Introduction & Objectives

• **Motivation**: debate on the effect of polarization at the policy level.
• **Data**: U.S. federal bill preamble texts from 1973 to 2018.
• **Task**: Predict bill sponsor’s party affiliation from bill preamble texts.
• **Methods**: various embedding and classification methods from previous research and a novel neural network model. *(CNN-LSTM with character-based Encoder Decoder Embedding).*
• **Transfer learning**: application of model to classify ideological sentences.

Data Sample

• **Bill Preamble Text**
  - **Democrat** [*S.Res.526-115*]: “A resolution expressing the sense of the Senate that politicians should not interfere with a woman’s personal health care decisions or attempt to prevent providers from offering their full medical recommendations to their patients”
  - **Republican** [*S.2311-115*]: “A bill to amend title 18, United States Code, to protect pain-capped unborn children and for other purposes.”
• **Ideological Book Corpus (Transfer learning)**
  - **Liberal**: “…laws that prevented women who were pregnant as a result of rape or incest from getting abortions.”
  - **Conservative**: “This disturbing effect of partial-birth abortion on medical personnel … justifies the prohibition.”

Approach

1) **Baseline (9 total)**
   - Embedding: Bag of Words(BOW), Word2Vec(W2V), Character2Vec(C2V).
   - Classification: Logistic Regression(LR), Convolutional Neural Network(CNN), Long Short-Term Memory(LSTM).

2) **Main Model**
   - Embedding: character-embedding method at the word level(W2C2V).
   - Classification: extract important features and capture long-term dependencies(CNN-LSTM).

Results, Analysis, and Conclusion

1) **Model Performance -- Prediction Accuracy**: LSTM with W2V outperforms other methods. The best LSTM model (i.e., tuned) yields the accuracy of **0.714**.

2) **Political Analysis**

3) **Transfer Learning**
   - A single-layer LSTM model classifies ideological book corpus sentences with **57%** accuracy.

4) **Conclusion**: LSTM performs best; a weak/positive correlation with polarization; a moderate degree of transferability.

Selected References