

Exploring Bias in Tweets by Members of Congress

Using Transfer Learning & TF-IDF

Mando Iwanaga
Alex Shropshire

Goal

Use transfer learning using BERT & ELMo to classify tweet text from politicians as having a democratic bias, a republican bias, or neutrality

Data Source



- 5K Tweets
- 500+ Members of Congress

, a human + machine intelligence company & data platform

Data Preparation

- Clean text (+ lemmatization)
- Annotate party affiliation for “partisan” tweets
- Merge DataFrames
- Train-Test-Split

Before Cleaning:

RT @nowthisnews: Rep. Trey Radel (R- #FL) slams...

After Cleaning:

rt nowthisnews rep trey radel r fl slams...

Transfer Learning

- **Success:**
 - **BERT:** Downloaded pre-trained BERT model weights trained on 104 languages, 768 hidden layers, and 110M parameters
- **Speedbumps:**
 - **ELMo:** Attempted to extract features from ELMo, but our method lead us to unproductively retrain ELMo from scratch

Modeling

- **Multiclass Classification:**
 - Neutral, Republican bias, Democratic bias
 - **Final Activation:** Softmax
- **Loss:** Sparse Categorical Cross Entropy
- **Optimizer:** Adam
- Incorporated Early Stopping
- Google Cloud GPU: NVIDIA Tesla T4
- **Accuracy:** 0.73
- **F-1 Score:** 0.73
- **TF-IDF Benchmark Accuracy:** 0.7558

Future Work



Kamala Harris @KamalaHarris · Jun 15

Dreamers deserve peace of mind. As president, I will take action to reinstate and expand DACA. I won't stop fighting until Dreamers are finally recognized as American citizens.

1.0K 866 4.3K



Sen. Susan Collins @SenatorCollins · May 10

As Chairman of the Transportation Appropriations Subcommittee, I know how important these investments are to enabling airports to make much-needed improvements to their taxiways and runways, enhancing the safety & efficiency of operations. collins.senate.gov/newsroom/senat...

104 20 89



Michael Bennet @MichaelBennet · 6h

The American people demand progress on health care, climate change, gun safety, inequality, and so much more. We need to fix our broken politics and pave the way for lasting change.

If you agree, join us at MichaelBennet.com/Join.

#MoneyOutPeopleIn



Jim Inhofe @JimInhofe · Mar 27

#DemsDucked the #GreenNewDeal vote. Rather than go on record for or against this radical policy, they merely voted "present" so they didn't have to face the reality that broad majorities of the American people recognize their plan to turn this country into a socialist fantasy.

49 31 154

- Test model on **new tweets**
- **Ranking:** Most Neutral & Most Biased Congressmen
- Strongest **buzzwords** for each affiliation
- More comprehensive **evaluation metrics**

Questions?

