Partisan Bias in the US Federal Court System

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INTRODUCTION & OBJECTIVE

UNITED STATES COURTS

Free Law Project

How **partisan** is the US court system?

There is increasing public acknowledgement that the judiciary, especially the US Supreme Court, is susceptible to **partisan influence**, and that such influence can affect **court outcomes**. However, data for lower courts, which make up the vast majority of the US legal system, is harder to study.

This project leverages NLP techniques to predict the **partisan direction** (liberal or conservative) and the general **topic area** of **lower federal court decisions** based on the text of their formal delivered opinions. To address the question of lower court partisan influence, these predictions are aggregated to the judge level to examine how the partisanship of individual judges and topics changes over time.

DATA & METRICS

CourtListener is an open-source research website that consolidates all US federal court data.

Features:
Opinion text: Documents from Supreme Court (~28K records) and lower courts (~9M records)
Metadata: Information on judges and dockets for lower court analysis

The Supreme Court Database (SCDB) provides more comprehensive metadata on US Supreme Court cases from 1791 to 2021.

Features:
Decision direction: Codes the partisan stance of Supreme Court decisions as liberal or conservative
Topic area: Categorized into broader topics, such as Criminal Procedure, Civil Rights, First Amendment, and more

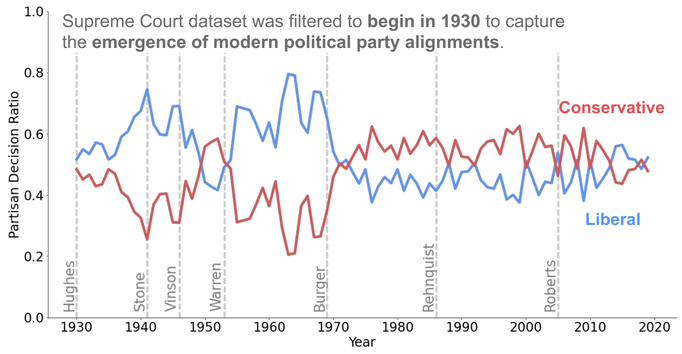

Figure 1. Supreme Court liberal and conservative decision ratio over time and active Chief Justice

Accuracy
Fraction of correct partisan direction or topic area predictions out of all predictions

AUC
How well the model can distinguish between liberal and conservative decision directions

Calibration
Alignment of the model's predicted partisan directions with the true likelihood of labels

RELATED WORK

2019 - Employed a simplified neural structure with Doc2Vec and Bi-LSTM RNN for legal document classification *(Wan et al.)*

2020 - Achieved optimal outcomes by combining domain-specific Word2Vec and an LSTM RNN for classifying eighteen legal categories *(Noguti et al.)*

2022 - Improved performance on multi-label classification tasks using domain-specific pre-training over fine-tuning OOB language models *(Song et al.)*

METHODOLOGY

Summarization Model

Long-T5 Handles long input sequences for text summarization

Classification Models Tested

Bi-LSTM RNN Bi-Directional Long Short-Term Memory Recurrent Neural Network

BERT Bi-Directional Encoder Representations from Transformers

★**LEGAL-BERT** Pre-trained on data from the legal domain

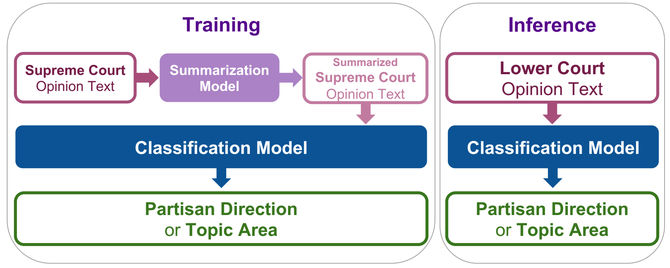

Figure 2. Training and inference model architecture

RESULTS

Partisan Direction

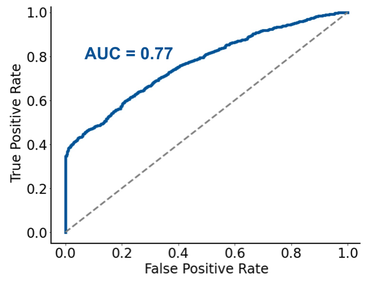

Figure 3. LEGAL-BERT ROC curve

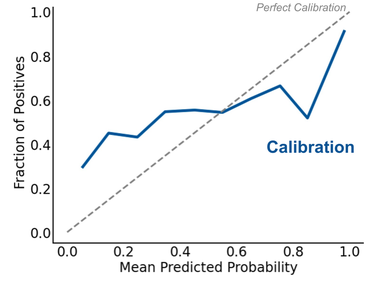

Figure 4. LEGAL-BERT calibration curve

The optimal model for **partisan direction** and **topic area** classification is **LEGAL-BERT**, attaining **accuracies** of **67.9%** and **78.7%**, respectively, on the Supreme Court decision text test set, along with a partisan direction classification **AUC** of **0.77**. The calibration of the partisan direction classification model is depicted above, indicating that the **LEGAL-BERT** model is not only more accurate and proficient in distinguishing between classes compared to other models, but also exhibits a fair level of calibration.

Topic Area

Table 1. LEGAL-BERT accuracy by topic and sample size in test set, colored by predicted top 5 shares in inference set

Topic Area	Accuracy	*Sample Size*
Unions	**88.6%**	*105*
Federal Taxation	**88.4%**	*147*
Criminal Procedure	**88.2%**	*604*
Economic Activity	**82.4%**	*512*
First Amendment	**82.0%**	*244*
Civil Rights	**80.8%**	*416*
Privacy	**76.5%**	*34*
Attorneys	**69.7%**	*33*
Judicial Power	**64.7%**	*295*
Due Process	**50.0%**	*112*
Federalism	**45.9%**	*111*
Miscellaneous	**0.0%**	*4*
Private Action	**0.0%**	*1*

LEGAL-BERT is similarly accurate on topics with varied sample sizes in the test set.

APPLICATION ON LOWER COURTS

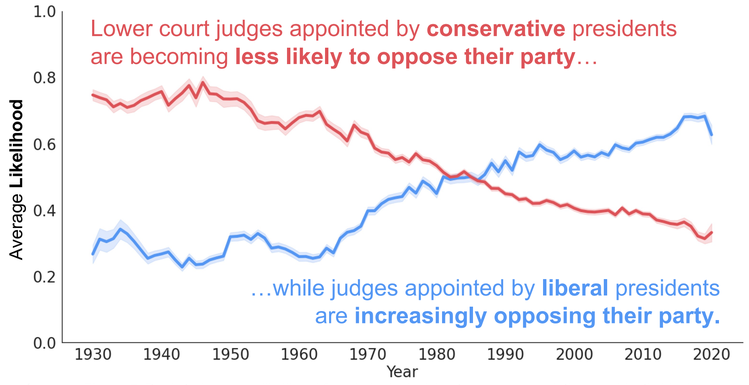

Figure 5. Predicted average likelihood for a judge's decision to oppose appointing president's ideology

Using **LEGAL-BERT**, inference on partisan direction and topic area was performed on all authored lower court opinions in the CourtListener database to examine judge partisanship and opinion topic area over time. The results focus on likelihood of a judge's opinion to oppose their appointing president's partisanship as well as the ratio of liberal decisions aggregated over all judges and stratified across appointing presidents' partisanship and topic area.

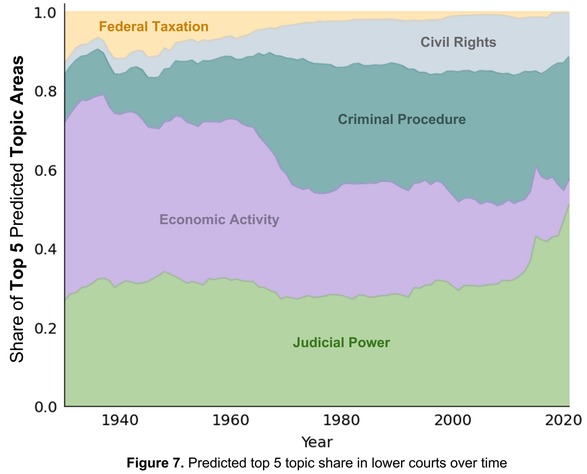

Figure 7. Predicted top 5 topic share in lower courts over time

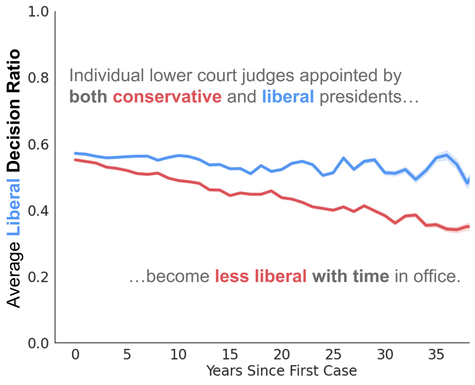

Figure 6. Predicted average liberal decision ratio over a judge's term

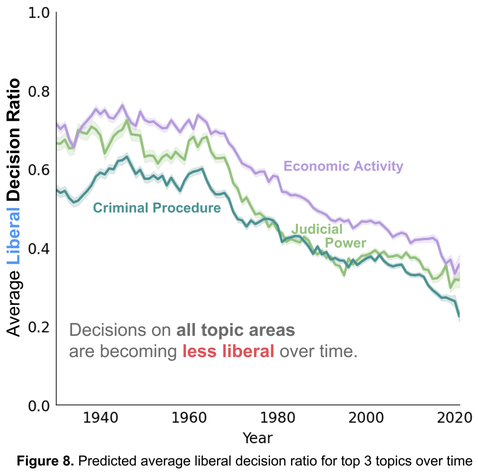

Figure 8. Predicted average liberal decision ratio for top 3 topics over time

CONCLUSIONS

LEGAL-BERT has the best performance on partisan direction and topic area classification, while being fairly calibrated.

Model predictions imply a shift over time towards more conservative decision making in the lower federal courts.

Caveats:

- Legal documents are lengthy, and they include more intricate semantic relationships.
- Capturing or defining partisan direction may involve more complexity and ambiguity than dealing with a specific topic area.
- Lack of completeness of data for the lower courts and assumption of comparable data distributions between the lower courts and the Supreme Court makes inference challenging to interpret.

This project is a valuable first attempt at extracting coveted lower court metadata - especially within topic area - to discern trends in judicial partisanship and topics over time and serves as a strong foundation for future work.

FUTURE WORK

- Explore larger and higher capacity LLMs designed for text generation (Llama, GPT) to perform classification tasks
- Assess partisanship along a spectrum rather than using fixed labels, potentially defined by Supreme Court vote splits
- Utilize SHAP to generate explanations for model predictions
- Incorporate Latent Dirichlet Allocation (LDA) for topic modeling

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