
Subreddit
Analysis
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TOC

What is Reddit?

What is a Subreddit?

- Communities within Reddit
- Users share information and media related to the primary topic
- More than 2.2mil subreddits
    - ~130k currently active

Problem Statement

- How can we classify a post as belonging to one of two subreddits?

r/askaconservative

r/AskALiberal

Steps to solve

1. Obtaining the data.
2. Cleaning, organizing, and featurizing our data sets.
3. Building a model to analyze our data.
4. Visualizing and reporting the findings.

Project objective 1

Data Collection and Preparation

Data Collection

01

- Utilized Pushshift API
- Developed a function to workaround API's limits
    - Utilized sleep timers to overcome rate limiting
    - Pulled all posts, from each subreddit, in one iteration
- Pulled 8000 total posts
    - 4000 from each subreddit

pushshift.io

Data Preparation

02

- Retained the post body, post title, and subreddit for each
- Duplicates and empty posts removed
    - ~10% removed

pushshift.io

Project objective 2

Featurization

01

Featurization

- Created metrics for:
  - Post length
  - Post word count
  - Title length
  - Tite word count

02

Featurization

- Created metrics for:
  - Grammar errors
  - Grammar error %
- Utilized:

language-tool-python 2.5.1

- A wrapper for:

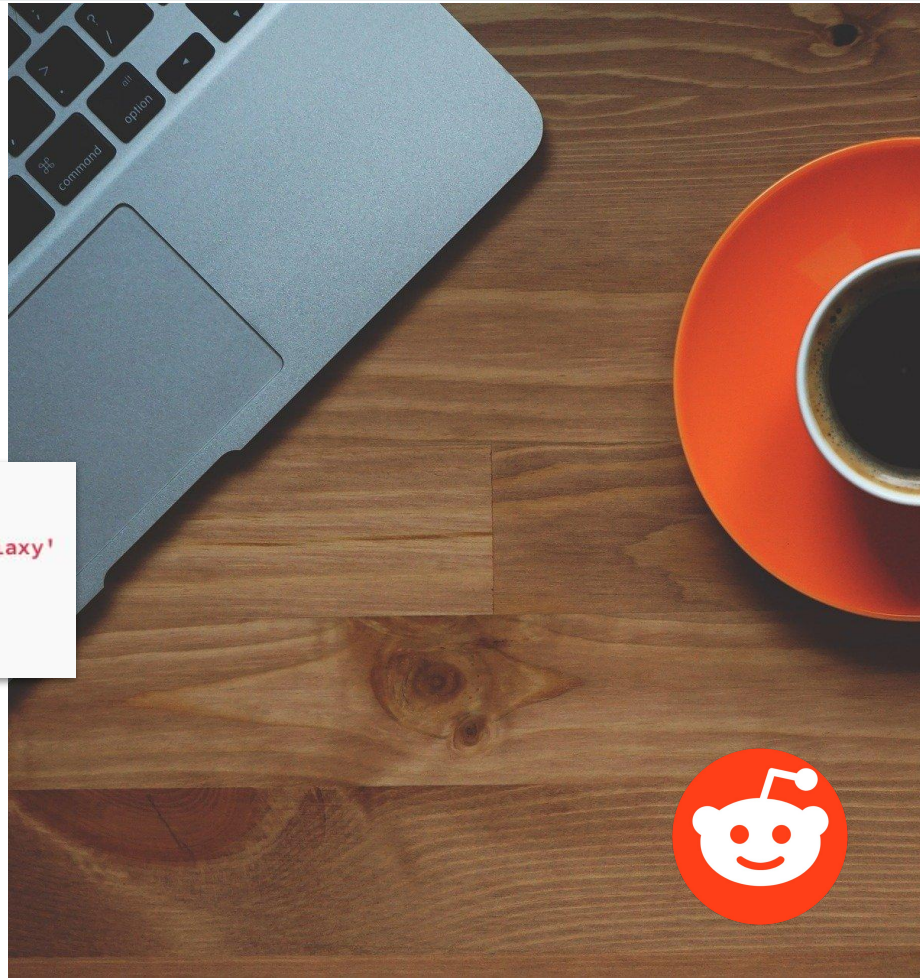
LanguageTool
Your writing assistant

02

Featurization

language-tool-python 2.5.1

```
>>> import language_tool_python
>>> tool = language_tool_python.LanguageTool('en-US')
>>> text = 'A sentence with a error in the Hitchhiker's Guide tot he Galaxy'
>>> matches = tool.check(text)
>>> len(matches)
2
```



03 Featurization

- Created metrics for:
  - Polarity
    - -1 to 1 range
      - -1 linguistically negative speech
      - 1 linguistically positive
  - Subjectivity
    - 0 to 1 range
      - 0: Objective
      - 1: Subjective
- Utilized Beautiful Soup Library

Project objective 3

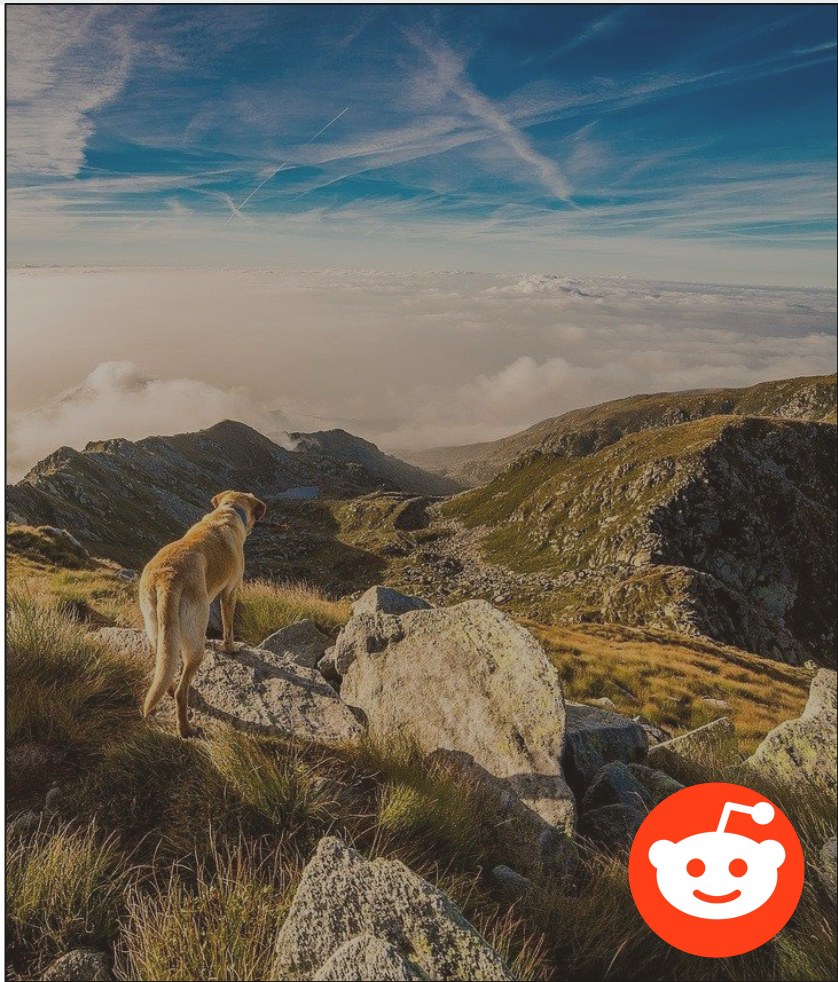
Exploring the Data

01

Exploring the Data

Polarity scores

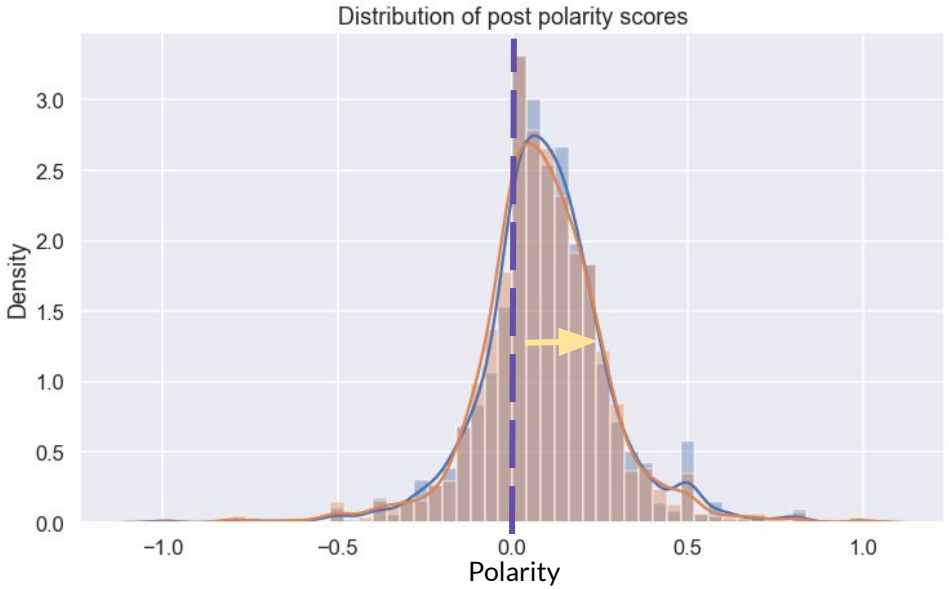
- r/askaLiberal
  - **0.064** average for posts
- r/askaConservative
  - **0.056** average for posts

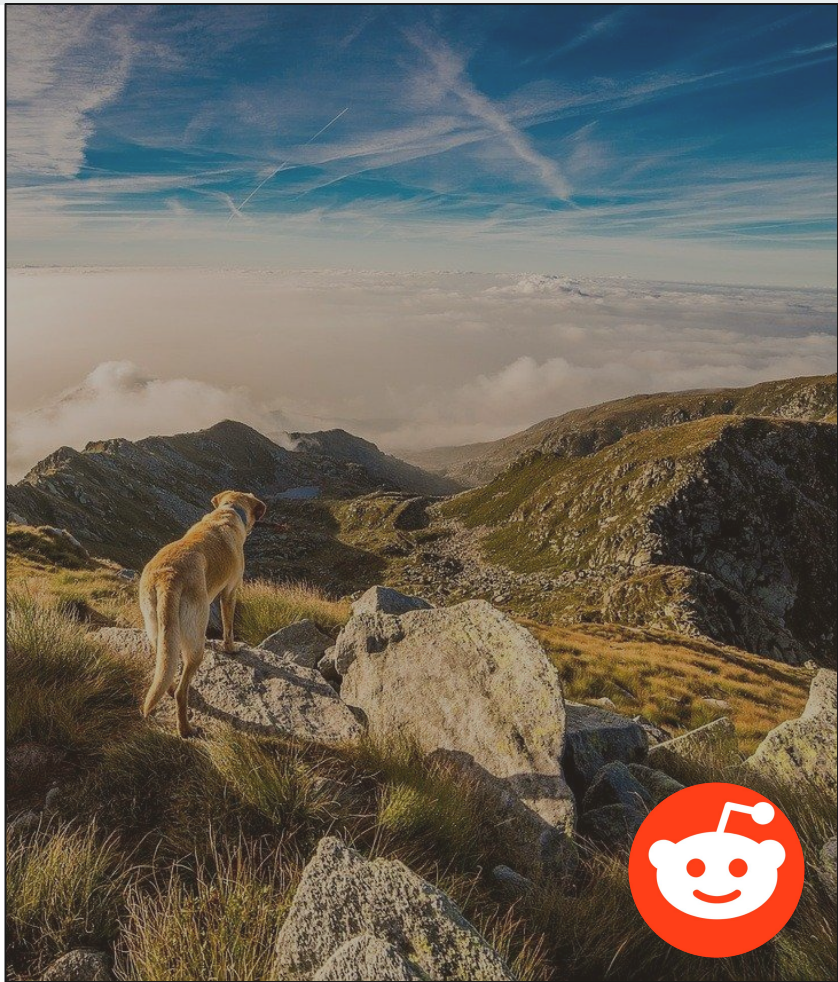


01

Exploring the Data

Polarity scores



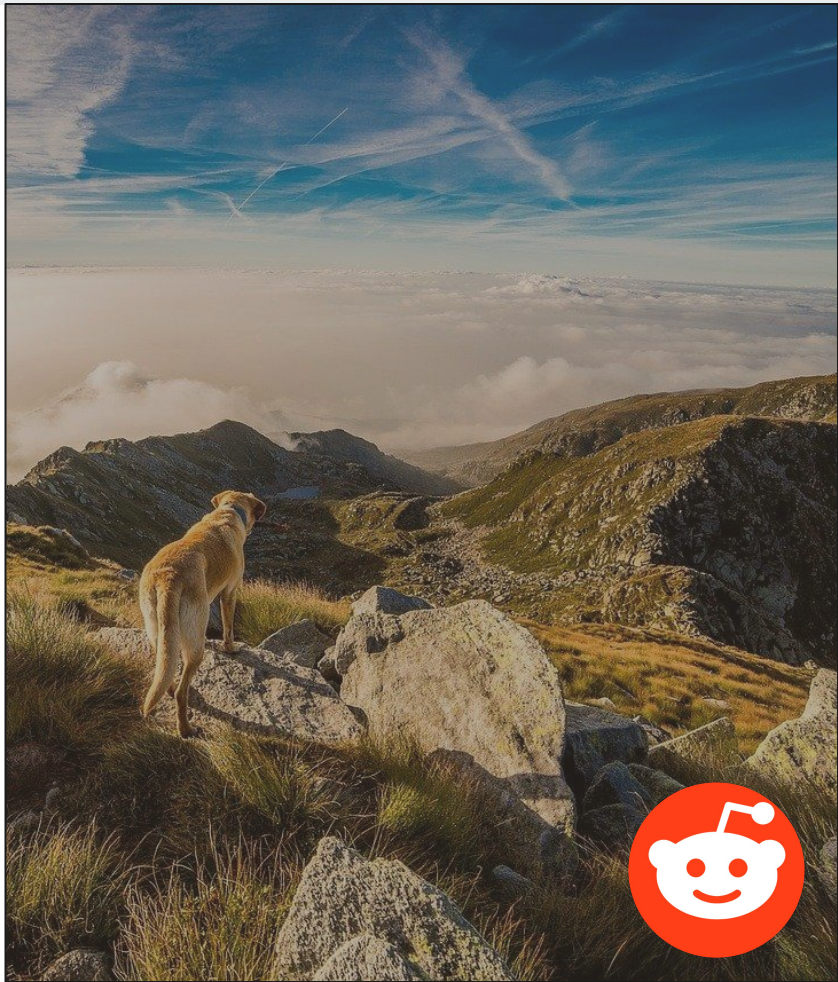


02

Exploring the Data

Subjectivity scores

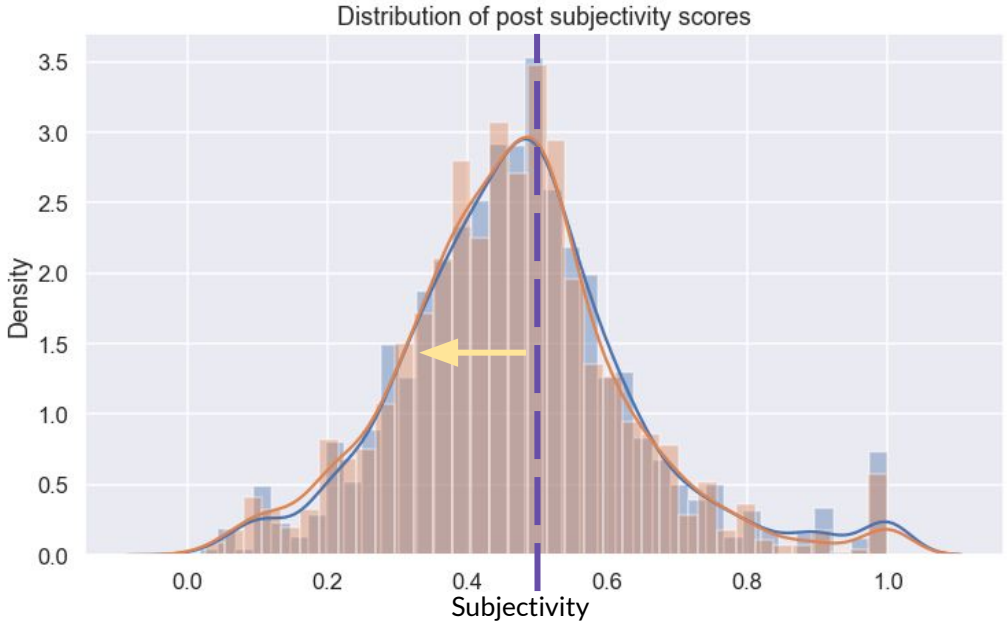
- r/askaLiberal
  - **0.322** average for posts
- r/askaConservativel
  - **0.297** average for posts

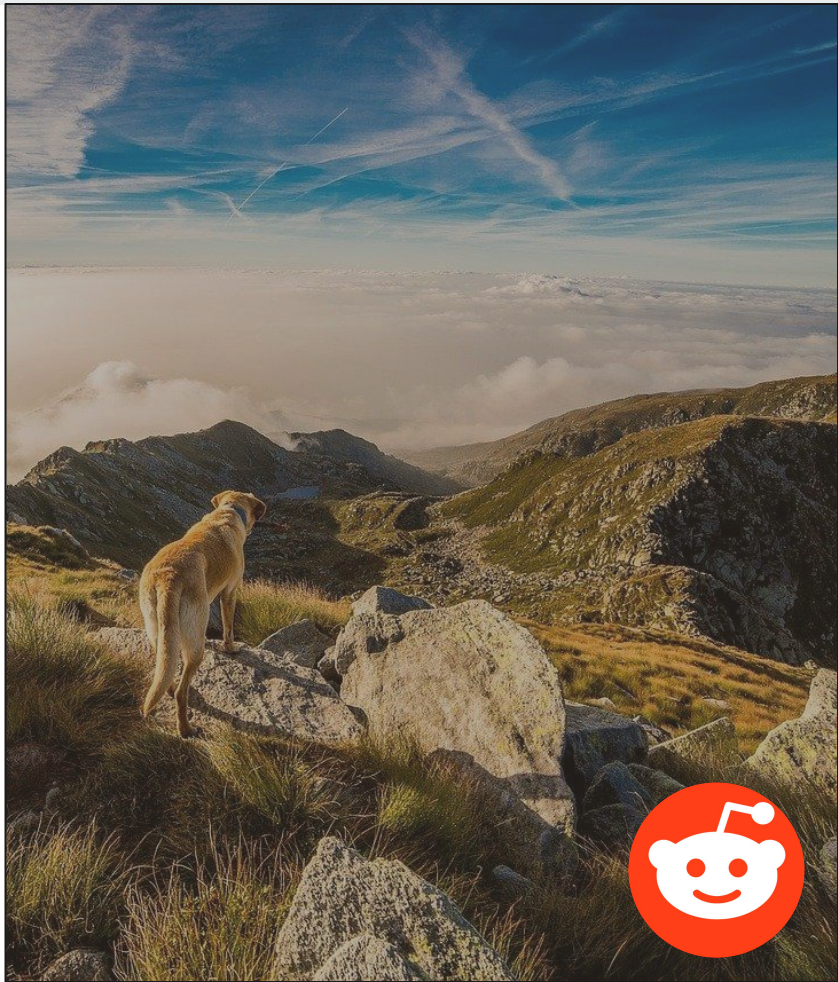


02

Exploring the Data

Subjectivity scores





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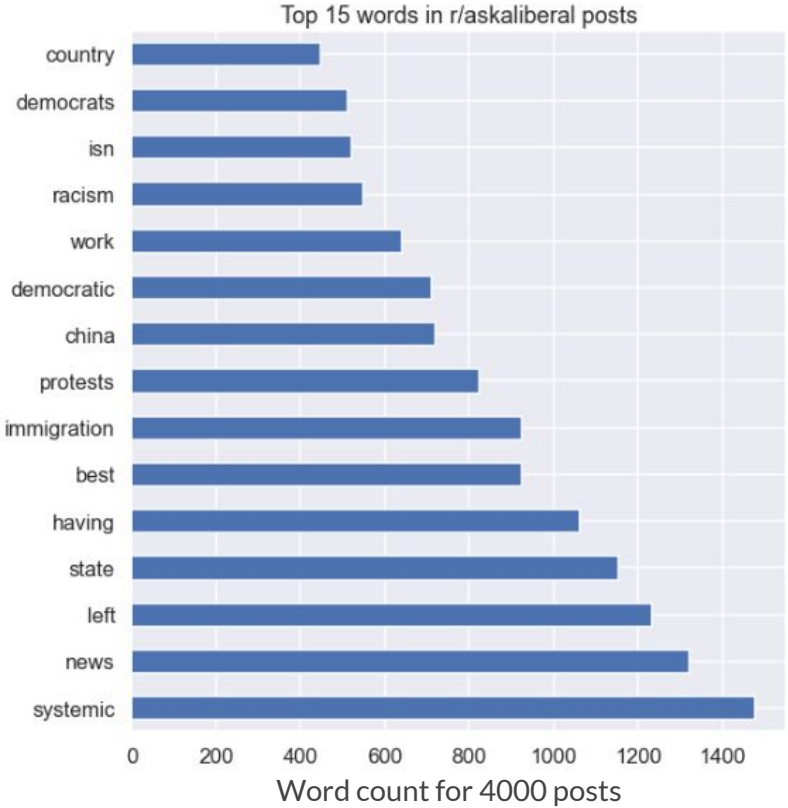
Exploring the Data



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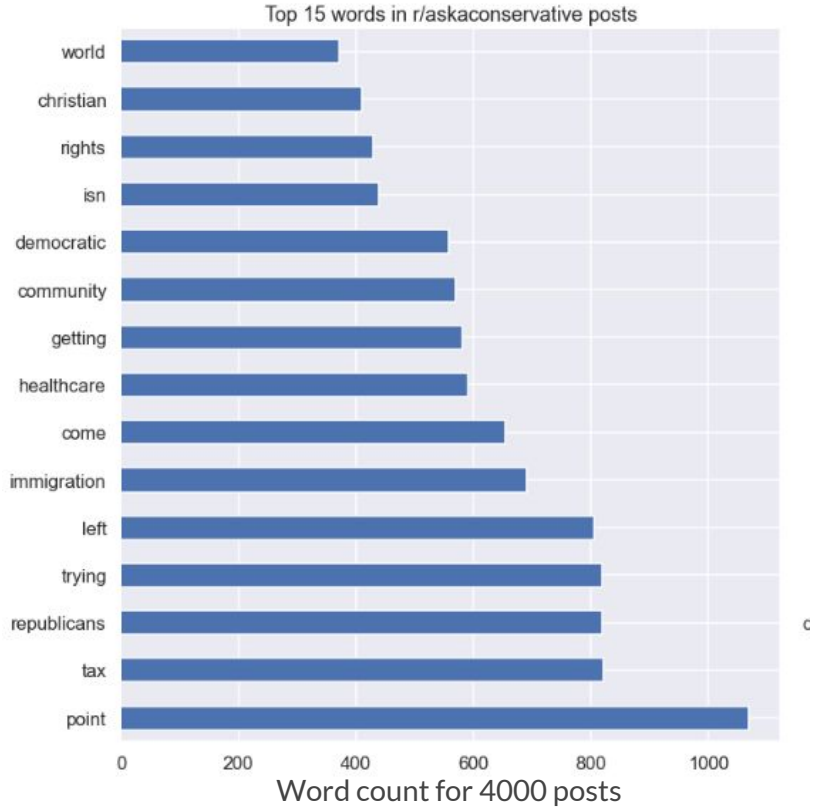

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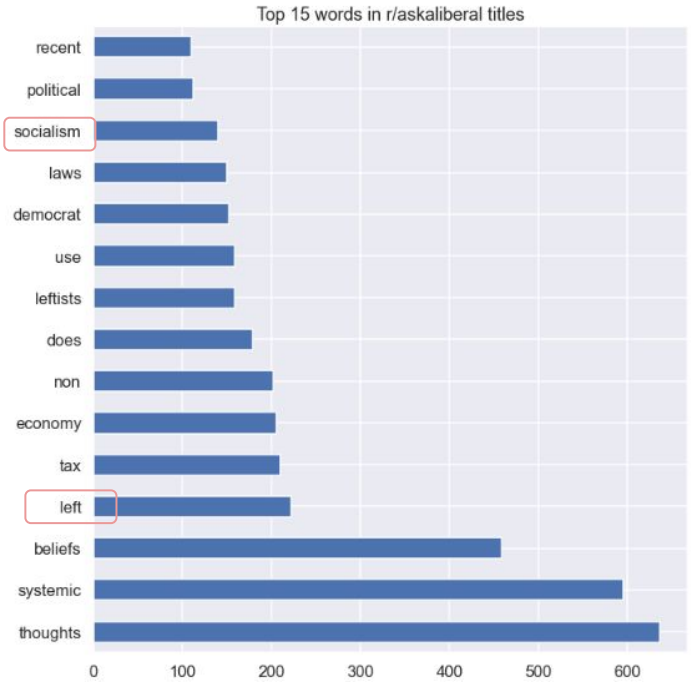
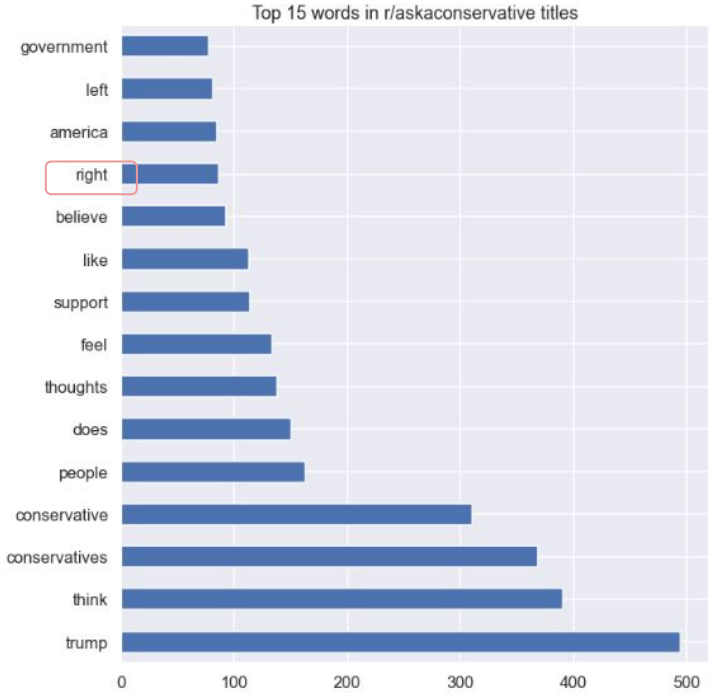
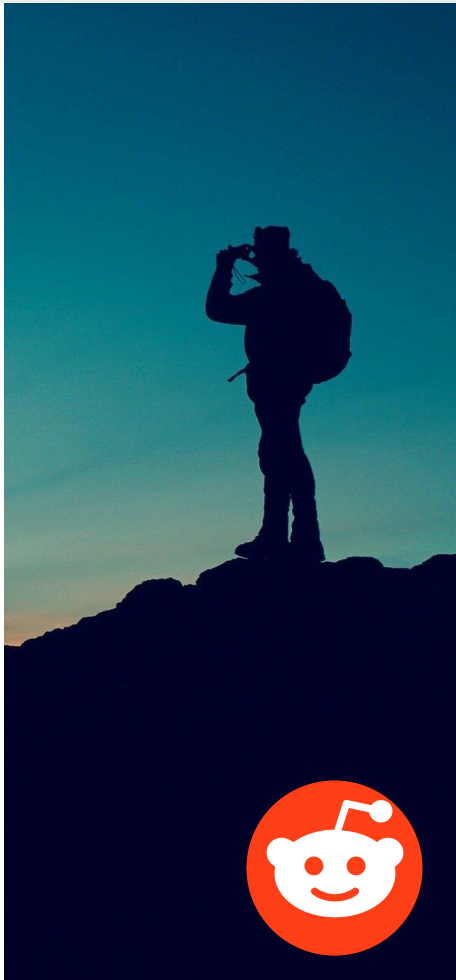




Word counts for 4000 posts



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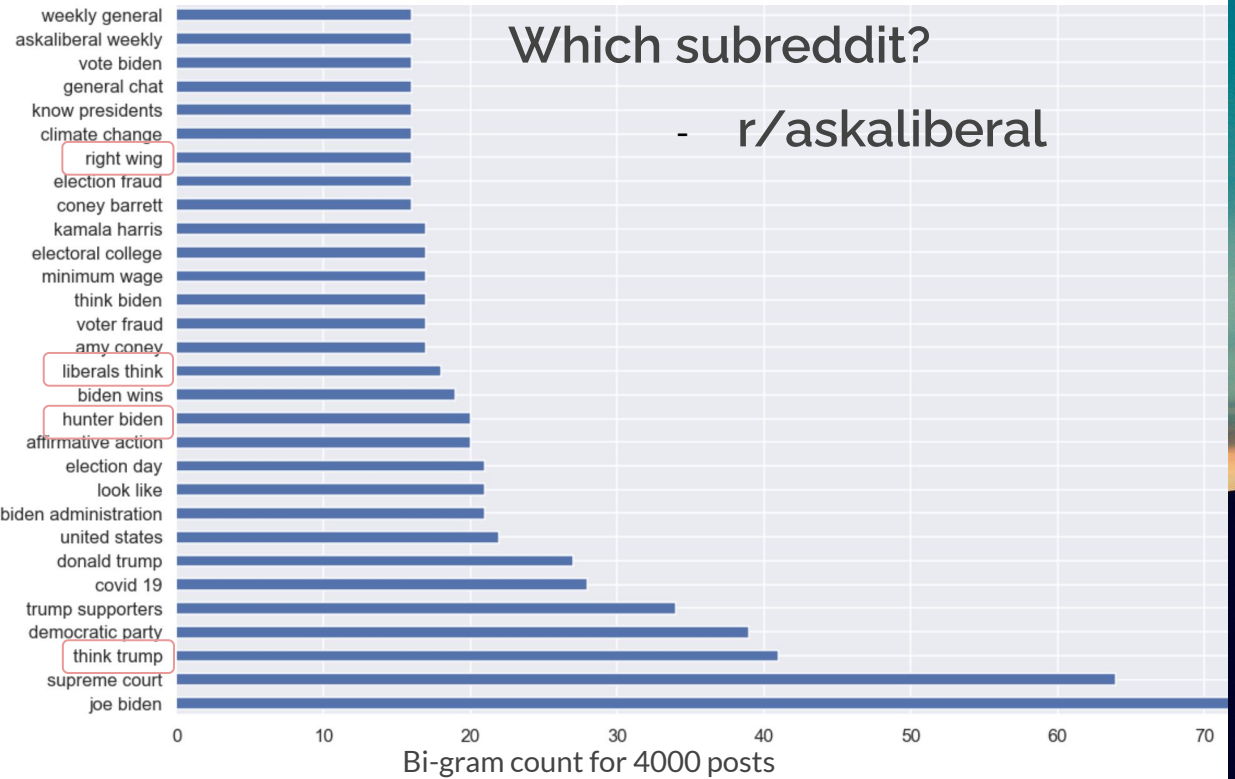
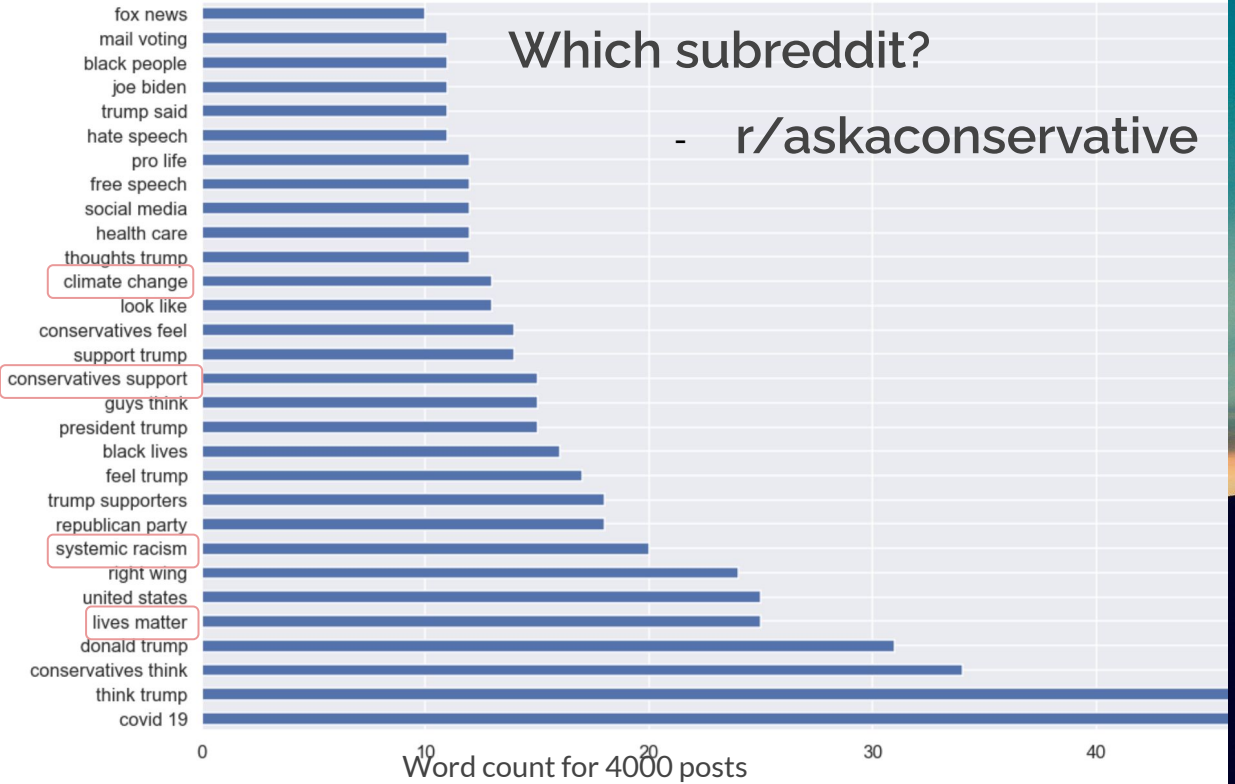


Which subreddit?

- r/askaliberal

04

Exploring the Data



Word count for 4000 posts

Which subreddit?

- r/askaconservative

04

Exploring the Data

When people say 'healthcare is a human right,' what does that mean functionally?

r/AskALiberal

Why don't minimum wage workers deserve at least the bare minimum of a liveable wage?

r/askaconservative

How do you respond to conservatives that say the Democrats spent the past 4 years saying the 2016 election was stolen by Russia but call republicans crazy for saying 2020 was stolen?

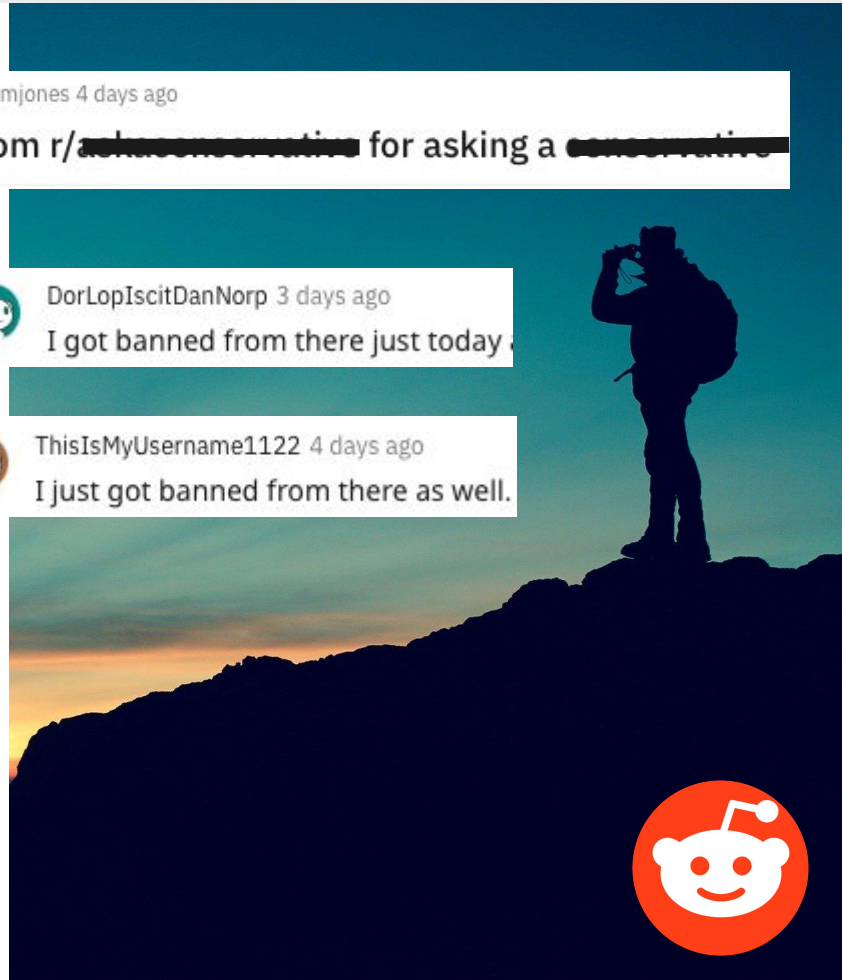
r/AskALiberal

Why is it considered "liberal" or "leftist" if you want to protect the environment?

r/askaconservative

04

Exploring the Data



Differences in moderation lead to posts that look nearly indistinguishable between the two subreddits

- Over the 8000 posts pulled, 10% were “removed by moderator”

- 100% of those posts belonged to r/askaConservative
  - This is a removal rate of 20%
  - Result is both subreddits having “conservative” verbiage
- Not a condemnation of moderation or censorship, but a serious challenge to analysis

r/askaconservative

r/AskALiberal

Project objective 4

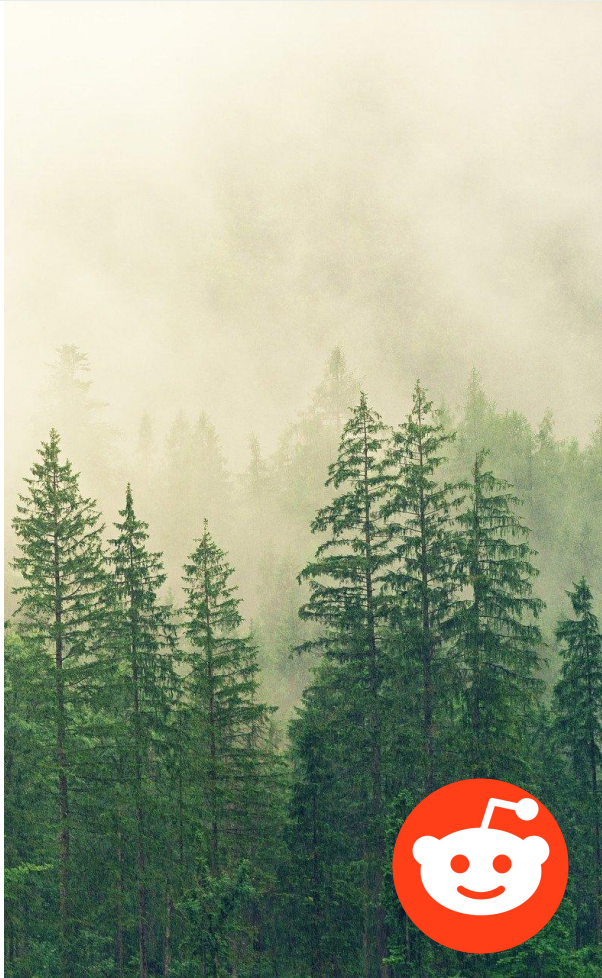
Modeling and Classification

04

Testing Models

Several models were fit, including:

- Naive Bayes
- Logistic Regression
- K-Nearest
- MLP
- AdaBoost
- Bagging
- **Random Forest**
- Neural net

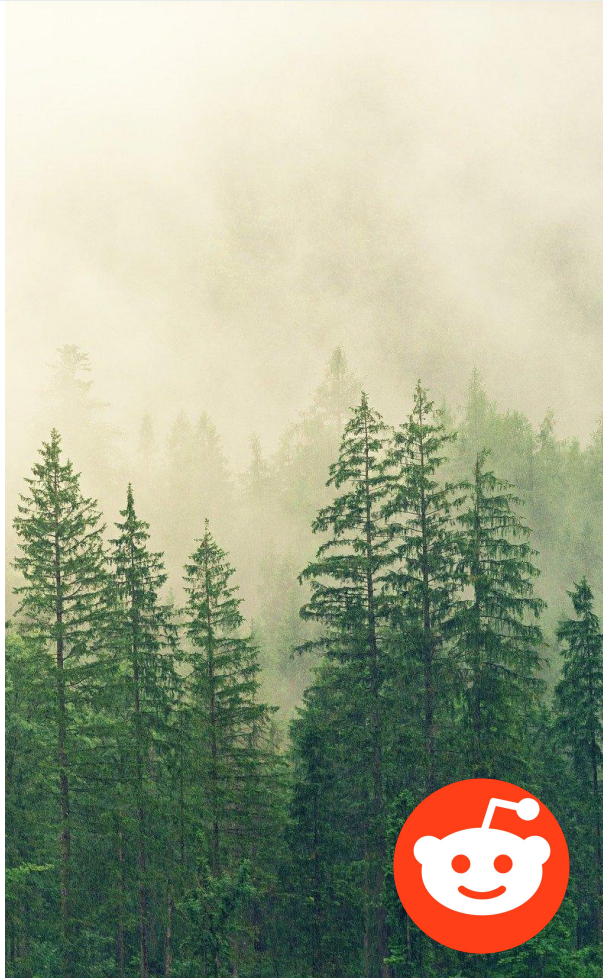


04

Testing Models

Most models averaged ~65% accuracy

- **Random Forest** performed highest
  - Notable parameters:
    - Minimum samples leaf: 1
    - N_estimators: 500
    - Criterion: entropy
    - CountVectorizer max features: 2500
    - CountVectorizer n_grams: (1, 1)
  - Accuracy: **74%**
  - Precision: **75%**
  - Recall: **62%**
  - F1 Score: **0.68**
  - AUC = **0.82**



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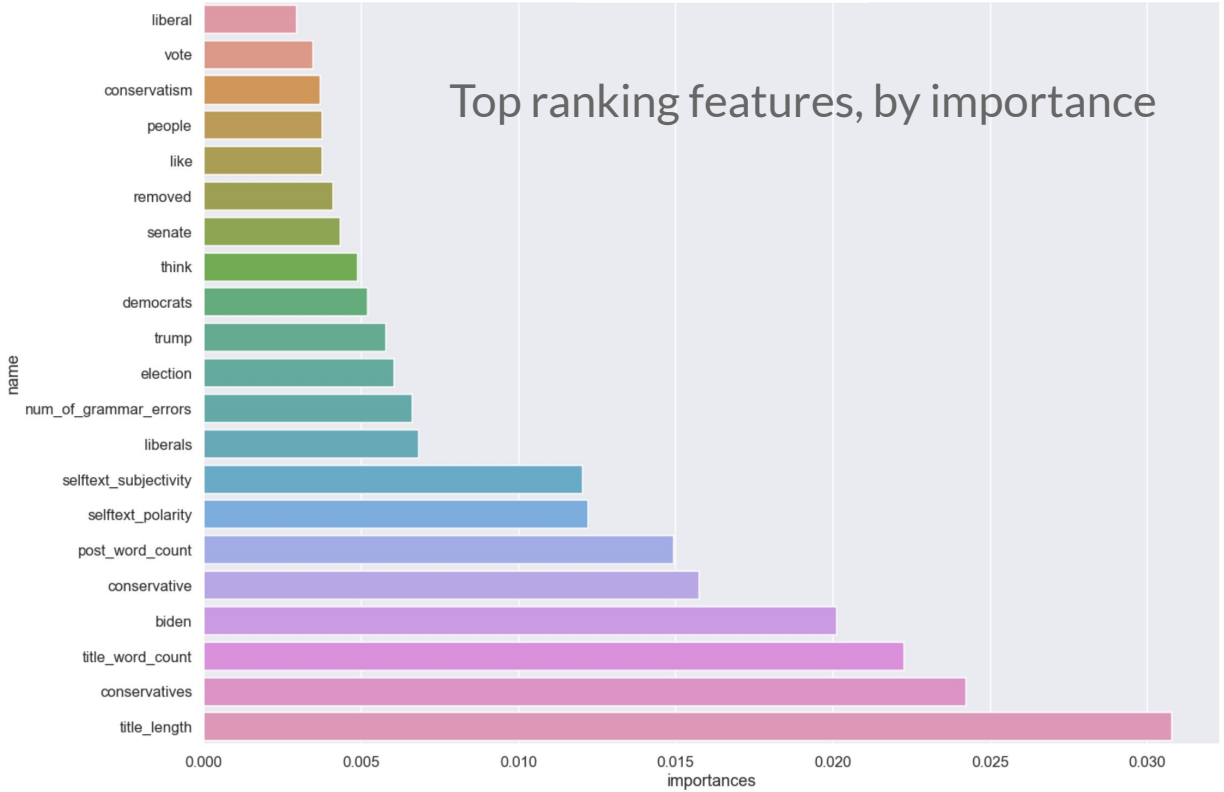
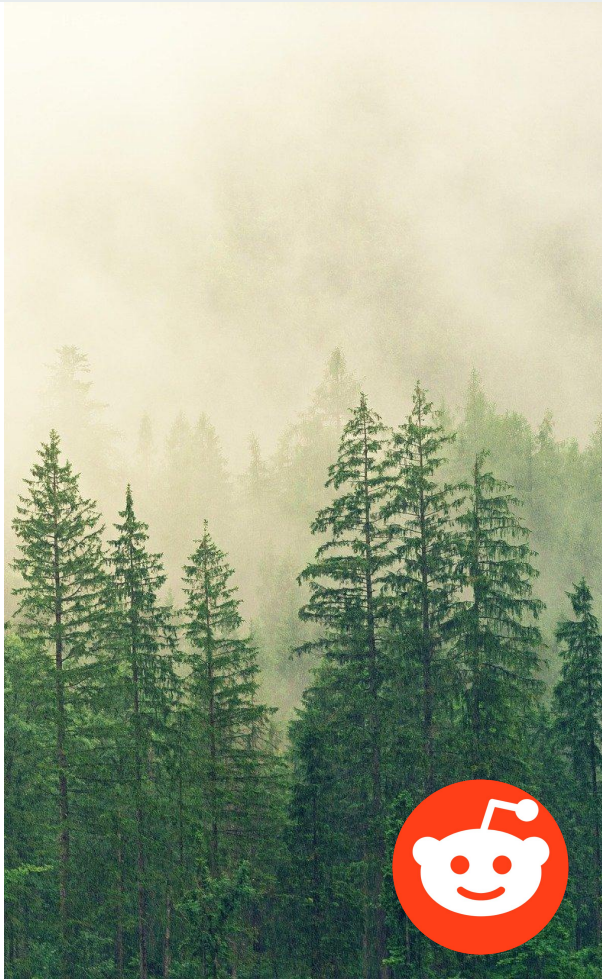
Testing Models



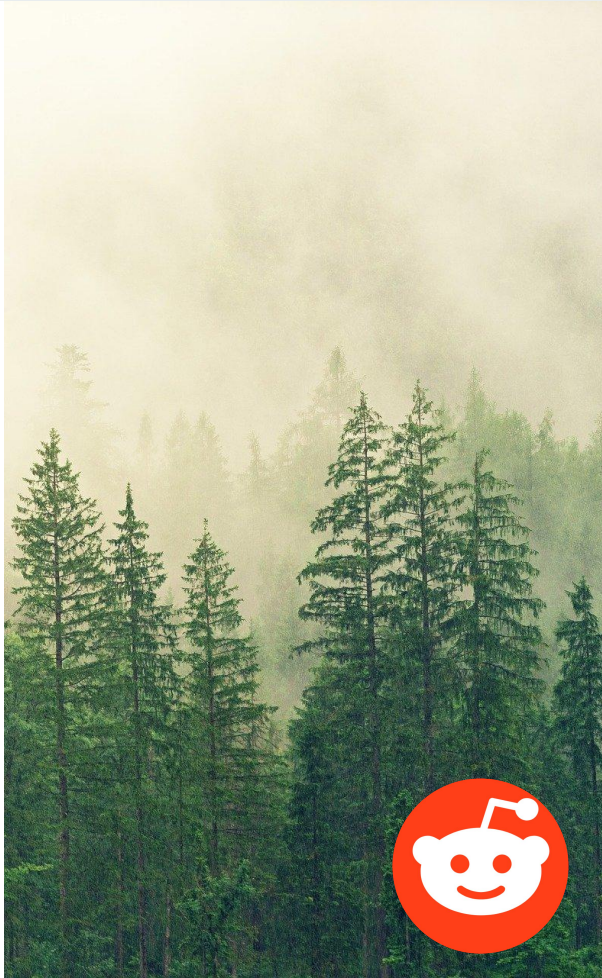


04

Testing Models

Limitations

- As discussed, posts were extremely similar
- Most posts could be interchanged with either subreddit

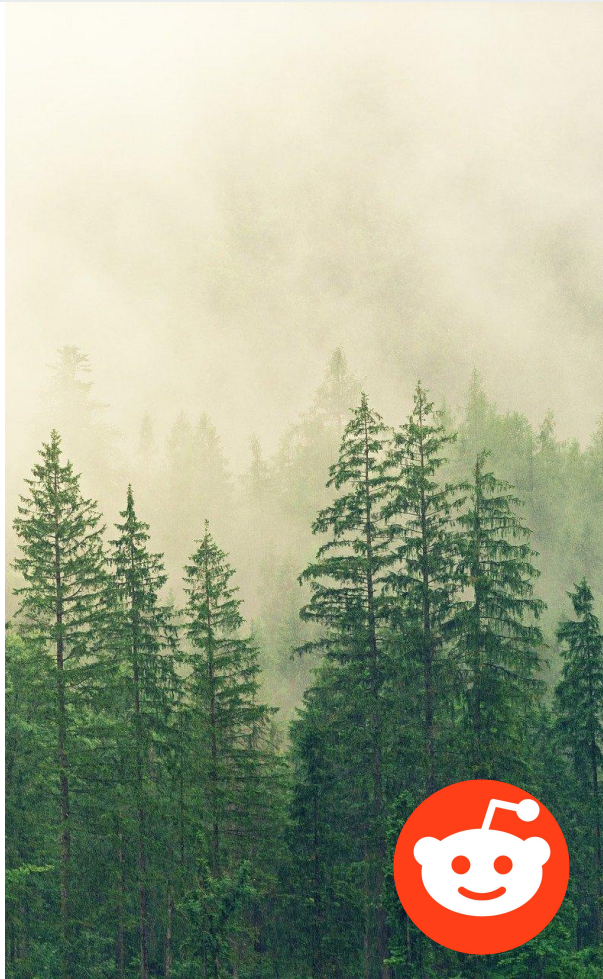


04

Testing Models

Recommendations

- Obtain user data and search for crossposting
- Creating a function that, rather than relying on a timestamp, scrapes posts as they are posted
    - Allowing for the analysis of balanced, unmoderated posts.



Conclusion

- Reddit is one of the largest social networks on internet, with millions of subreddits.
- Currently able to classify whether a post was made to r/askaLiberal or r/askaConservative with 74% accuracy.
- Antagonistic cross-posting and imbalanced post removal is a hurdle that needs further exploration.

Any Questions?

All photos courtesy of pixabay.com