Predictions of Supreme Court Justice Votes from Oral Arguments

Sam Coogan and Lillian Ratliff

May 8, 2013
Background

- In each Supreme Court case, 1 hour for oral arguments: 30 mins for each side
- In theory, they are gathering information, but...
  - Justice ask a lot of questions and make comments
  - Often may have made their decision (political lean, already read briefs, etc.)

**Question:** Can we predict votes of individual Justices by using text from their comments and questions during the oral arguments? Yes, with case outcome $F_1$ above 90%
Data Source

- Supreme Court transcripts from at least 1979 ([oyez.org](http://oyez.org) from Chicago-Kent School of Law)
- Gathered transcripts from 3,524 cases
- Obtained Justice vote counts for the cases from [scdb.wustl.edu](http://scdb.wustl.edu) which is the Supreme Court database hosted by Washington University, St. Louis.
Divide each case into *petitioner document* and *respondent document*.

- Tokenize Justices separately, \( \approx 78k \) tokens per Justice
- Used logistic regression to train model
- For testing, we used a 10-fold cross validation
- To predict case outcome, compare score of petitioner and respondent
Results

**Figure**: ROC Curves for each of the three of the nine Justices, along with values for area-under-the-curve (AUC) and the $F_1$ score. Data is from a 10-fold cross validation.
Figure: ROC curve for the 106 cases in which all nine current Justices have ruled. We predict the final case outcome by determining the predicted vote for each of the nine justices and consider the winning party to be the party that receives at least five votes.
Relative Predictive Weights

Figure: For each Justice, we consider the 1000 most predictive tokens and calculate the fraction from each of the Justices. The labels also indicate the average scaled weight of these tokens. Positive weights increase the likelihood of a vote in favor of the arguing party, while negative weights decrease the likelihood.
Predictions

Figure: Predictions for two high profile supreme court cases whose rulings are imminent. Our methodology allows us to place the Justices on a scale, expressing our confidence in the prediction.
**Prediction on a Recent Decision**

**Figure**: Prediction for a case decided earlier this year. The vote was 9-0 in favor of the petitioner. Our prediction was precisely this outcome.
Summary

- Predict votes of Supreme Court Justices using Justices’ comments and questions gathered from the oral arguments of 3,524 cases.

Lessons Learned:
- Predicting case outcomes is best accomplished by predicting each Justice’s vote.
- Prediction is dramatically improved by tokenizing Justice’s separately.