Project 3: Reddit Data Scraping and Building Classification Model

Saba Suhail

Overview

Nate Silver and co. at FiveThirtyEight have agreed to hear my pitch for a story in two weeks. I need to make a narrative on how to create a Reddit post that will get the most engagement from Reddit users.

This project will involve web-scraping, NLP and classification models.

Use of PRAW:

- 11353 data-points which after dropping duplicates become 10958 entries

-Post_id, post_title, authors_link karma, authors_comment_karma etc adding to 19 columns per entry

Understanding the project

Item 1

Scraped data from Reddit

Cleaning

EDA

Item 2

Dummies for subreddits

NLP for post_title:

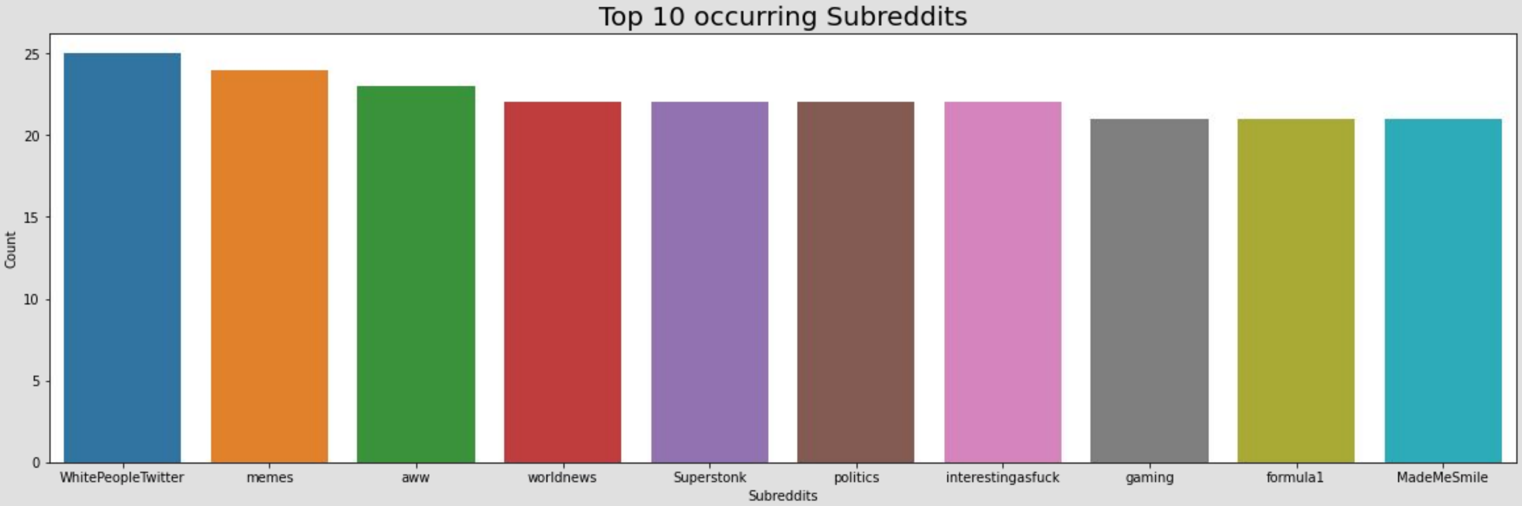
1. Countvectorization
2. Tfidfvectorization

Item 3

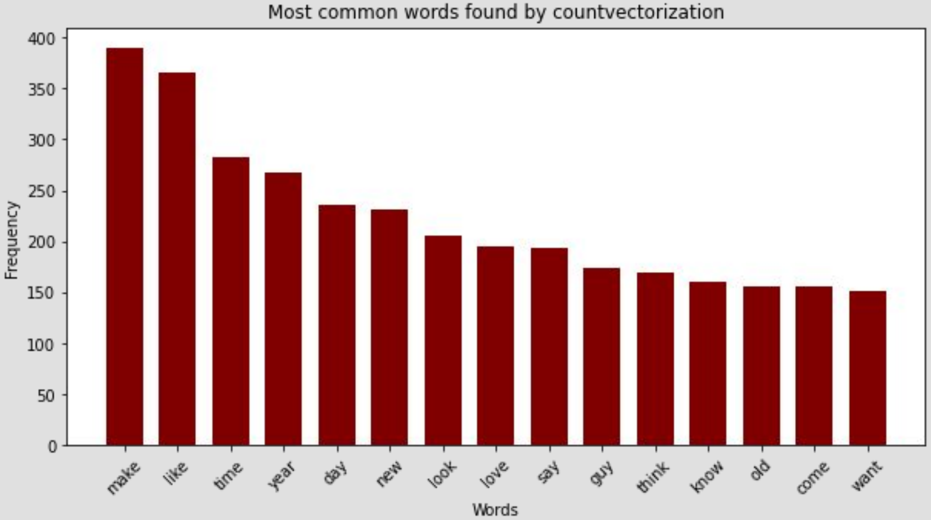
Classification model evaluation:

1. RandomForestClassifier
2. RandomForestClassifier with Gridsearch
3. KNN
4. LogisticRegression
5. Ensemble Methods: Decision tree, Bagging, Decision Stump

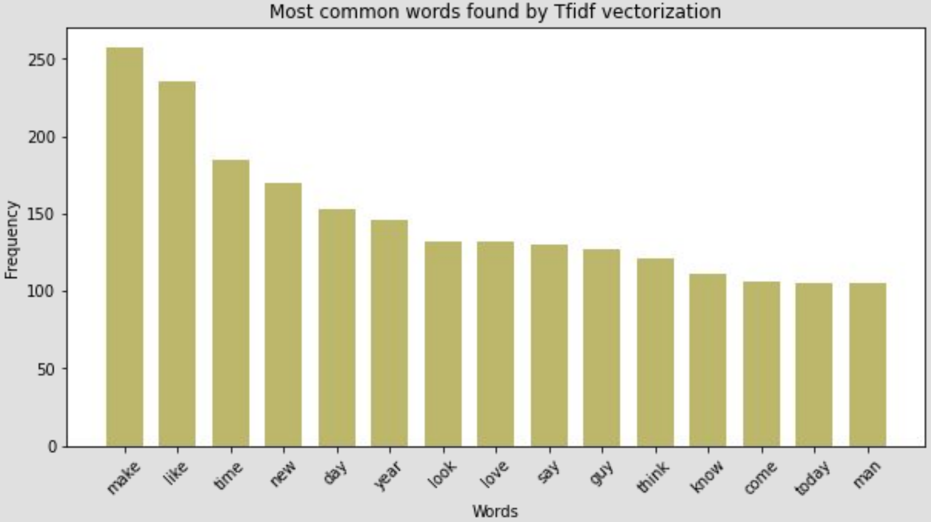
Understanding the data



Top 10 occurring Subreddits

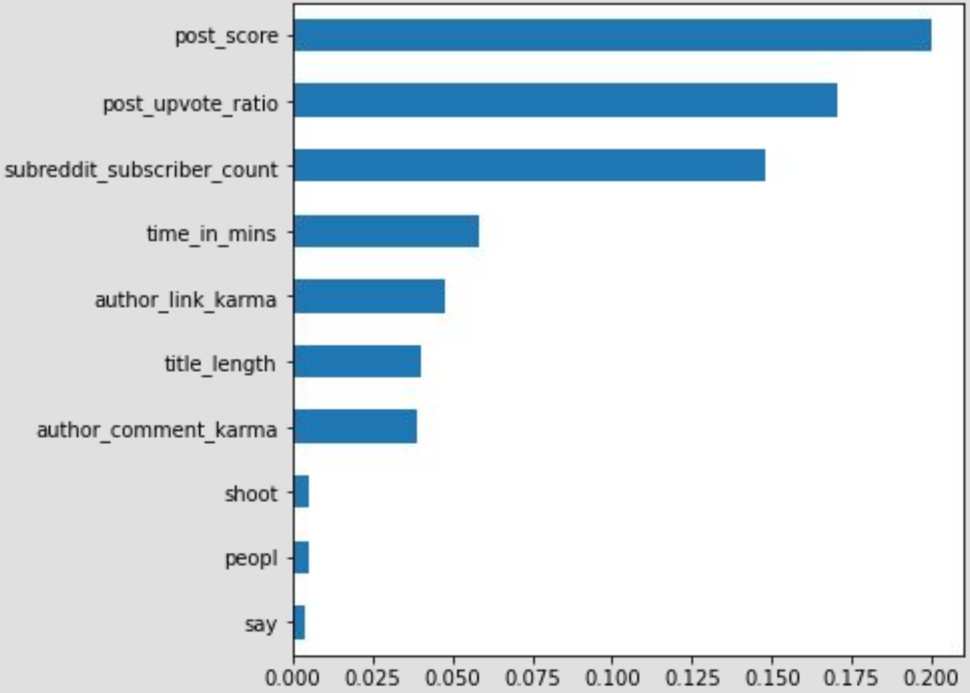


Most common words found by countvectorization



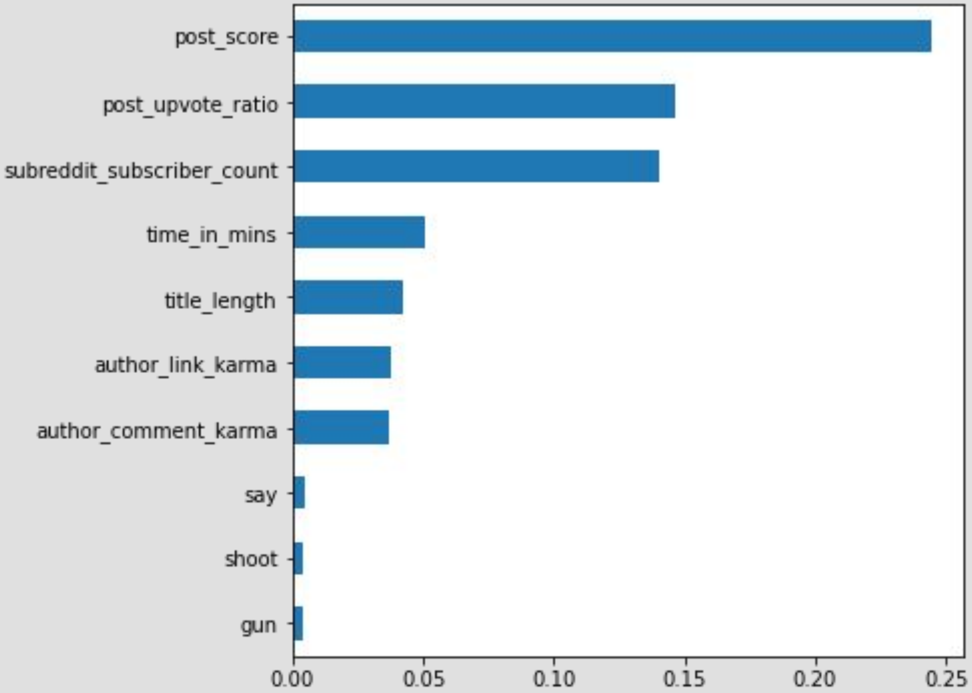
Most common words found by Tfidf vectorization

RandomForestClassifier for Countvectorized Data



```
The best parameters on the training data are:
 {'max_depth': 23, 'n_estimators': 170}
best max_depth: 23
best n_estimators: 170
Random Forest Score: 0.78 +- 0.035

Confusion Matrix:

[[1085  283]
 [ 328 1044]]
              precision    recall  f1-score   support

           0       0.77      0.79      0.78      1368
           1       0.79      0.76      0.77      1372

    accuracy                           0.78      2740
   macro avg       0.78      0.78      0.78      2740
weighted avg       0.78      0.78      0.78      2740

0.777007299270073
```

RandomForestClassifier for Tfidfvectorized Data



```
GridSearch results
The best parameters on the training data are:
 {'max_depth': 23, 'n_estimators': 170}
best max_depth: 23
best n_estimators: 170
Random Forest Score: 0.78 +- 0.030

Confusion Matrix:

[[1101  267]
 [ 339 1033]]
              precision    recall  f1-score   support

           0       0.76      0.80      0.78      1368
           1       0.79      0.75      0.77      1372

    accuracy                           0.78      2740
   macro avg       0.78      0.78      0.78      2740
weighted avg       0.78      0.78      0.78      2740

0.7788321167883212
```

Points to ponder

1. Removed post_num_comments as it would be leaking data
2. Time_in_min can be removed
3. Varying max_features in NLP algo will give different results
4. Sample selection problem
5. Don’t use things not known apriori-post upvote ratio, post_score, time_in_min for posts yet to be posted

Conclusion

1. Bagging performed best followed closely by RandomForestClassifier and Decision tree
2. The complexity of algorithms should be considered into account while dealing with huge datsasets-use better GPUs for complex algorithms
3. Respective models' scores on countvectorised and tfidfvectorised data are comparable
4. Best results for k=5 for KNN

Recommendations

1. Post in a subreddit with high subscriber count, tag as many as possible
2. The company should employ an author with high karma(if possible)
3. Have a decent title length
4. Politics, funny,antiwork etc popular topics. Use them
5. Increase upvotes. Ask whoever you know, bots also if possible