Online Science Forum Post Filtering

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We are planning to **build an online scientific forum** for students and faculties to freely exchange scientific questions of their interests.

This project seeks to find a strategy to **filter out 'troll' forum posts**, that are scientifically irrelevant.

By utilizing natural language processing and classification models on two different subreddits, **'AskScience'** and **'ShittyAskScience'**, the project will explore the differences in the texts of troll and legitimate scientific questions and aim to classify between the two.

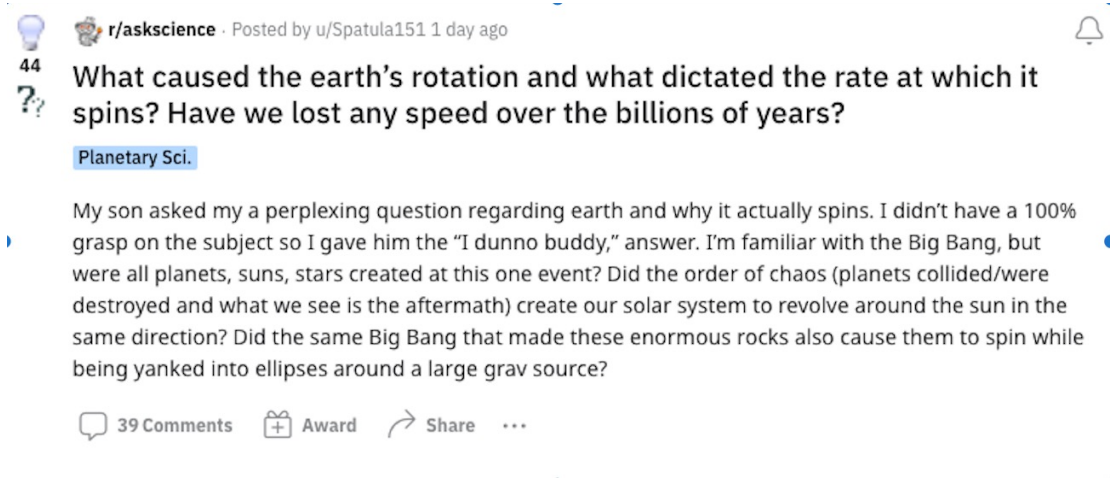
Datasets

- **Pushshift API** to access and scrape texts from posts
- About 5000 posts scraped from each of the **AskScience** and **ShittyAskScience** subreddits
- Data cleaning
  - Remove URLS
  - Vectorizers to create bag of words

r/AskScience

Real science questions and real scientific answers

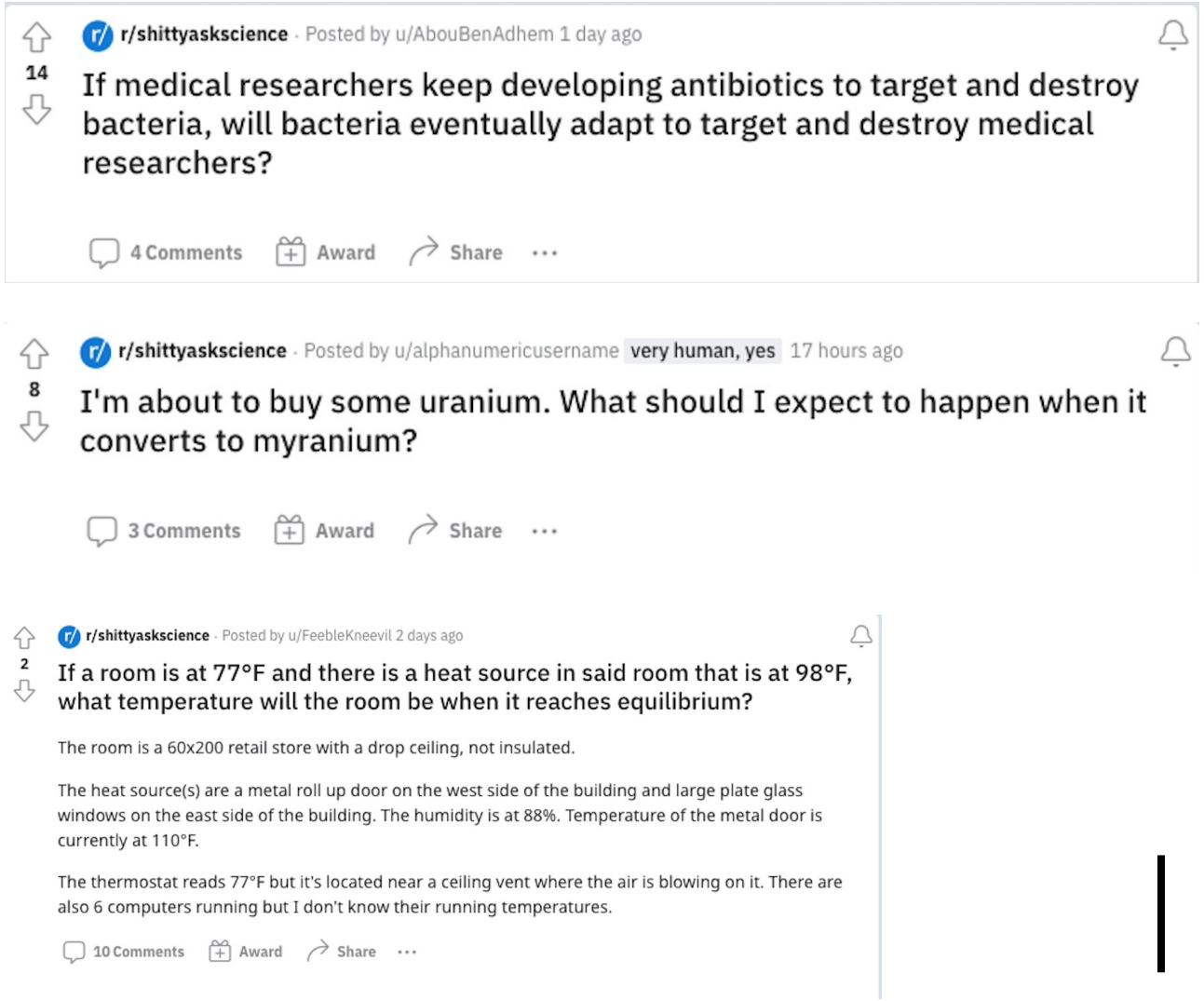
Rules more strictly regulated



r/ShittyAskScience

Meant to be funny

Does not actually makes scientific sense



Drawbacks

- Unable to access body of text using Pushshift API
- Had to work with only the Title of the subreddits
- Many posts in ShittyAskScience subreddit refers to other posts or GIF’s, which are not able to be analyzed using Natural Language Processing

Features Compared

COUNTS

- Characters
- Words
- Numerical Texts

WORD FREQUENCIES

- Stop words?
- Lemmatized
- Bigrams

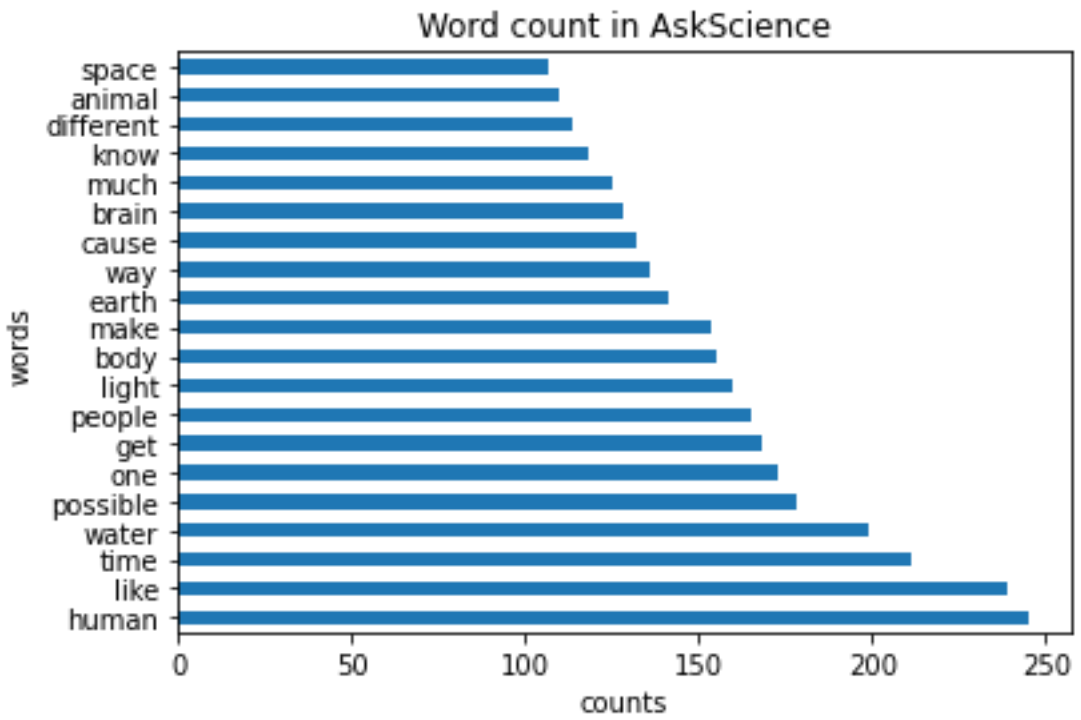
SENTIMENT SCORES

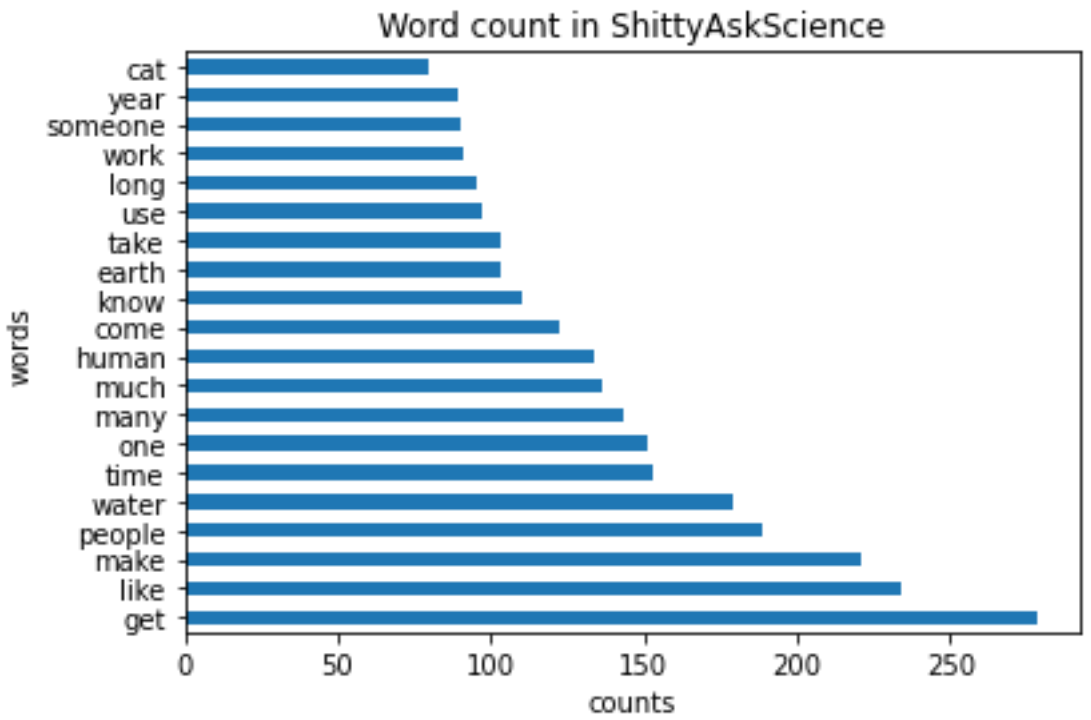
- Negative
- Neutral
- Positive

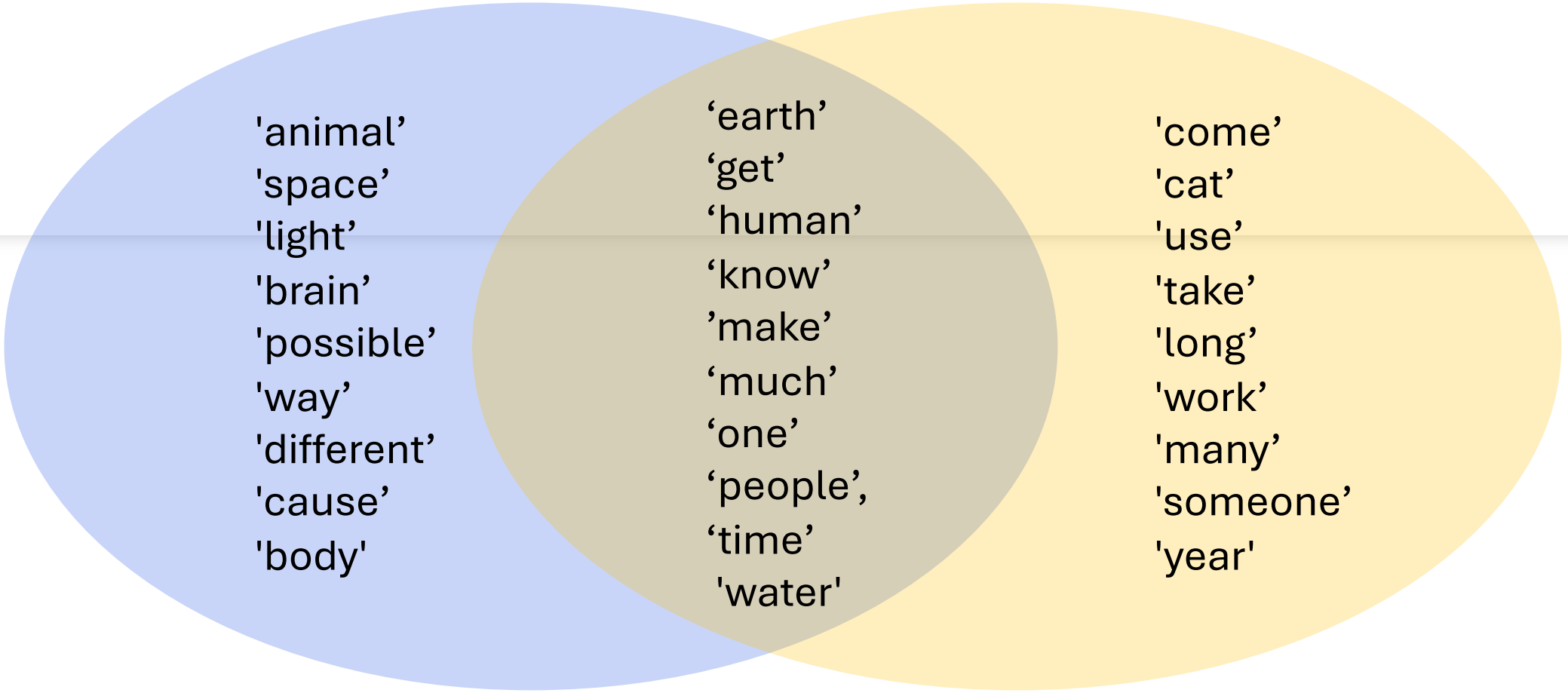
COMPLEXITY

- Ave word counts
- Flesch Reading Ease score (FRE)

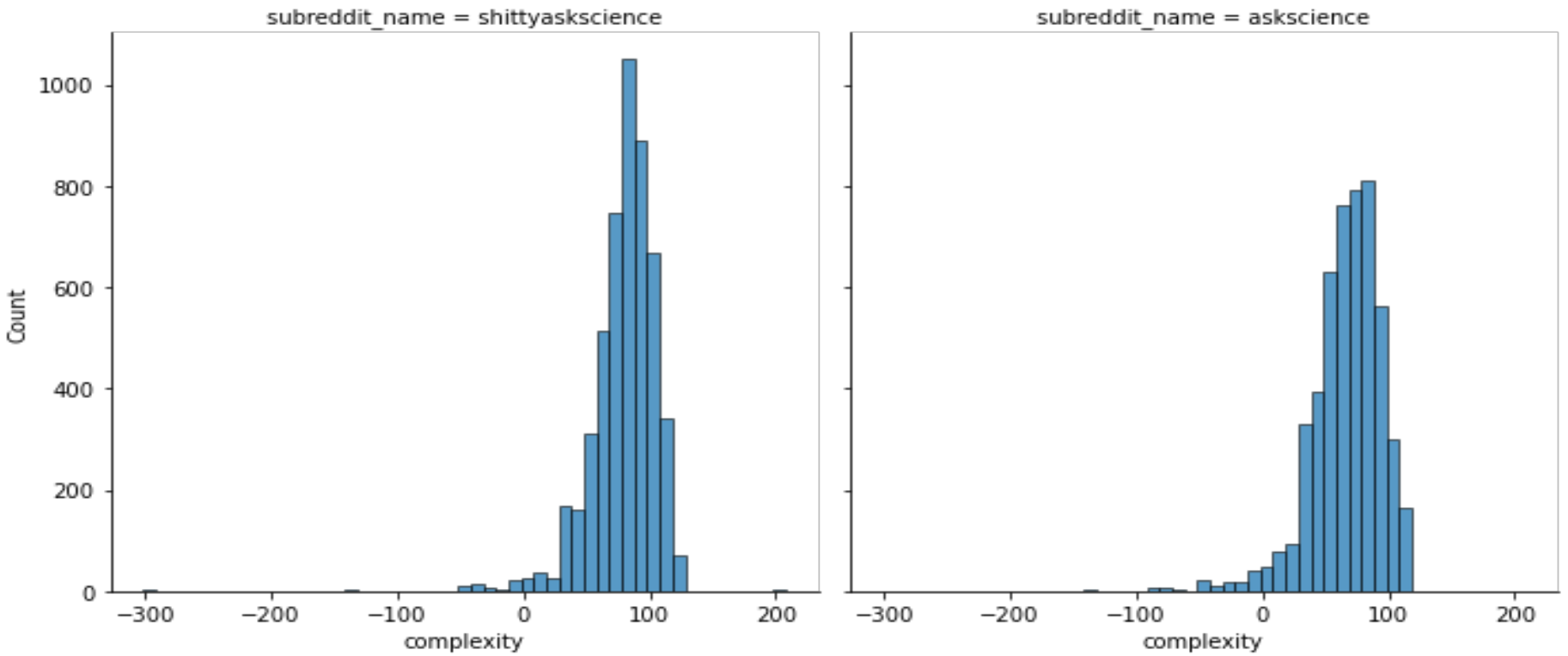
Word Frequencies






'animal'
'space'
'light'
'brain'
'possible'
'way'
'different'
'cause'
'body'
'earth'
'get'
'human'
'know'
'make'
'much'
'one'
'people',
'time'
'water'
'come'
'cat'
'use'
'take'
'long'
'work'
'many'
'someone'
'year'
AskScience
ShittyAskScience

Text Complexity



$$FRE = 206.835 - 1.015\left(\frac{total\ words}{total\ sentences}\right) - 84.6\left(\frac{total\ syllables}{total\ words}\right)$$

Subreddit	Average Word Length	FRE Score
AskScience	6.04	66.08
ShittyAskScience	5.49	79.00

Modeling: Metrics

	MultinomialNB	Random Forest	Logistic Regression	KNN Classifier
Accuracy	0.7201	0.7262	0.7069	0.6109
Recall	0.7082	0.6488	0.6984	0.8236
Specificity	0.7320	0.8035	0.7154	0.3986
Precision	0.7251	0.7672	0.7102	0.5776
F1	0.7166	0.7031	0.7042	0.6790

accuracy: percentage of correct subreddit classification

Sensitivity(Recall): Among the actual ShittyAskScience submissions, how many(or proportion) did I predict correctly

Specificity(True negative rate): Among the actual AskScience submissions, how many(or proportion) did I predict correctly

Precision(Positive predictive value): Among the posts I predicted as ShittyAskScience, how many did I get correct?

Conclusion

- Overall, model improvement is needed as the model with highest accuracy predicts less than a third of the texts correctly classified

- Possibly able to enhance the model if I can scrape the text body, not just the title

- Will return with a better model!