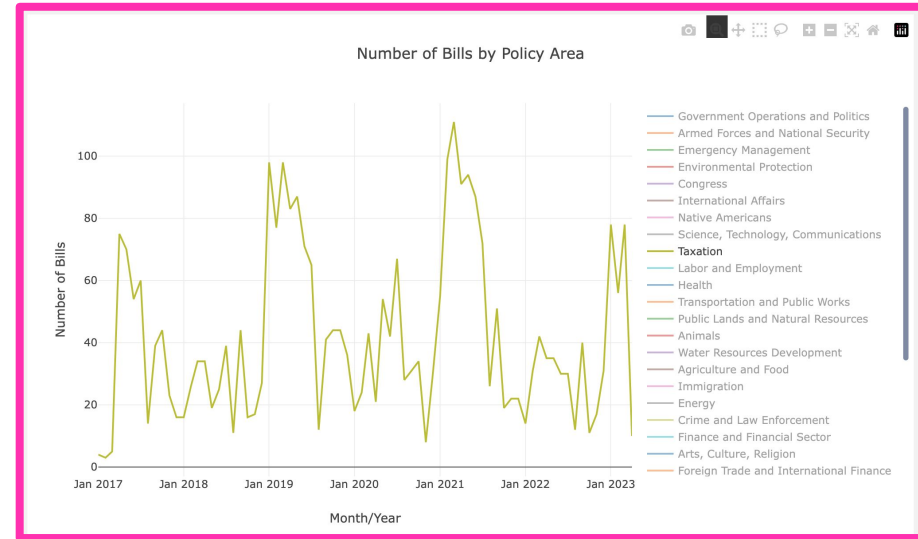
- How has the inner-workings of congress changed over time?
 - Do they still get things done?
 - Whether or not they do, how does party affiliation affect this?
- Does it matter who the president is?

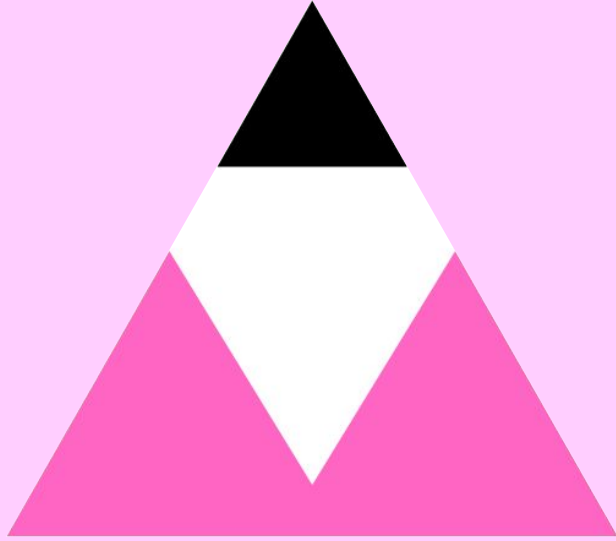




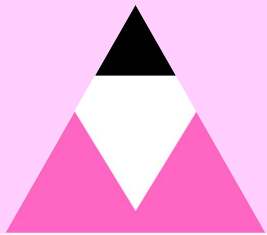
Interesting Findings

- Average Age of Congress has increased over time
 - Term lengths increased
- Democrats tend to cosponsor more legislation than Republicans
- In split congress, party NOT of president passes more laws
- Tax bills tend to spike closer to tax season





DEMO



References

- <https://api.congress.gov/>
- <https://www.wikipedia.org/>
- <https://plotly.com/javascript/react/>
- <https://flask.palletsprojects.com/en/2.3.x/>
- <https://react.dev/>