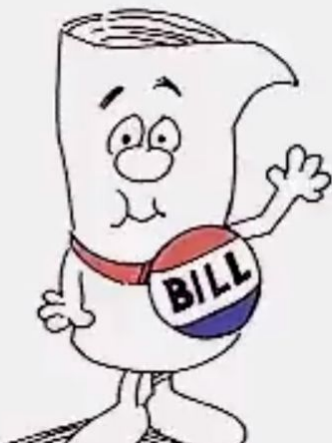


# State Bill Prediction

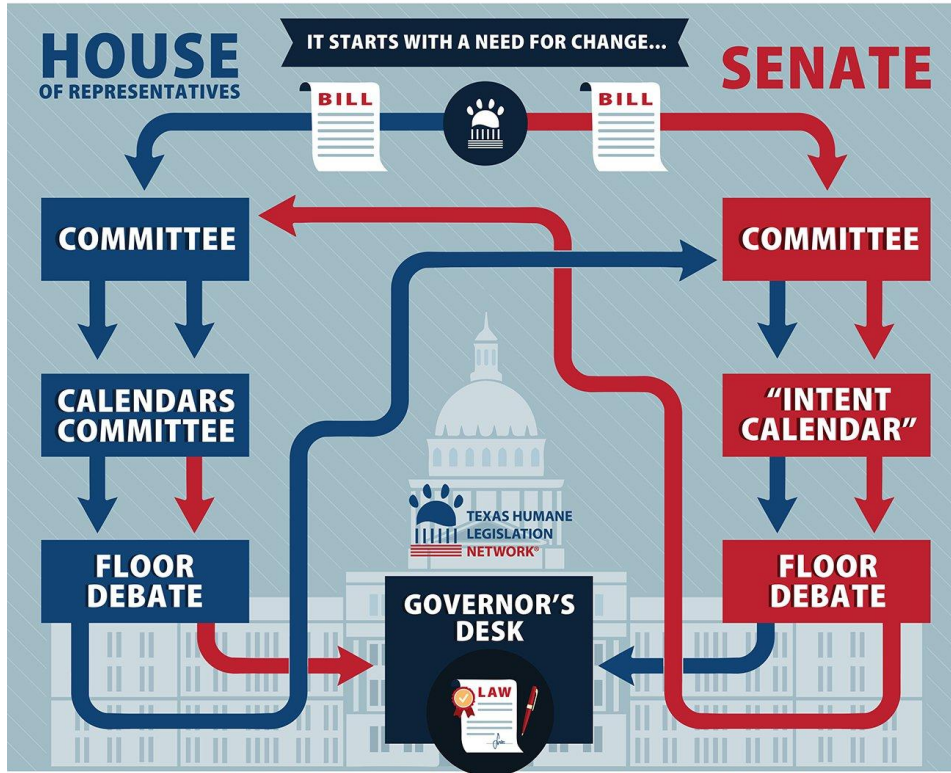


A machine learning study in predicting the outcome of state bills.

By Lucas Ogilvie

# The Journey of a State Bill

## HOW A BILL BECOMES A LAW IN TEXAS



[THLN.ORG/LEGISLATION\\_BASICS](https://thln.org/legislation_basics)

Image from the [Texas Humane Legislation Network](https://thln.org/)

# Goal of this study

Can we predict the outcome of a state bill using:

- 1) The title of the bill
- 2) Majority party for both houses and governor

Bill title

S-0676.1	SENATE BILL 5461	
State of Washington	68th Legislature	2023 Regular Session
By Senators Fortunato and J. Wilson		
1 AN ACT Relating to requiring the removal of graffiti on		
2 department of transportation property; adding a new section to		
3 chapter 9A.48 RCW; and making an appropriation.		
4 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:		
5 <u>NEW SECTION.</u> Sec. 1. A new section is added to chapter 9A.48		
6 RCW to read as follows:		
7 When any person is found guilty of violating RCW 9A.48.090 or		
8 9A.48.105 committed against property owned by the state of Washington		
9 under the jurisdiction of the department of transportation, the court		
10 must order a mandatory 30-day period of community restitution to		
11 require the removal of graffiti from the building, structure, or		
12 property where the offense was committed, unless the court finds that		
13 such an order is not practical. The community restitution must be		
14 imposed consecutively to any other community restitution the court		
15 imposes for the offense.		
16 <u>NEW SECTION.</u> Sec. 2. The sum of \$10,000,000 is appropriated for		
17 the fiscal biennium ending June 30, 2025, from the general fund to		
18 the department of transportation to:		

# Data Overview

## 1) Sources:

- a) Open States
- b) National Conference of State Legislatures
- c) Harvard Dataverse, published by Dr. Garlick

## 2) Content of data:

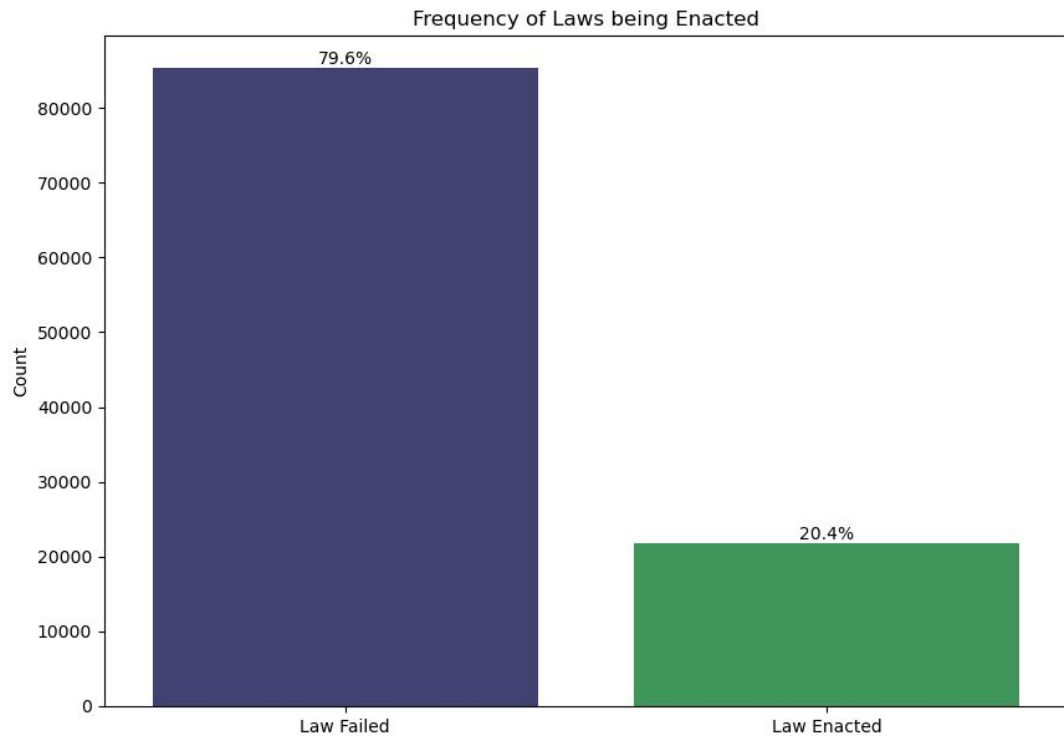
- a) Title of Bill
- b) Party features: (e.g. Republican Governor)
- c) Outcome of bill

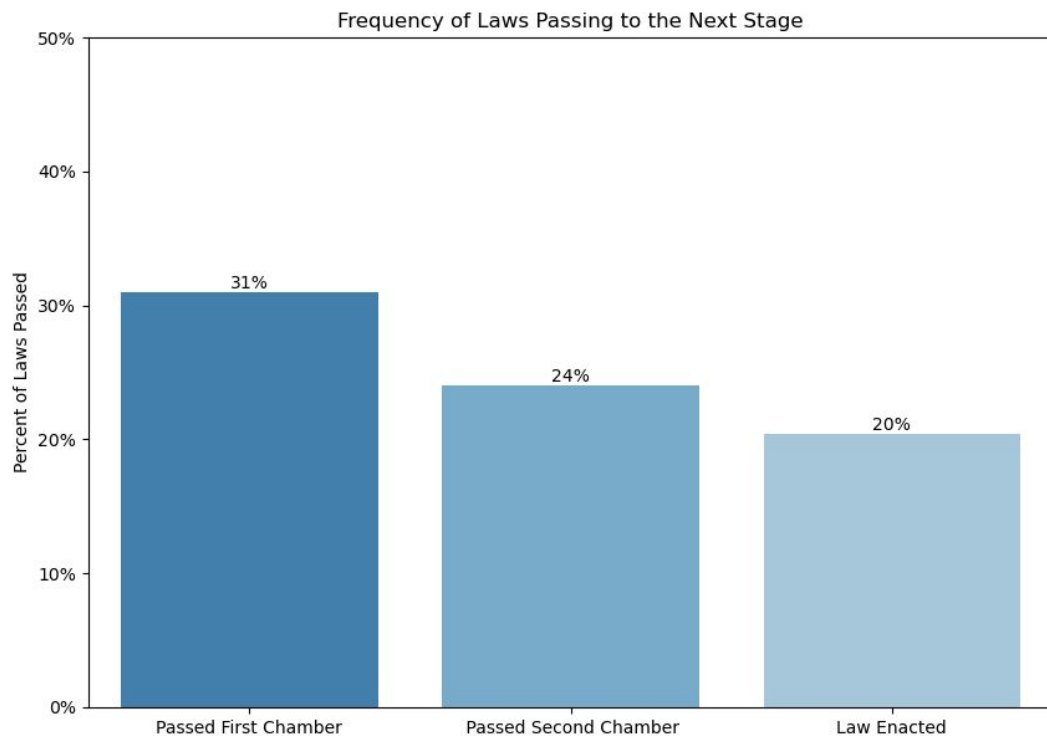
## 3) Size:

- a) 110,000 bills from 2017 and 2018

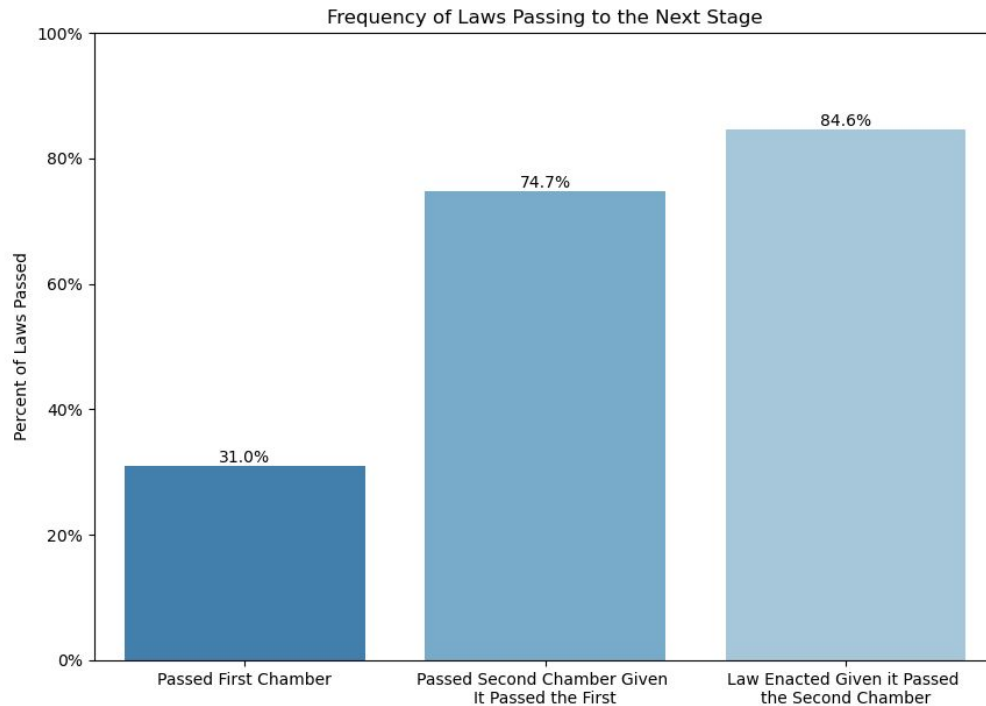


# Imbalanced Data



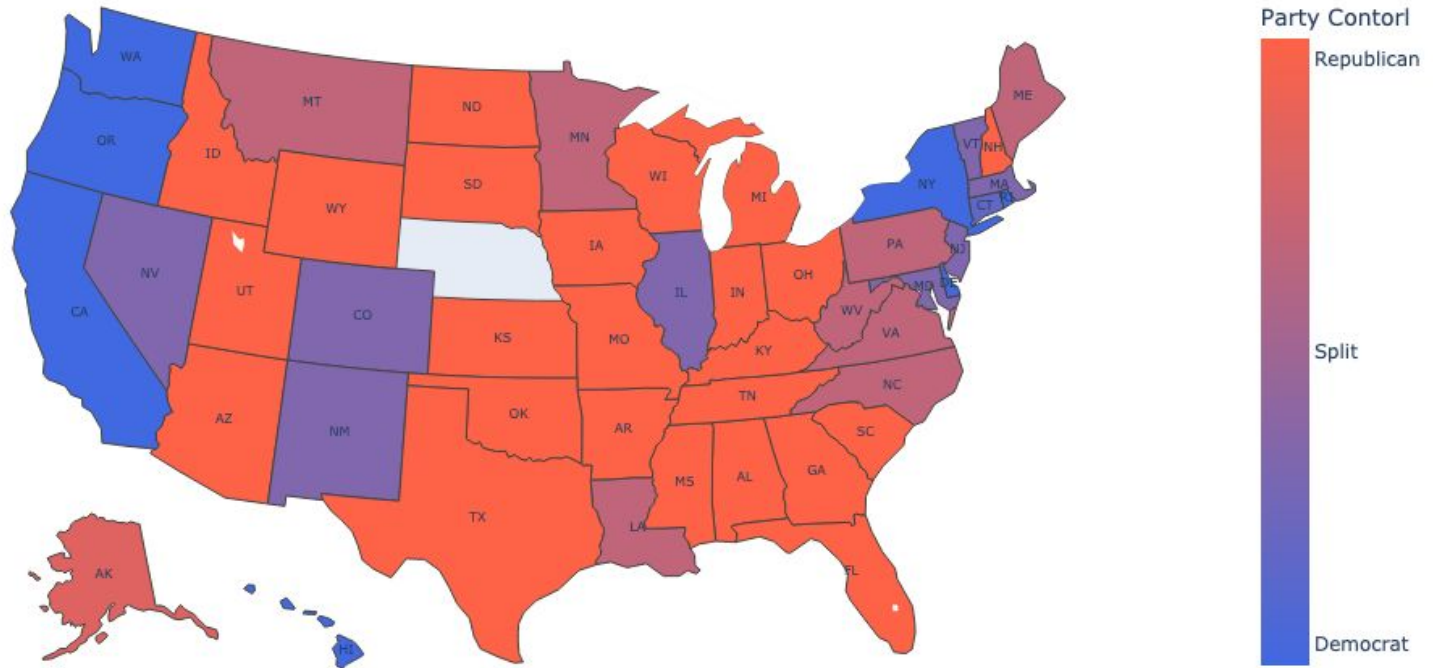


**Bills are  
scrutinized at  
each step**



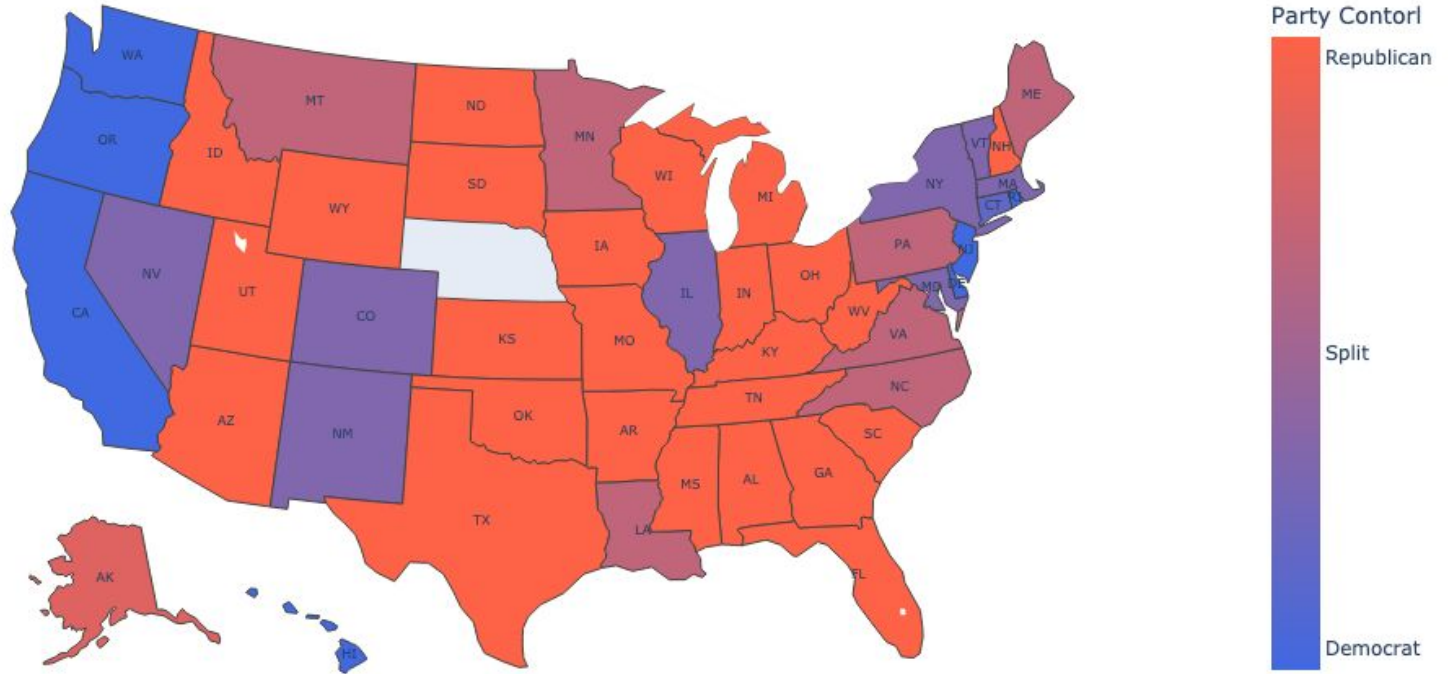
**The hardest chamber to pass is the one the bill was introduced in.**

## State Party Control 2017

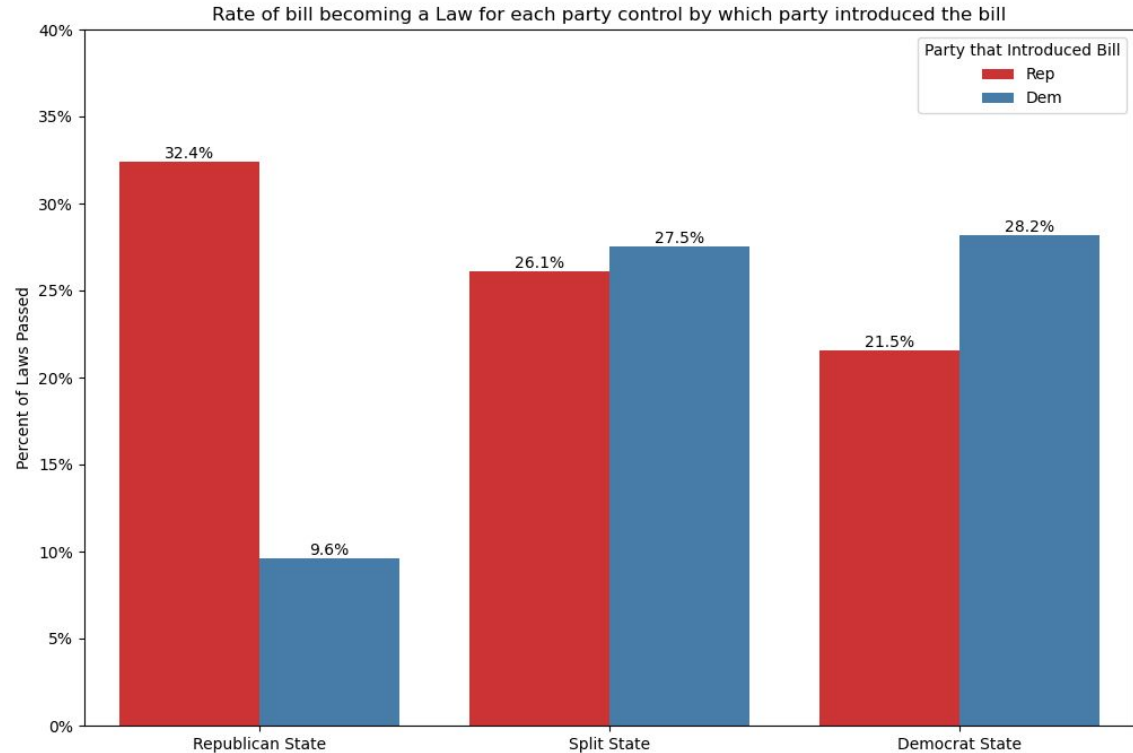




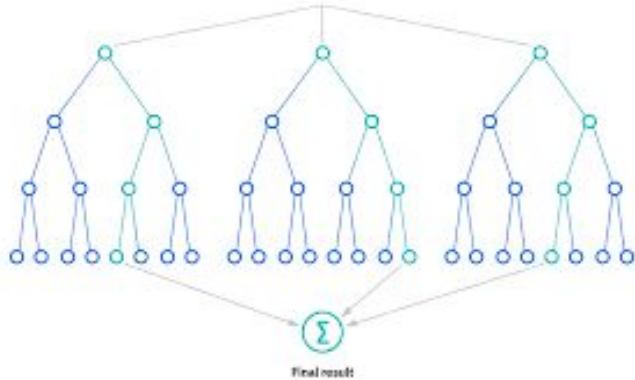
## State Party Control 2018



Partisanship  
plays a role in  
the outcome of  
bills.



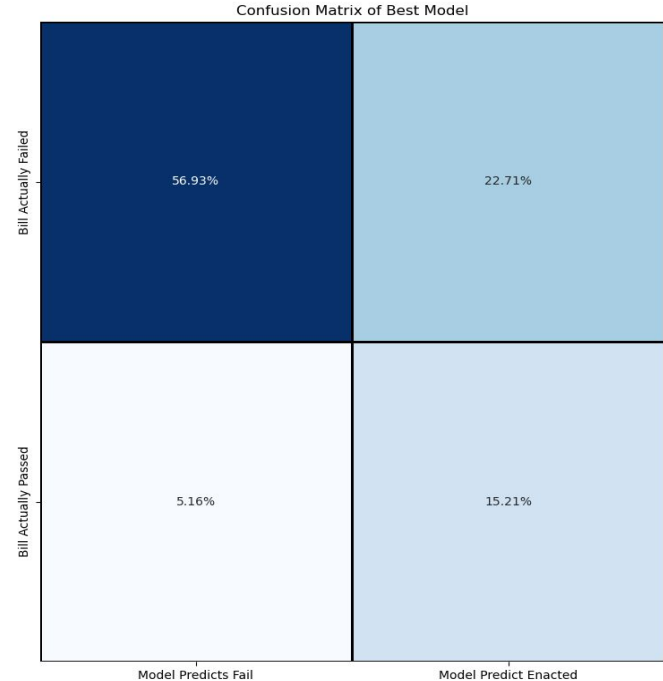
# Modeling



- The title of the bills were processed
  - Count Vectorize
- A Random Forest Classifier model was used to make predictions

# Model Performance

- Accuracy of 72%
- 75% of passed bills were correctly identified
- When the model predicted the bill would not pass, it was correct 91% of the time
- When the model predicted the bill would pass, it was correct 40% of the time



# App

## State Bill Prediction

### About the Model

This model uses the title of the bill, the majority party of the state's congressional houses, the governor's party, and whether a state's houses and governor parties are aligned or not to predict if the bill will pass or not. This model was trained on 80,000 pieces of legislation and tested on 27,000 bills from the years 2017 and 2018. On the test set, the model was able to predict 75% of the bills that passed. This is impressive as only 20% of state bills are enacted into law. When the model predicted the bill would not pass, it was correct 92% of the time. When the model predicted the bill would pass though, it was only correct 40% of the time.

A major limitation of this model is that this model's ability to interpret language is limited. For example, it is difficult for the model to differentiate between phrases like "raise taxes" compared to "decrease taxes".

### Model Prediction

Copy and paste the state bill title.

0/1000

What state is the bill being introduced in?

Alabama

Predict Bill Outcome



## Model Prediction

Copy and paste the state bill title.

Requiring the removal of graffiti on department of transportation property.

75/1000

What state is the bill being introduced in?

Washington

Predict Bill Outcome

The model predicts that the bill will pass

# Conclusion



- This model shows that predicting outcomes of bills is possible
- The model can be improved on
  - Using bill abstracts instead of titles
  - Different modeling techniques: (BERT)