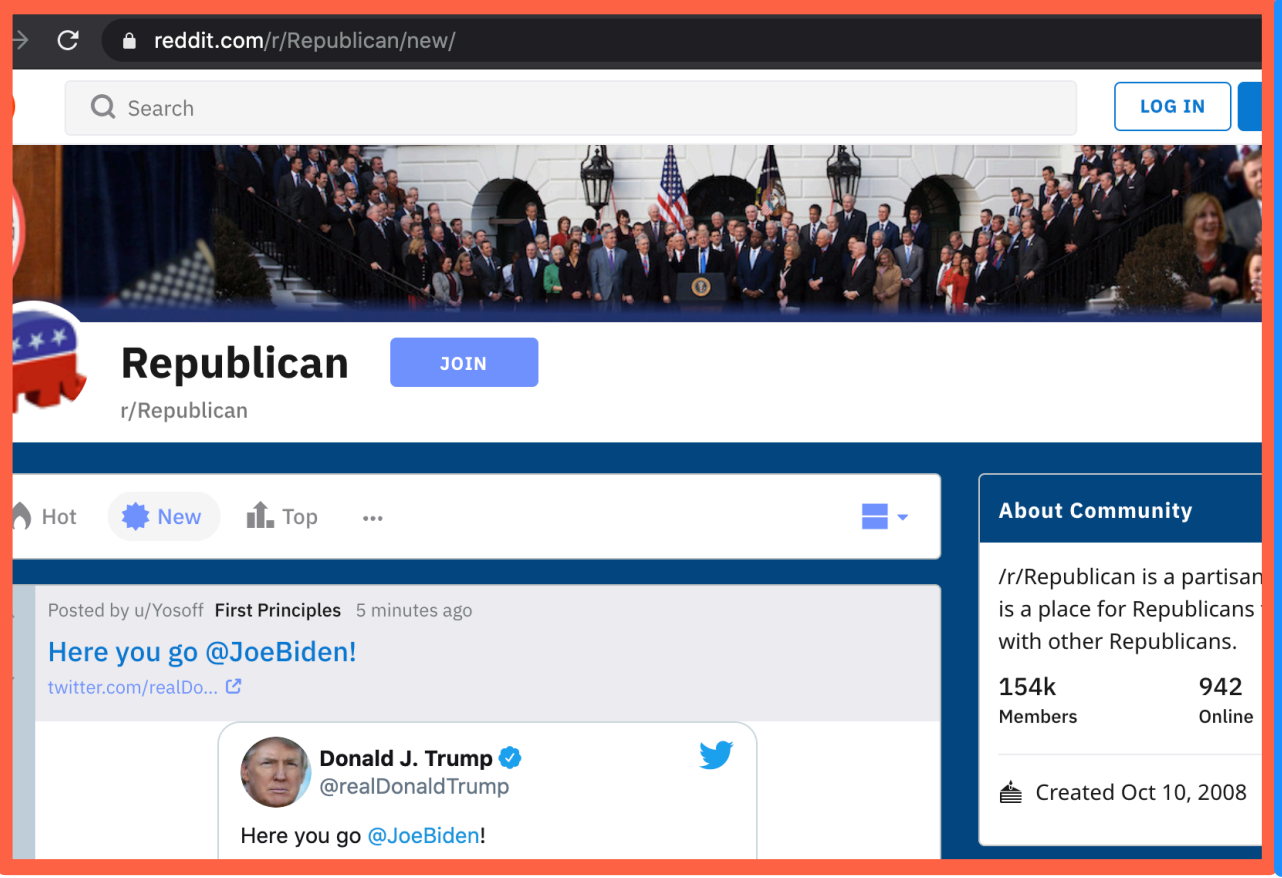
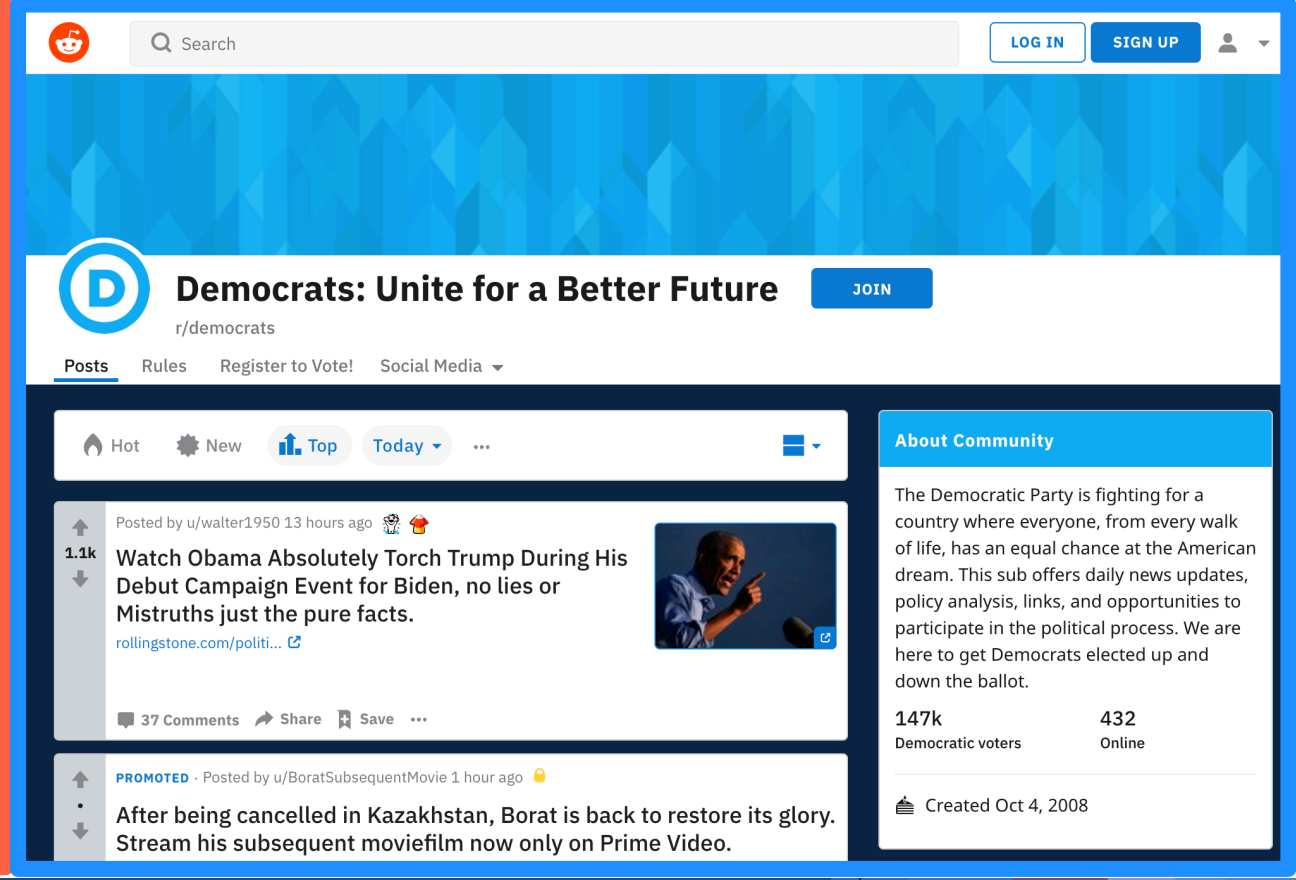
Republican
or
Democrat

Which Subreddit is it?





Background

r/Republican

154k members

Republican group with most members

90,351 submissions from last 8 years

r/democrats

146k members

Democratic group with most members

123,668 submissions from last 8 years

Two Goals:

Predict the subreddit

Understand word appearances

Common? Unique? Frequencies? Surprises?

Methodology

- Downloaded 8 yrs data from two subreddits
  - Over 90,000 submissions from each one

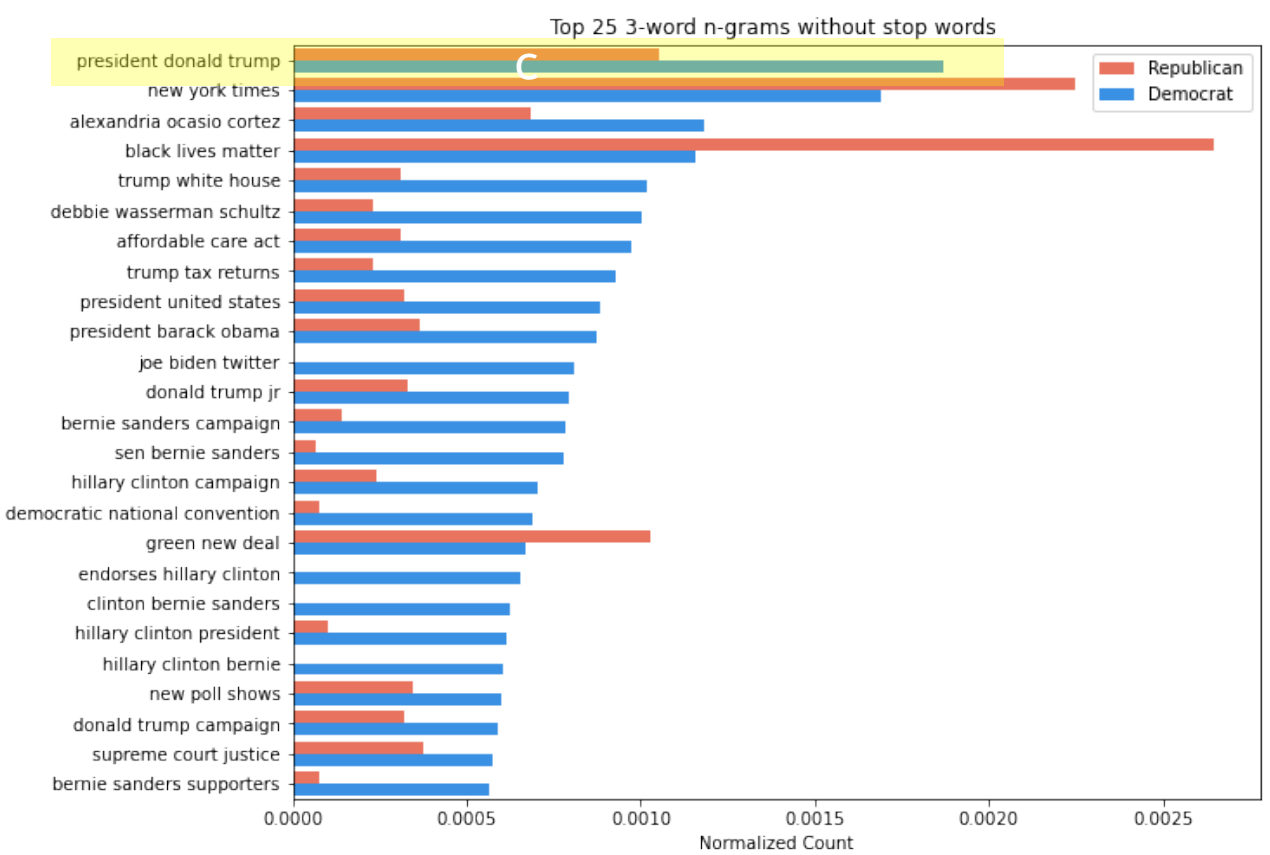
Understand Word Appearances

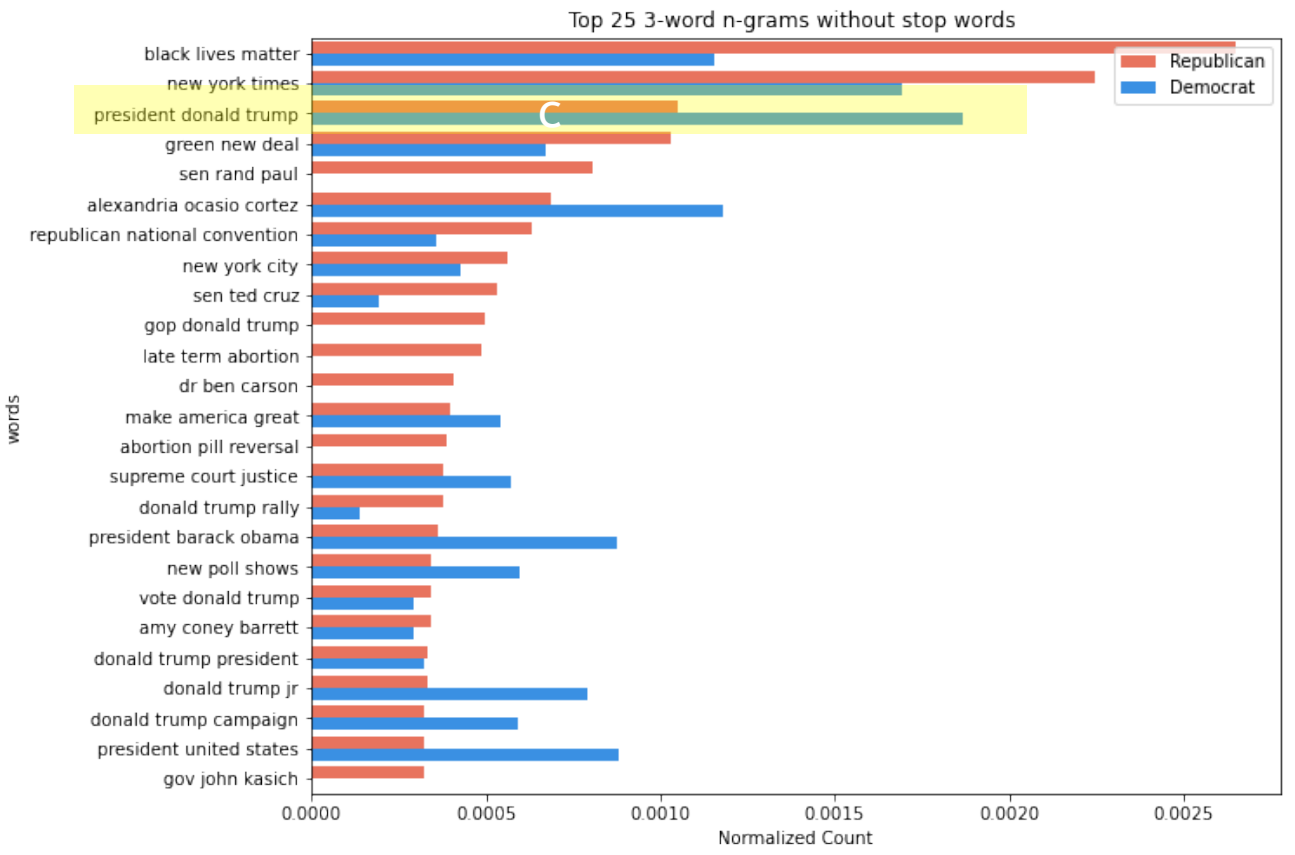
- Analyzed words in titles of submissions
  - Common, Unique, Tone
- Analyzed urls
  - Common, Frequency
- Analyzed title word count, title length

Predict the Subreddit

- Created models to predict
- Reviewed prediction results
- Reviewed predictions to see if they matched previous analysis

Understand Word Appearances





Common Words

3 n-gram words

Took top 900 for each and compared

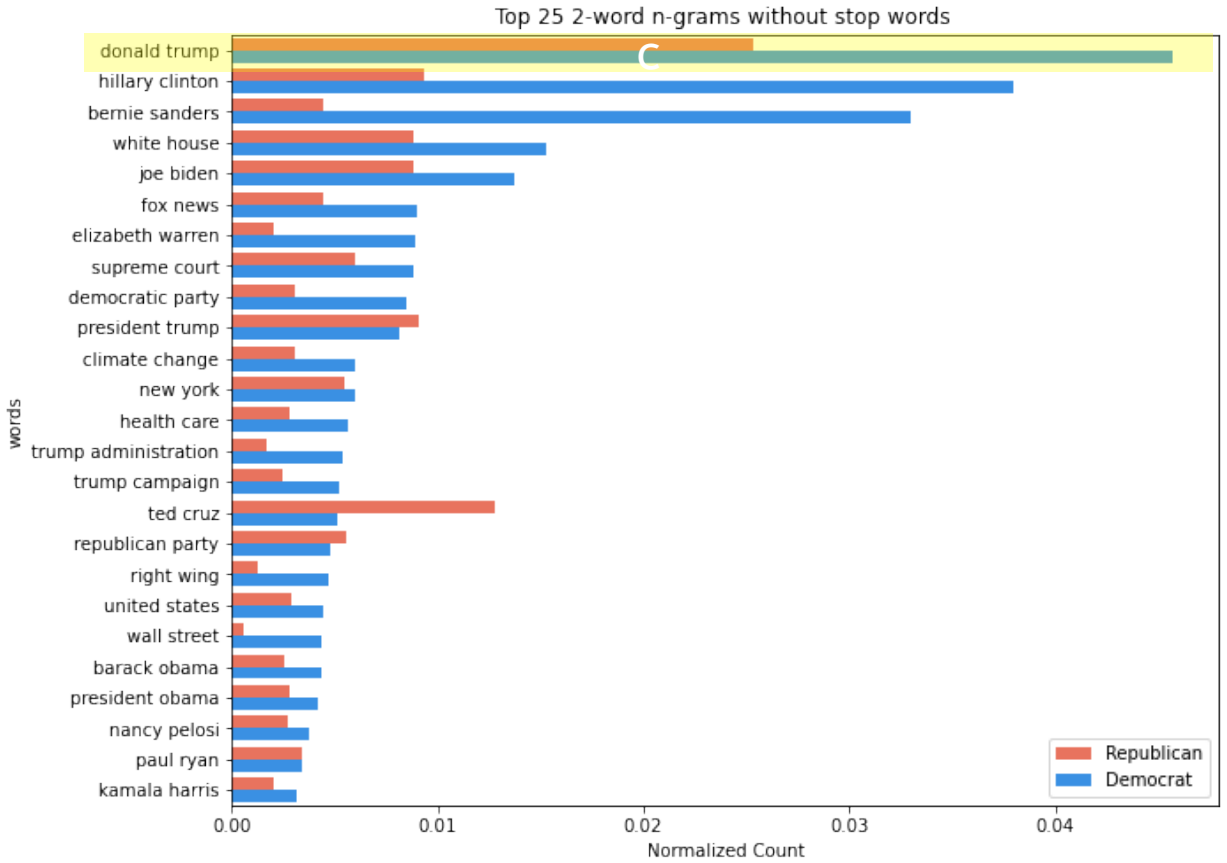
Does not include stop words

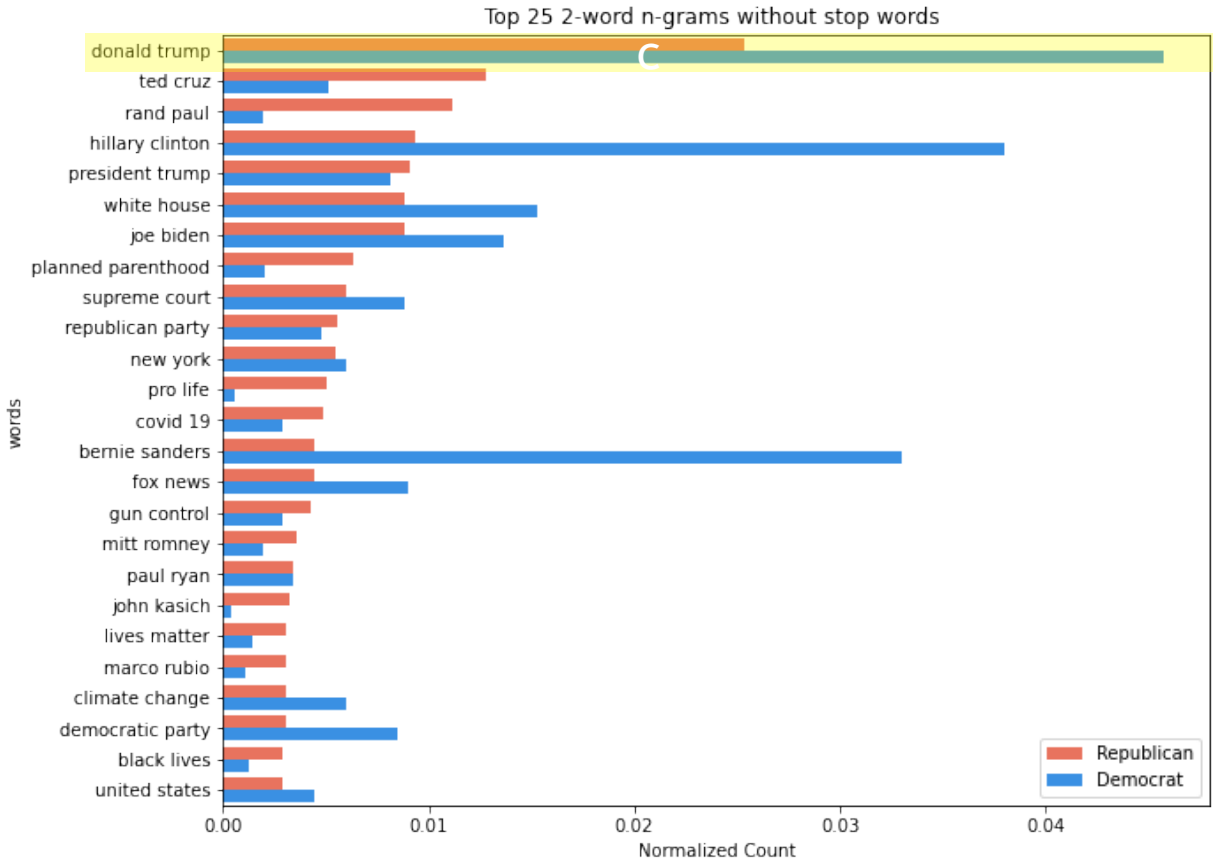
Normalized Counts

One of top words for both is president donald trump

Very dissimilar distributions - some are missing from one party

Mostly key names/causes in each party





Common Words

2 n-gram words

Took top 900 for each and compared

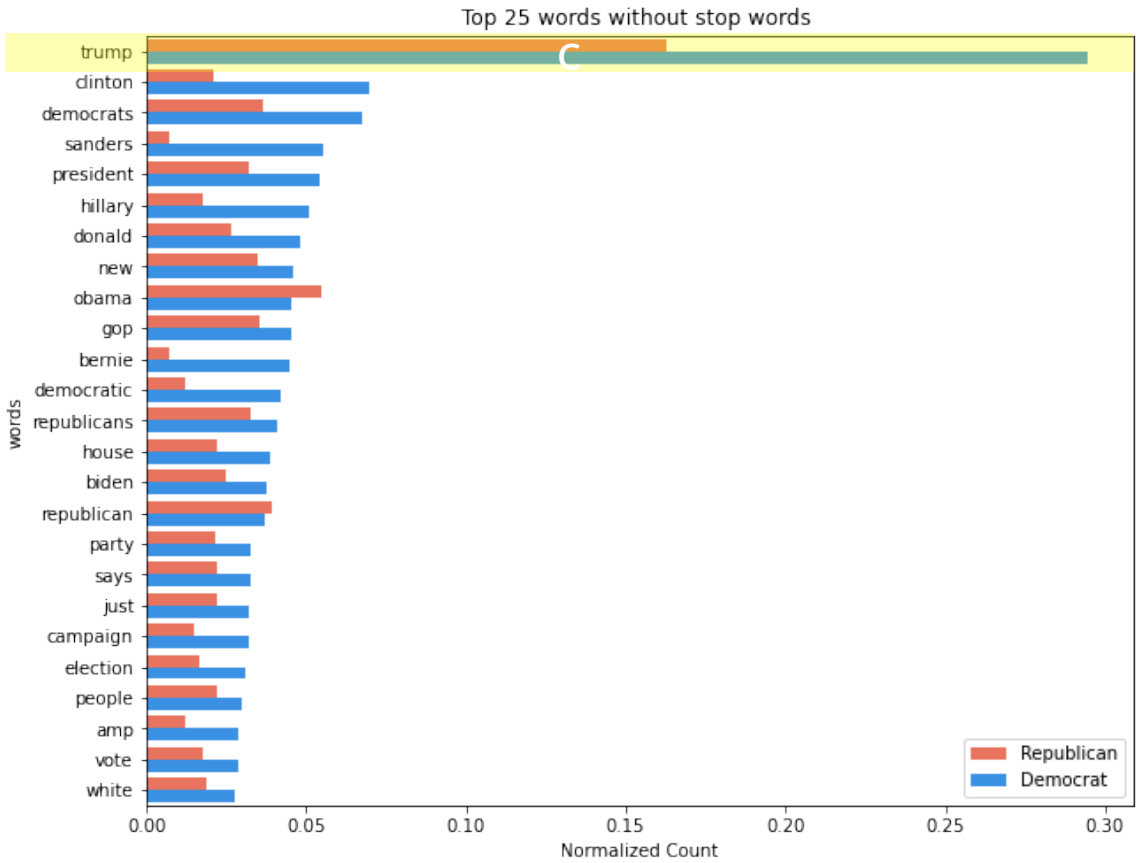
Does not include stop words

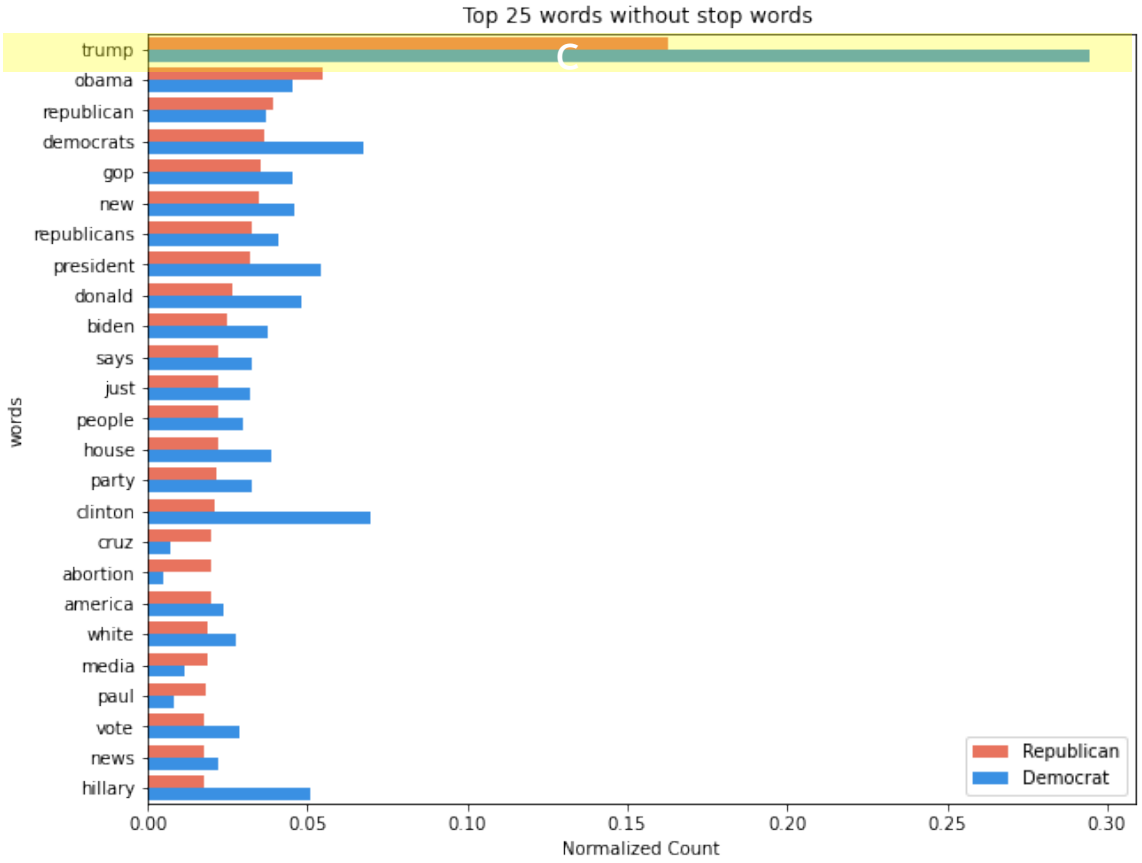
Normalized Counts

Top words for both is Donald trump, but this is disproportionately referenced by Democrat

Generally dissimilar distribution

Mostly key names in each party





Common Words

1 n-gram words

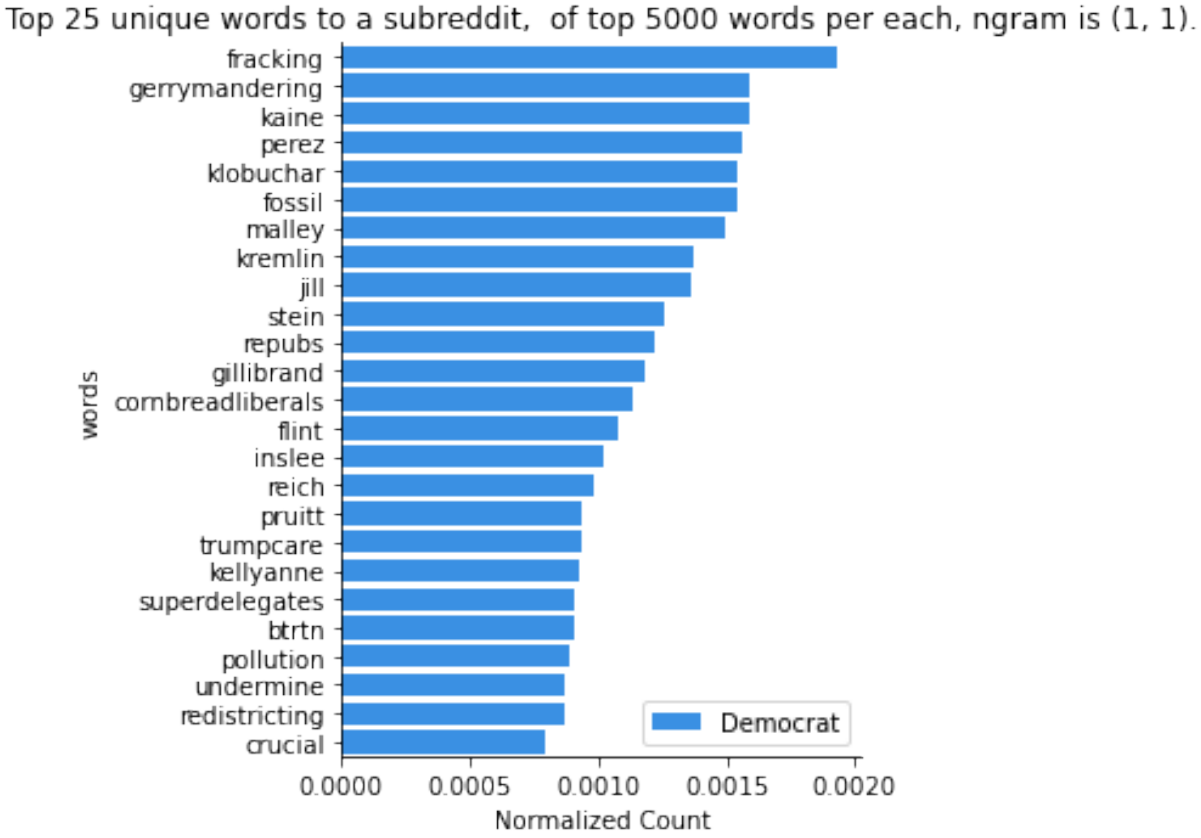
Took top 900 for each and compared

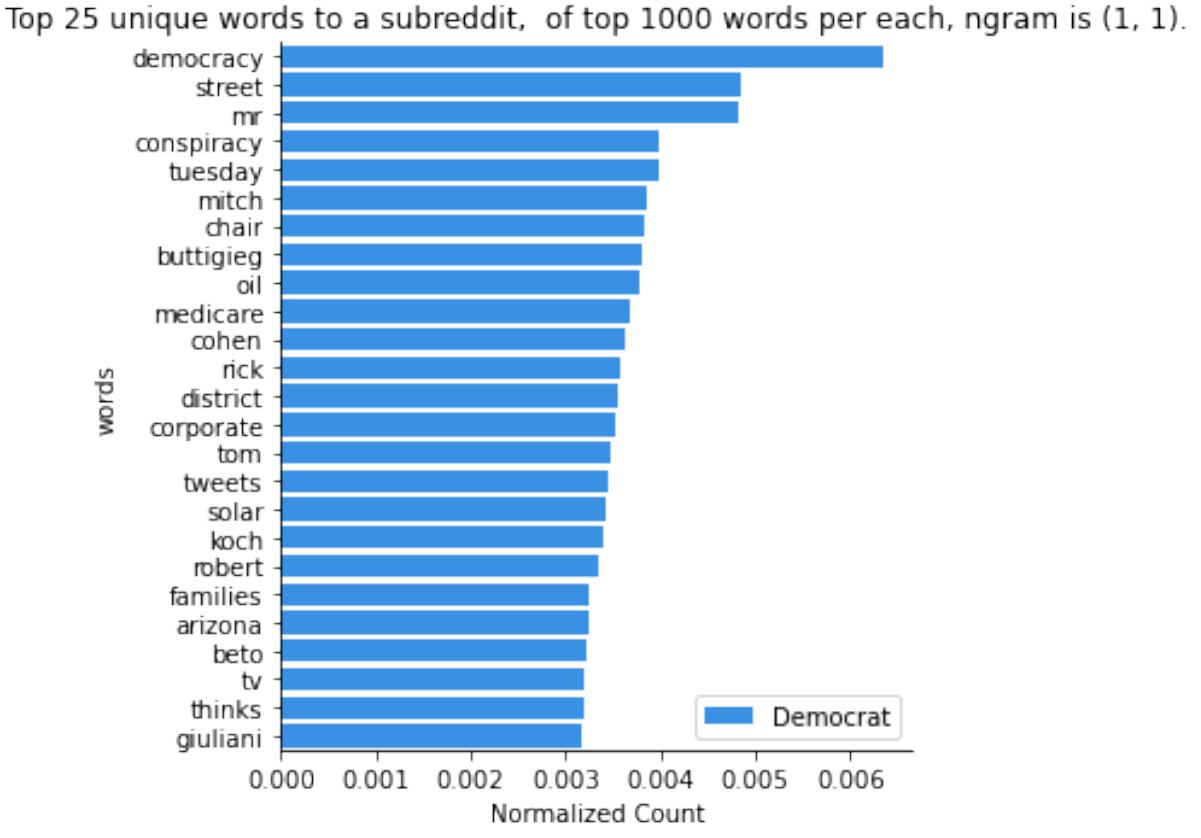
Does not include stop words

Normalized Counts

Top words for both is Trump, but this is disproportionately referenced by Democrat

Generally similar distribution





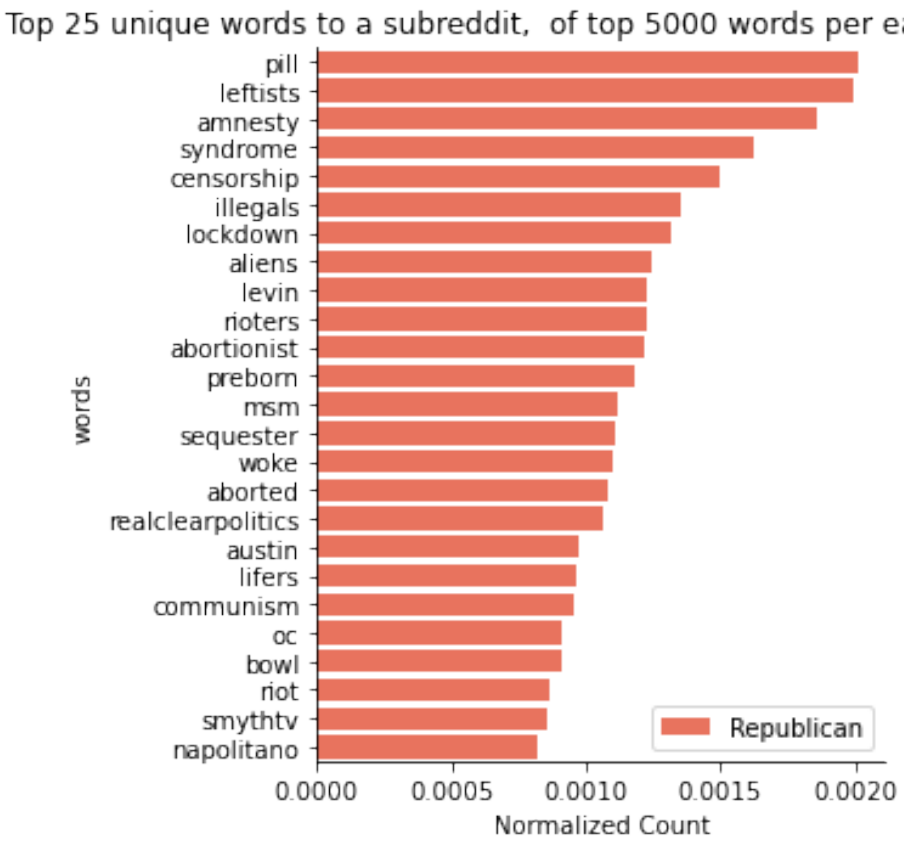
Unique Words

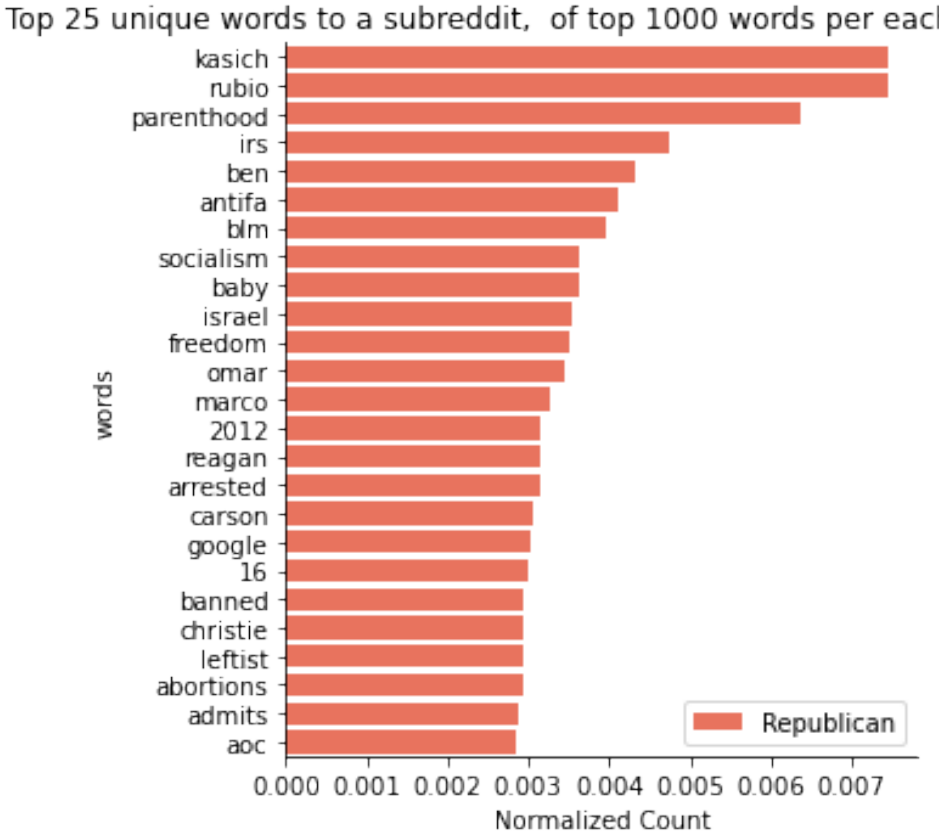
Took top 5000 and 1000 for each and compared

Includes stop words

Normalized Counts

Terminology is interesting





Unique Words

Took top 5000 and 1000 for each and compared

Includes stop words

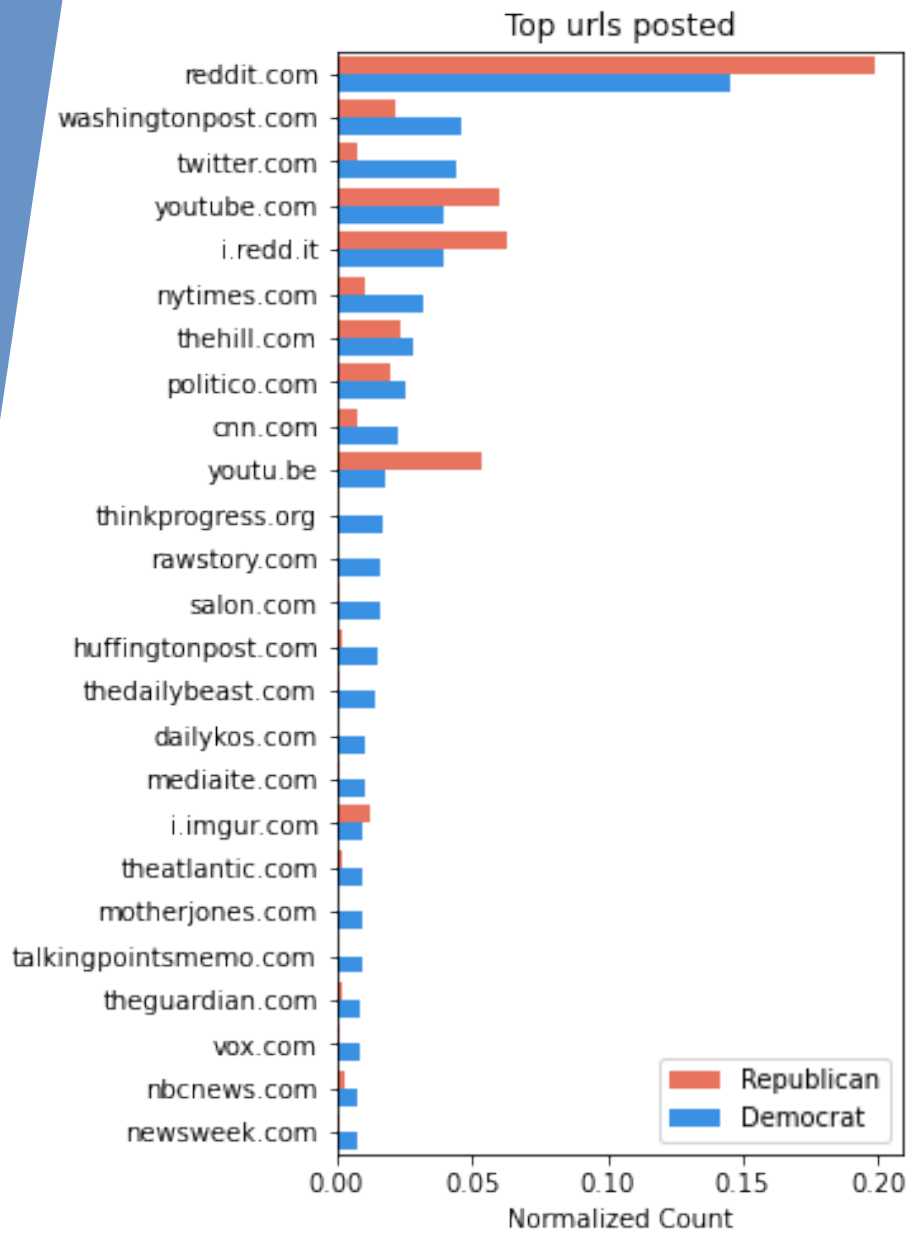
Normalized Counts

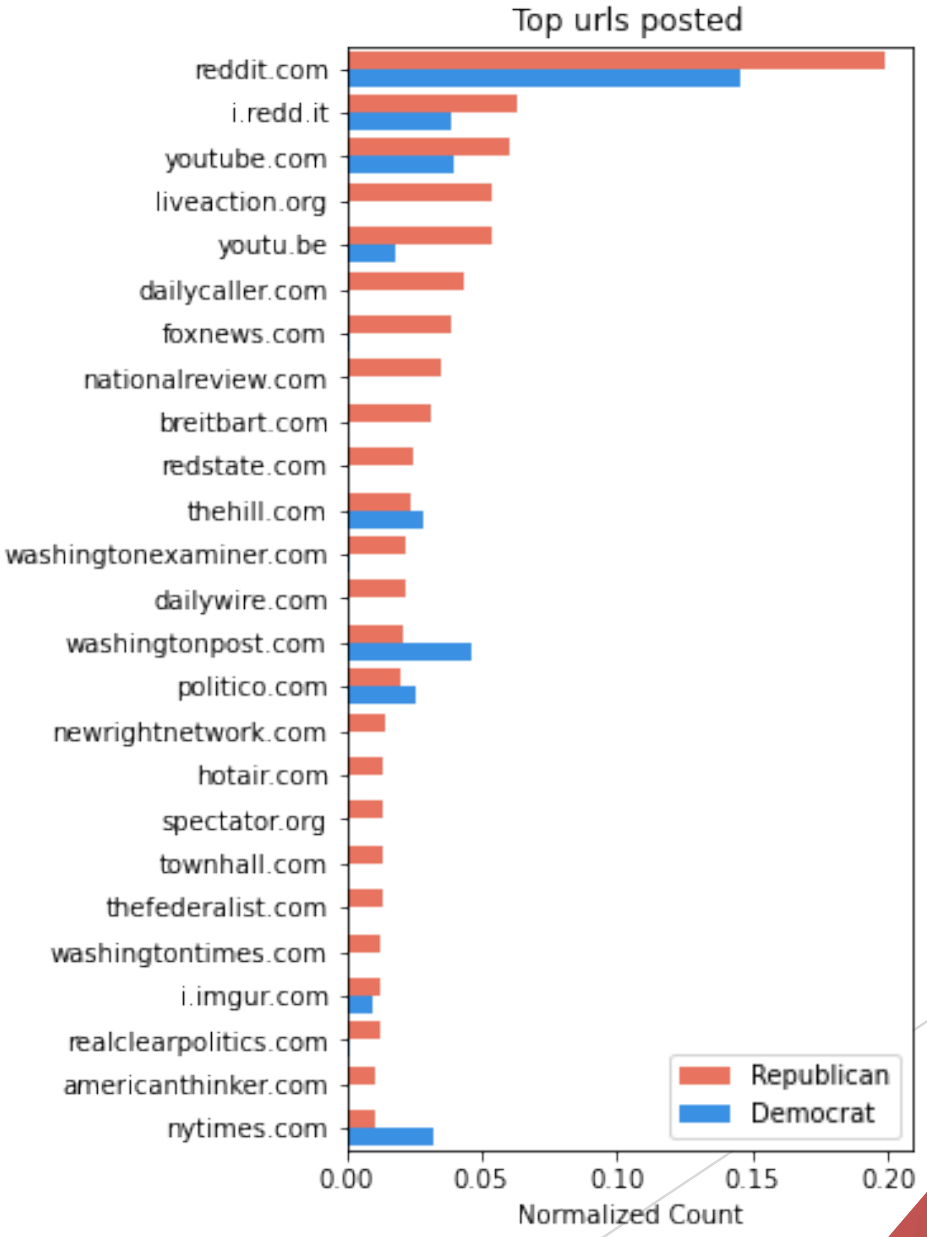
Terminology is interesting

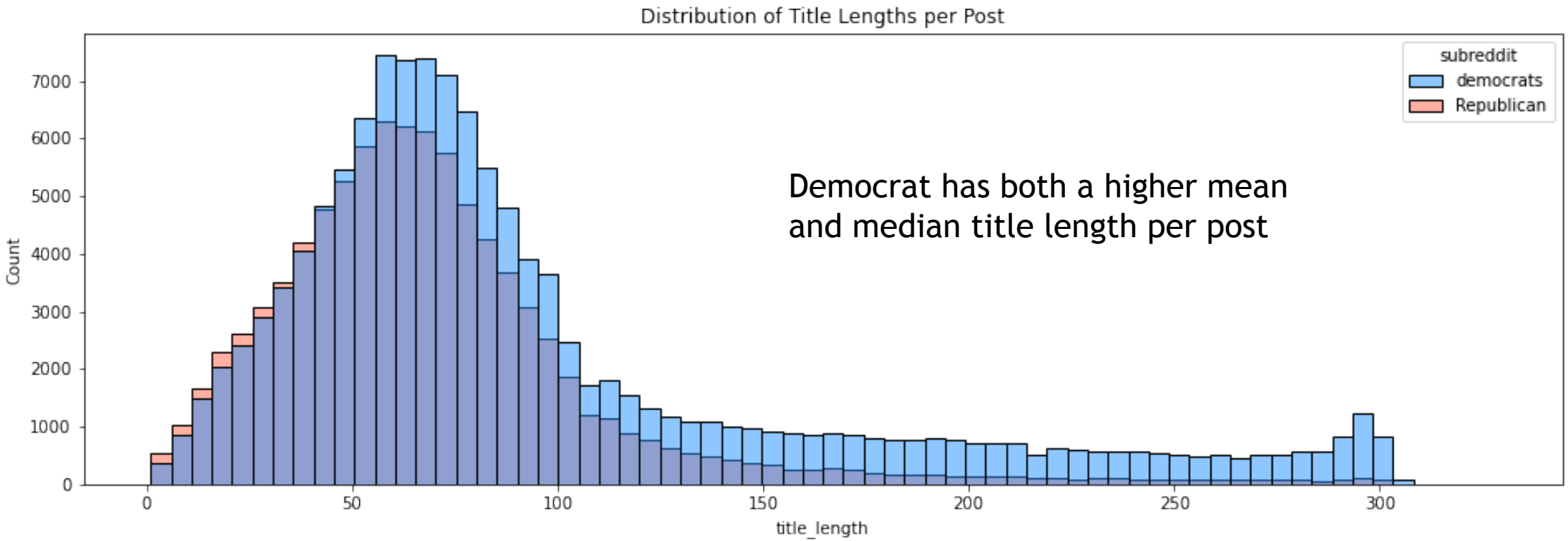
Understand Other Appearances

URLs

Mostly National News Organizations

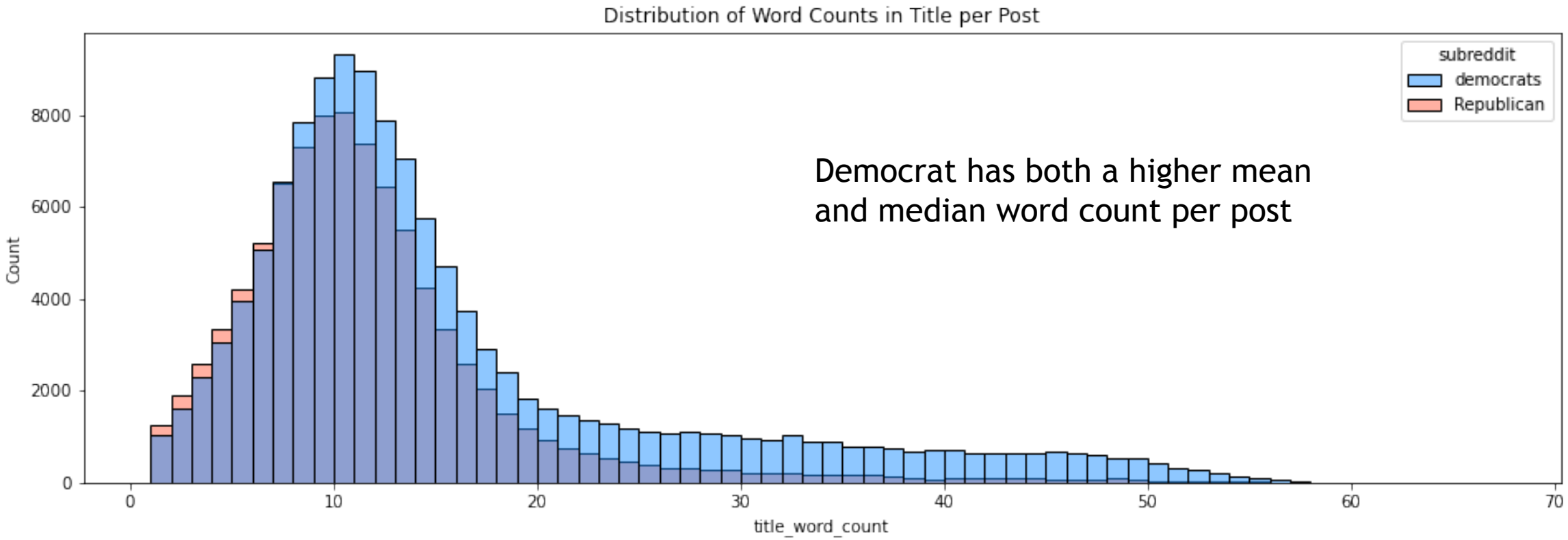






Democrat has both a higher mean and median title length per post

	Democrat	Republican
Overall Count	123,668	90,351
Mean	95.6	70.0
Median	74	64



Democrat has both a higher mean and median word count per post

	Democrat	Republican
Overall Count	123,668	90,351
Mean	15.6	11.3
Median	12	10

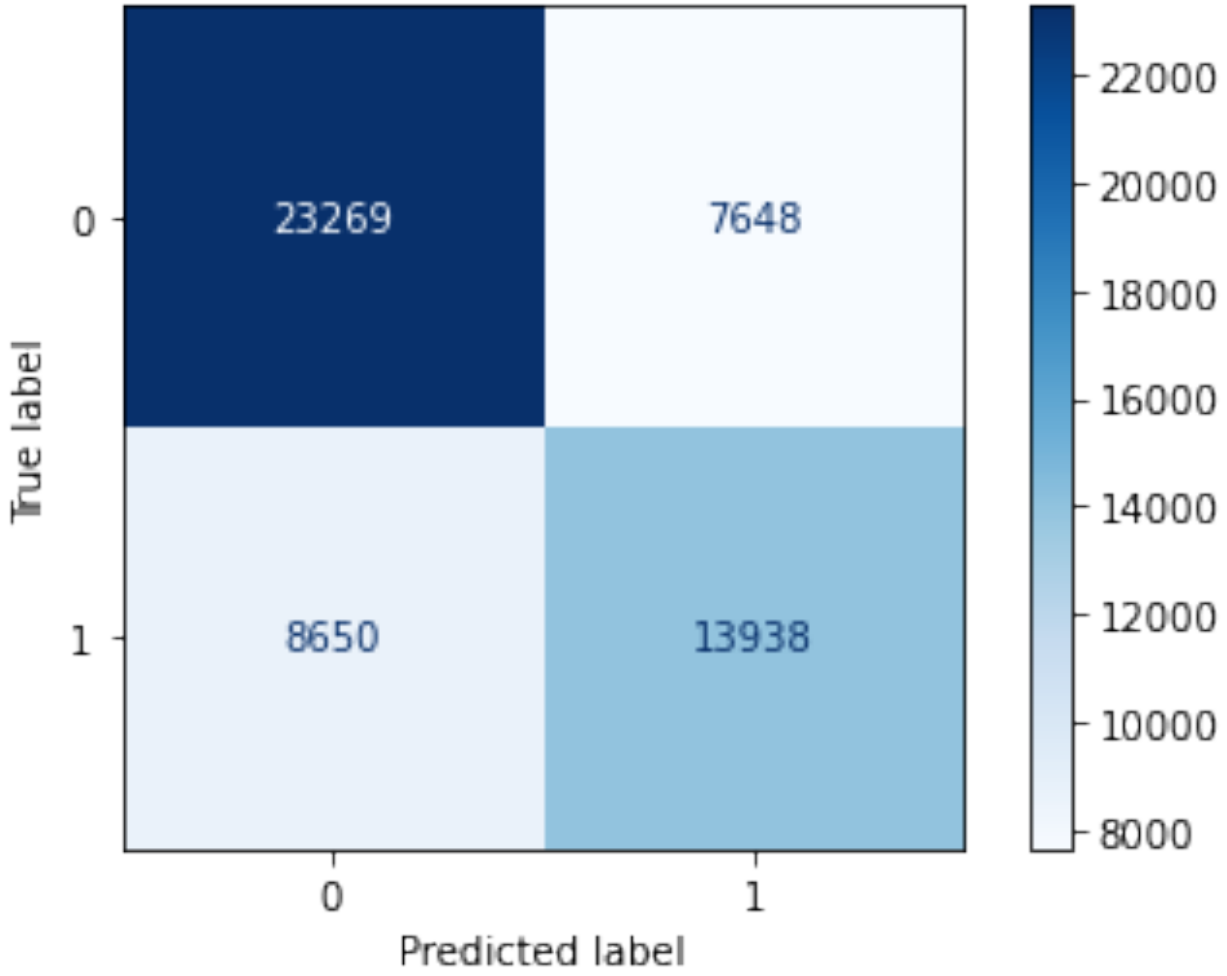
Predictions

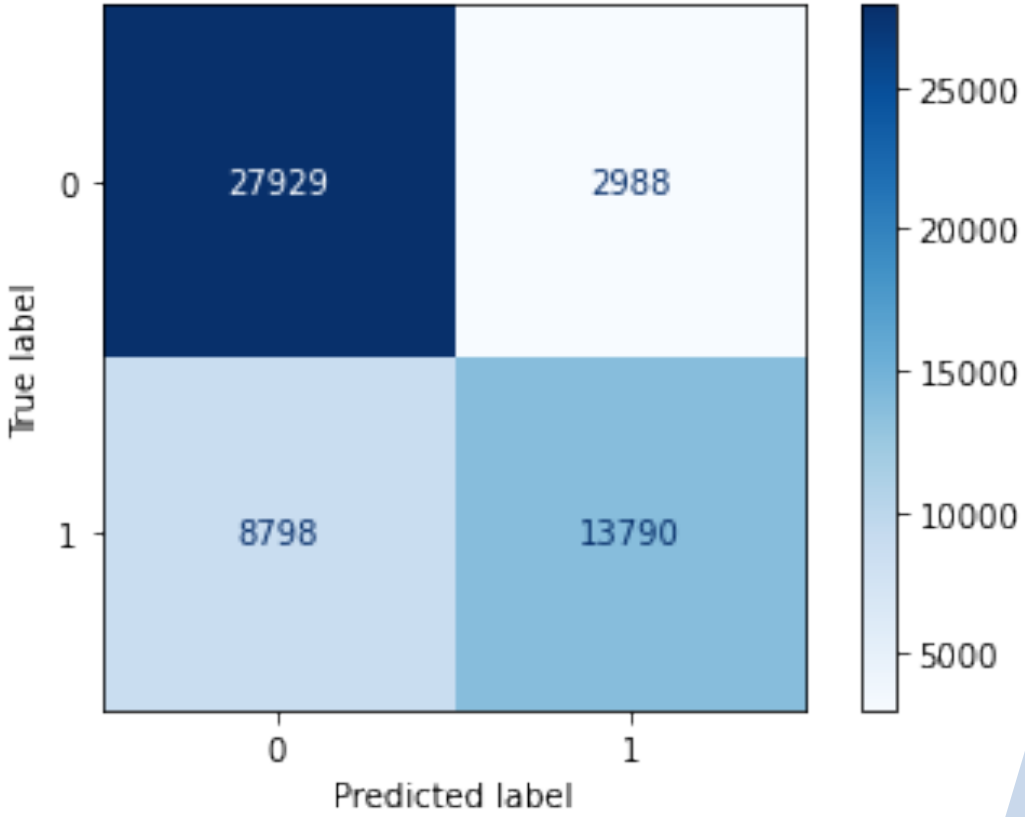
Modeling Criteria:

- Performed a GridSearch for three types of Models
  - Multinomial Naïve Bayes
  - Logistic
  - RandomForestClassifier
- Tried two vectorizers:
  - CountVectorizer
  - Term Frequency-Inverse Document Frequency
- Also tried with and without urls, and with and without status length, title count

Best Model – NLP only:

- CVEC, Logistic Regression
- Baseline score:
  - 57.8% are Democrats
- Accuracy:
  - Cross-Val: 69.0%
  - Train: 71.4%
  - Test: 69.5%
- Sensitivity: 61.7%
- Specificity: 75.3%

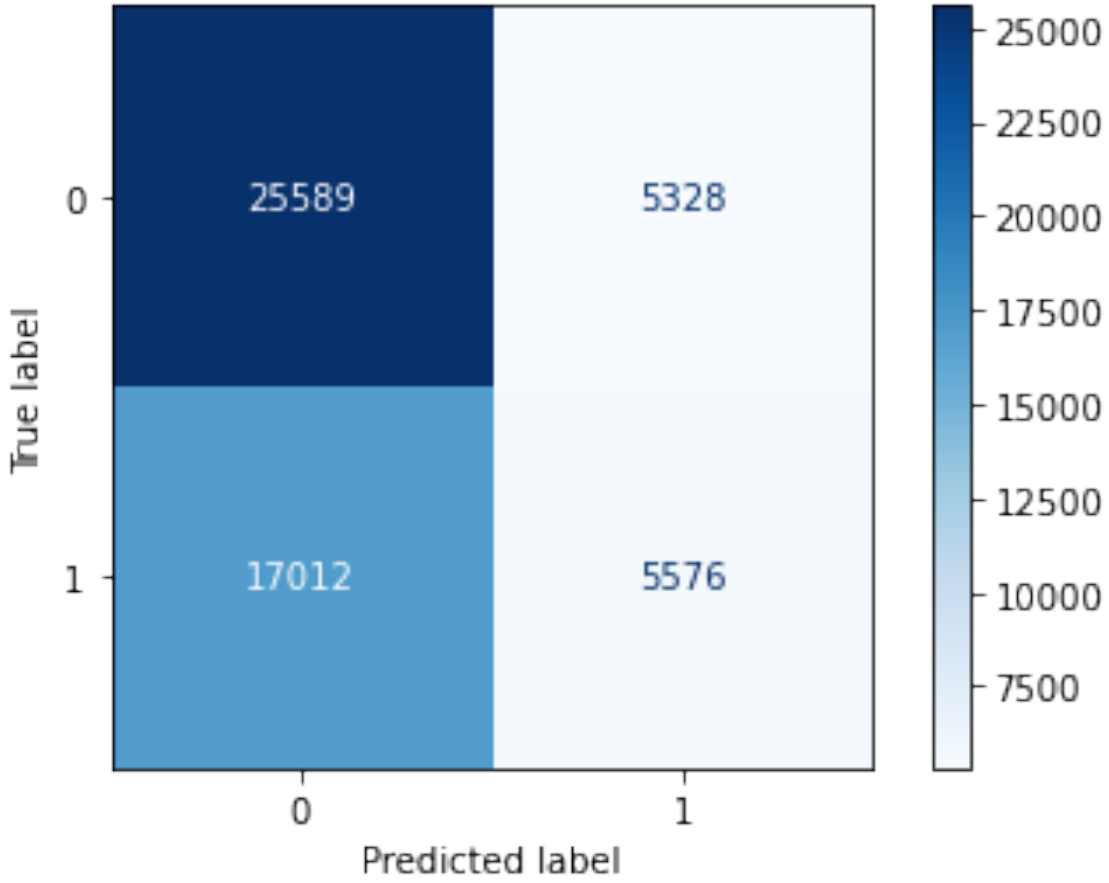




Best Model – URLs only:

- TVEC, Logistic Regression
- Baseline score:
  - 57.8% are Democrats
- Accuracy:
  - Cross-Val: 77.6%
  - Train: 79.7%
  - Test: 78.0%
- Sensitivity: 90.3%
- Specificity: 61.1%

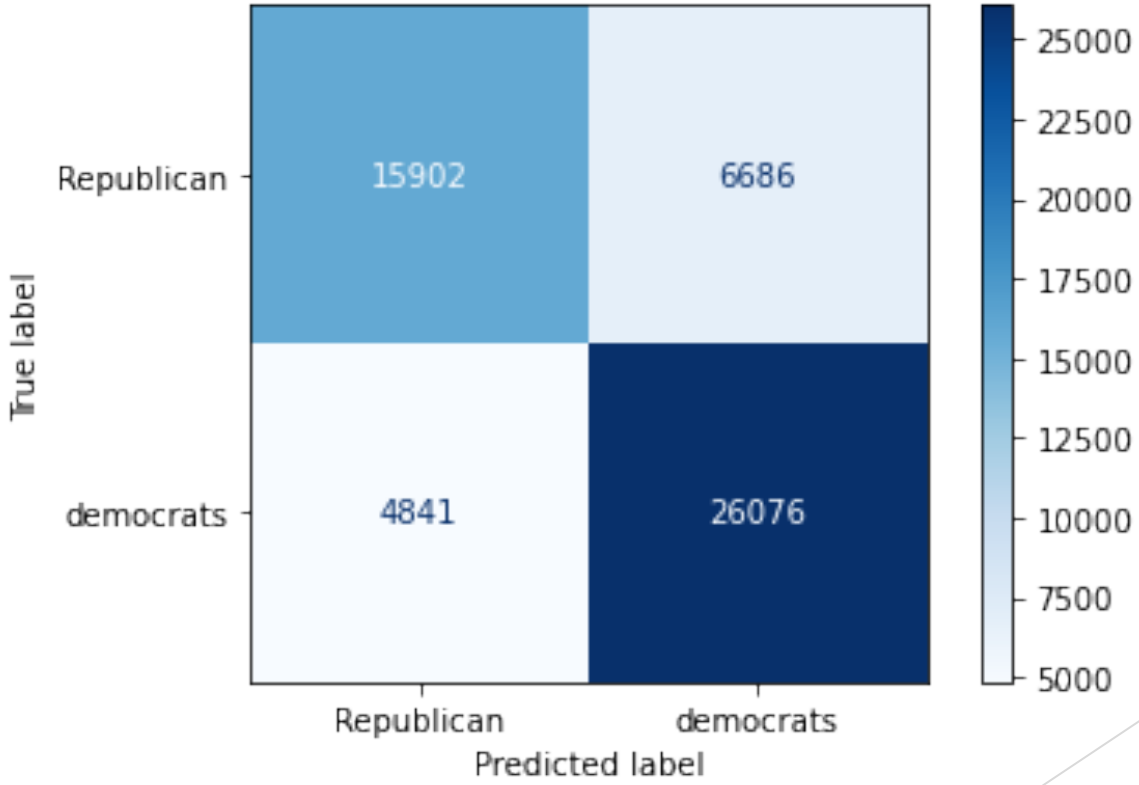
Model – Counts:

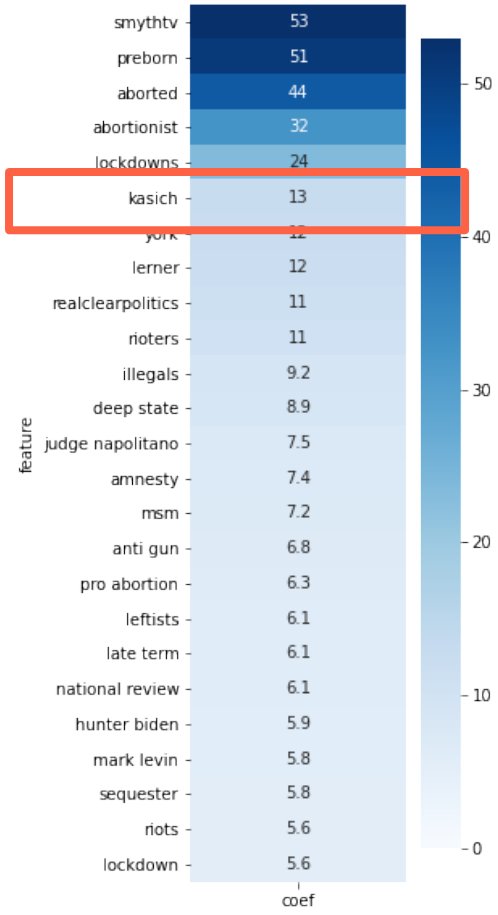


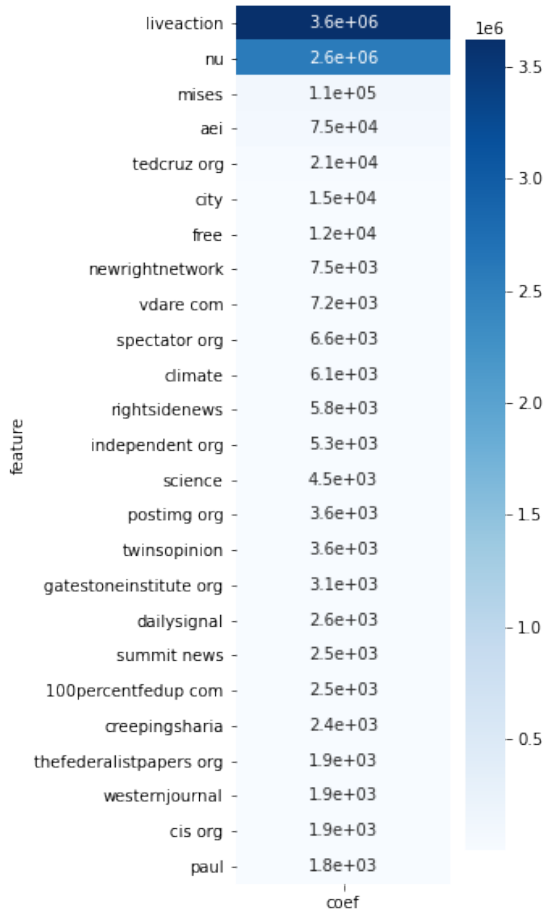
- Logistic Regression
- Baseline score:
  - 57.8% are Democrats
- Accuracy:
  - Cross-Val: XXX%
  - Train: 58.5%
  - Test: 58.2%
- Sensitivity: 82.8%
- Specificity: 24.7%

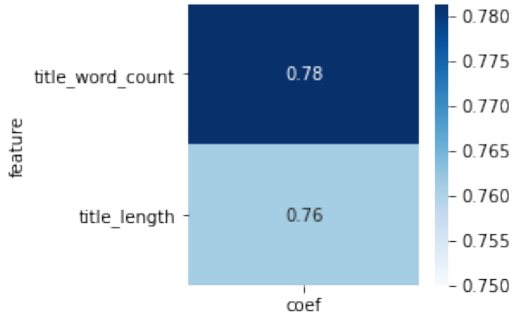
Best Model – Overall:

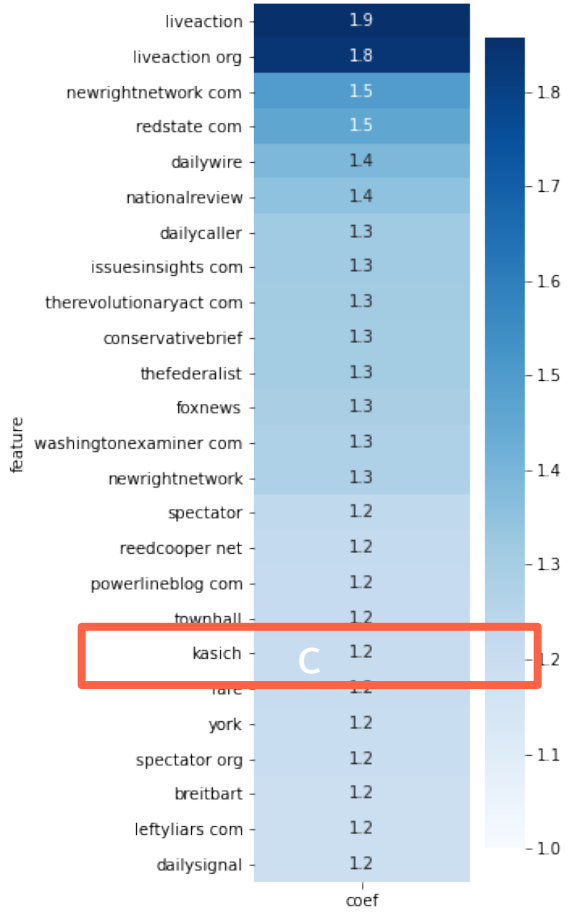
- Logistic Regression
- Baseline score:
  - 57.8% are Democrats
- Accuracy:
  - Train: 80.0%
  - Test: 78.5%
- Sensitivity: 70.4%
- Specificity: 84.3%











Title - words

Urls

Title - counts

All

Review Features

Urls dominate the combined model

Conclusions

- ‘Trump’ is mentioned almost twice as often in Democrats vs Republicans
- Democrats like to write more words
- Urls tell more about the subreddit than the words in the title
- Combining the words, Urls, and title description is the best

Next Steps

- Explore the relationships in the words more
- What ranking of words count for each least are the features in each model
- Explore similar subreddits – libertarian, conservative, progressive, liberal

VOTE!!!