Milestone 5

Diego Arias

4/3/2020

Contents

1 Overview of Replication Paper

In their paper, "Emotional Arousal Predicts Voting on the U.S. Supreme Court", Dietrich and colleagues study over 3,000 hours of Supreme Court audio recordings to try to assess if judges implicitly reveal their leanings during the oral arguments.[1] The predictor in their analysis is "Pitch Difference", which was calculated by subtracting the judges' vocal pitches in questions directed to the respondents by their pitches in questions directed to the respondents. It is important to note that the judges' vocal pitch at different instances was quantified in the number of standard deviations above or below his/her average vocal pitch in the trial. The outcome variable is the judge's final vote (more specifically if he votes in favor of the petitioner (1) or against (0).

In their effort to find study the effect of vocal pitch on voting, the authors use a multilevel logistic regression model that uses pitch difference as a predictor for voting behavior. Ultimately, the authors find that the more emotionally aroused a justice's questions are at an attorney compared to his/her opponent, the less likely that attorney is to win the Justice's vote. Interestingly, the model goes on to show that if the vocal pitch of the questions directed to both the petitioner and respondents is the same, the probability of a justice voting for a petitioner is .55. The model goes on to show the effect of vocal pitch because if the difference between the pitches of questions directed to the petitioner is one standard deviation higher than that related to the respondent (meaning the judge is more emotionally aroused) the probability of a justice voting for a petitioner drops to .48.

This multilevel logistic regression model ends up predicting 57.5% of the judge's votes accurately and 66.55% of overall case outcomes accurately, which is incredible judging how the model just uses one implicit measure to predict something as complicated as voting behavior. To put this in perspective, the authors of the study compared their model to a widely known one called {Marshall}+, which uses 95 predictors and successfully predicts 64.76% of Supreme Court Cases.

This project will aim to replicate the aforementioned logistic regression model (and others included to answer secondary questions in the study). It will also take the analysis a step further by providing a new avenue to analyze the already collected data.

---

[1] Please refer to the Github repository of my final project for further information., Github repository I make use of Xie (2019) and Wickham (2019)

2 Beautiful? Graphic

Looking at Relationship Between Pitch Difference and a Judge's Vote
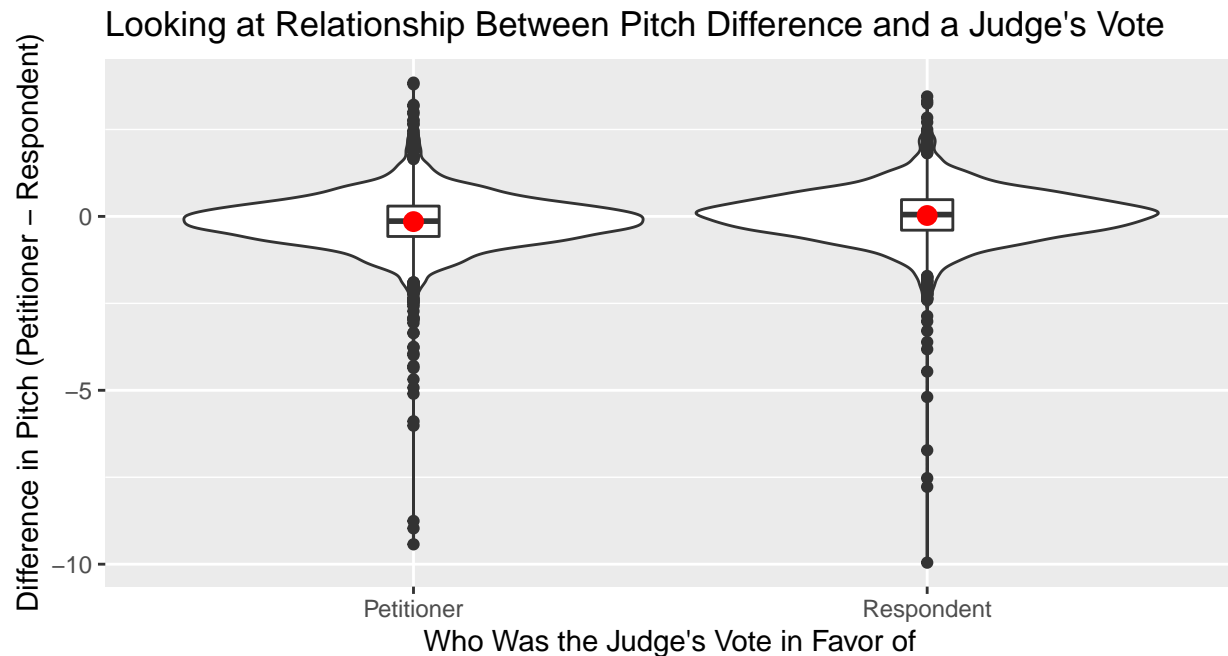
While hard to see in the boxplot, judges who vote in favor of the petitioner will average have have a more negative difference in pitch(which is measured as the pitch toward the petitioner minus the pitch toward the respondant) compared to judges who vote infavor of the respondant

Data from Dietrich et al. (2011)

3 Appendix

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
## Formula: petitioner_vote ~ pitch_diff + (1 | justiceName)
##    Data: sc
##
##      AIC      BIC   logLik deviance df.resid
##   7109.4   7129.1  -3551.7   7103.4     5206
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.0233 -1.0556  0.7648  0.9101  1.6206
##
## Random effects:
##  Groups      Name        Variance Std.Dev.
##  justiceName (Intercept) 0.02598  0.1612
## Number of obs: 5209, groups:  justiceName, 18
##
## Fixed effects:
##              Estimate Std. Error z value Pr(>|z|)
```

```
## (Intercept)  0.17811    0.05469   3.256  0.00113 **
## pitch_diff  -0.26596    0.03617  -7.354 1.93e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##            (Intr)
## pitch_diff 0.043
```

4 References

Dietrich, Bryce J., Ryan D. Enos, and Maya Sen. "Emotional arousal predicts voting on the US supreme court." Political Analysis 27.2 (2019): 237-243

Miller, Gerald R., et al. "The effects of videotape testimony in jury trials: Studies on juror decision making, information retention, and emotional arousal." BYU L. Rev. (1975): 331.

Oliver, Edward, and William Griffitt. "Emotional arousal and 'objective'judgment." Bulletin of the Psychonomic Society 8.5 (1976): 399-400

Wickham, Hadley. 2019. *Stringr: Simple, Consistent Wrappers for Common String Operations*. https://CRAN.R-project.org/package=stringr.

Xie, Yihui. 2019. *Knitr: A General-Purpose Package for Dynamic Report Generation in R*. https://CRAN.R-project.org/package=knitr.