HATE SPEECH DETECTION

PREPROCESSING OF TEXT DATA INCLUDES:

1. Replacing URLS, usernames
2. Using Emoji Python library to detect emojis
3. Replacing Hashtags , punctuations
4. Removing stop words
5. Word Lemmatization

Vectorization is performed on the clean data using:

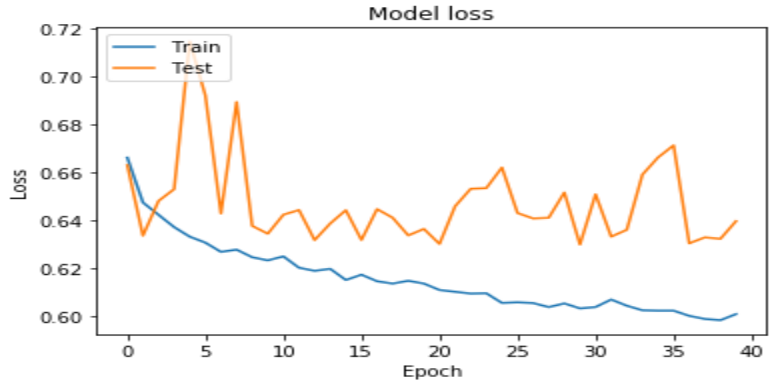
1. Word Embeddings
2. TF-IDF Word Vectorizer
3. Count Vectorizer - Bag of Words model

Multiple Classifiers were used in each form of vectorization:
As it is a binary classification, I used classifiers such as MLP, Logistic Regression, SVM with a gaussian kernel and Random Forest Classifier.

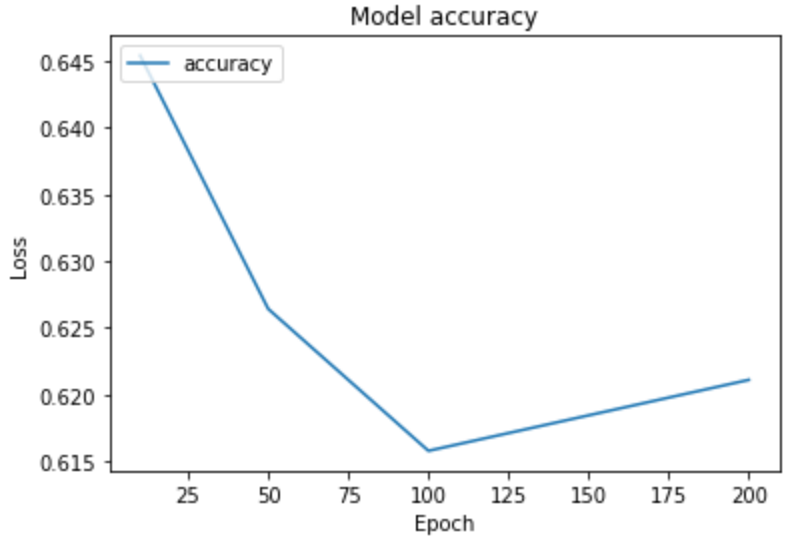
GridSearchCV was used for hyperparameter tuning that gave the best parameters as output that produced the most accurate results.

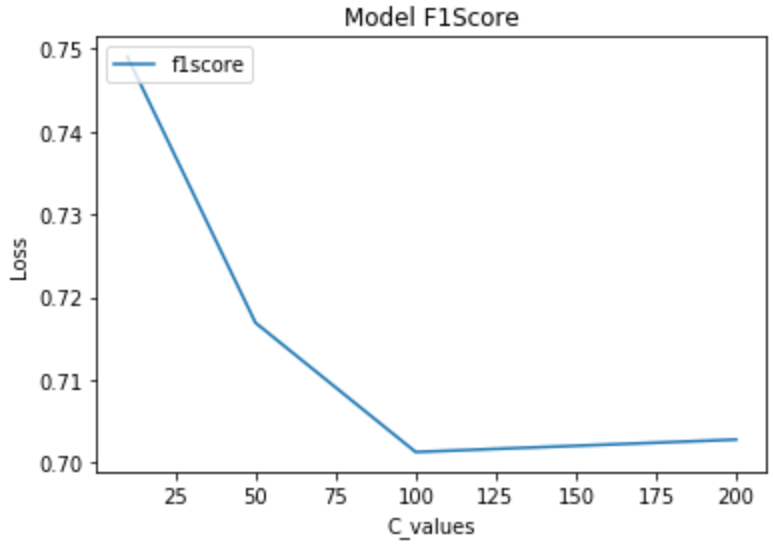
1.WORD EMBEDDINGS:

Using MLP:

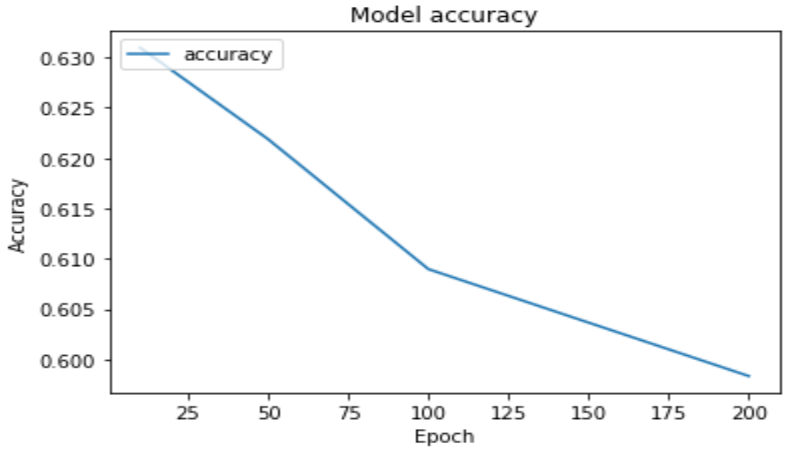


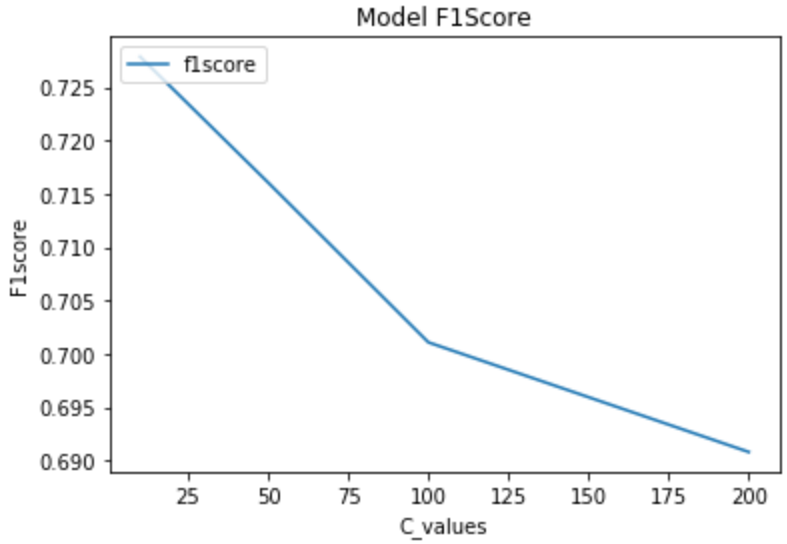
USING SVM: Different values of C and kernel = ‘rbf’





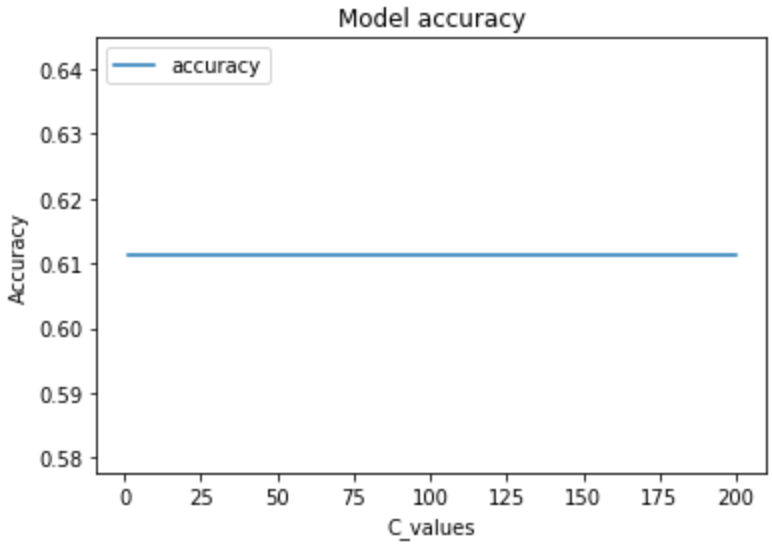
Using Logistic Regression:

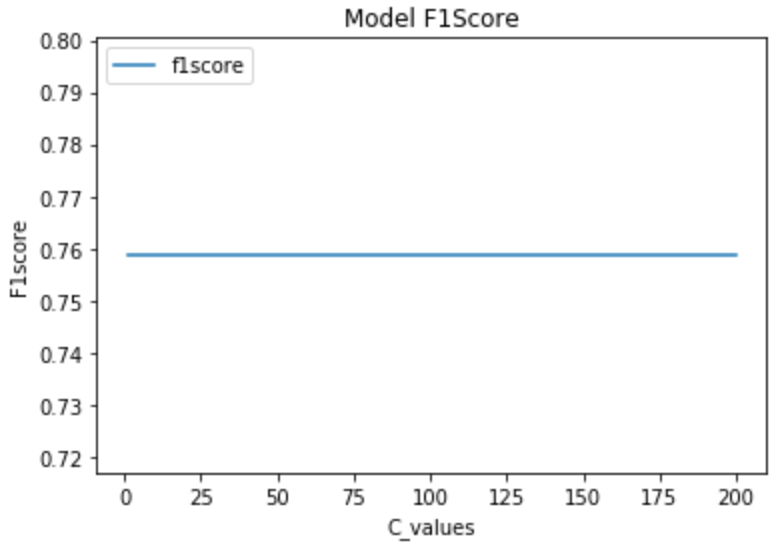




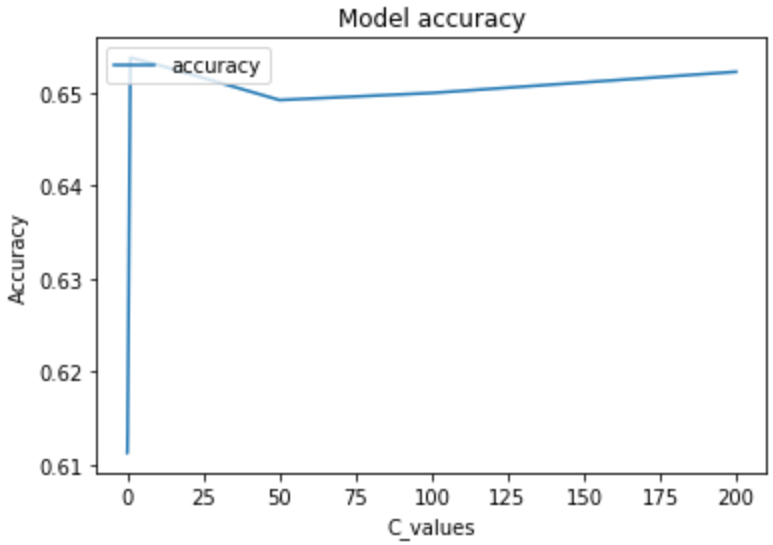
2. TF - IDF

Using SVM:

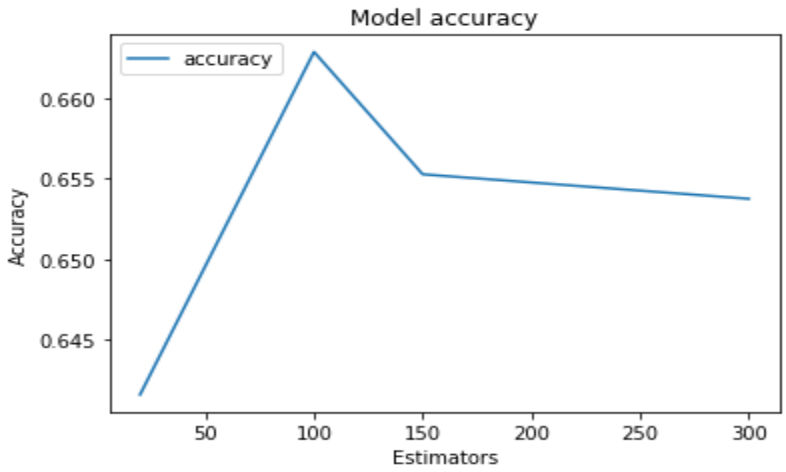


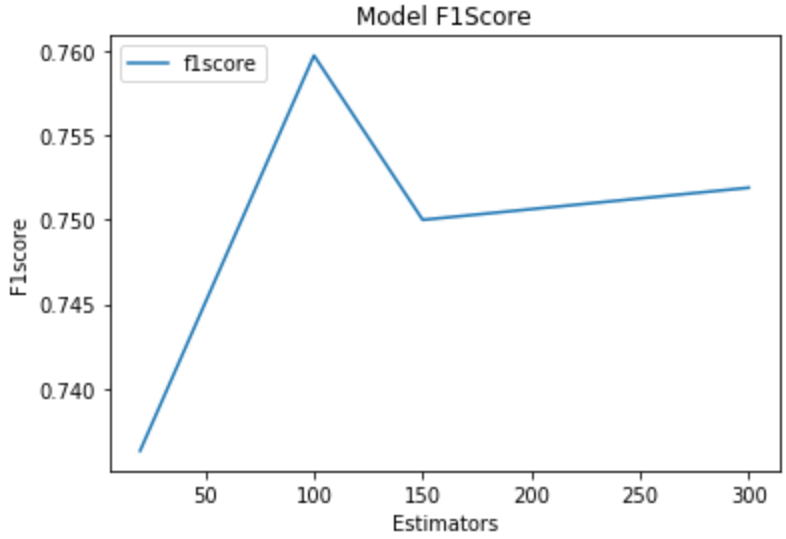


Using Logistic Regression :



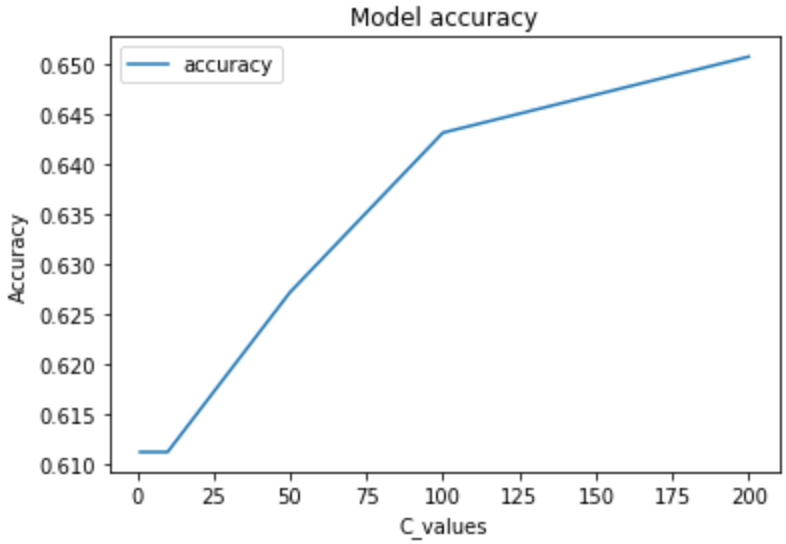
Using Random Forest Classifier:

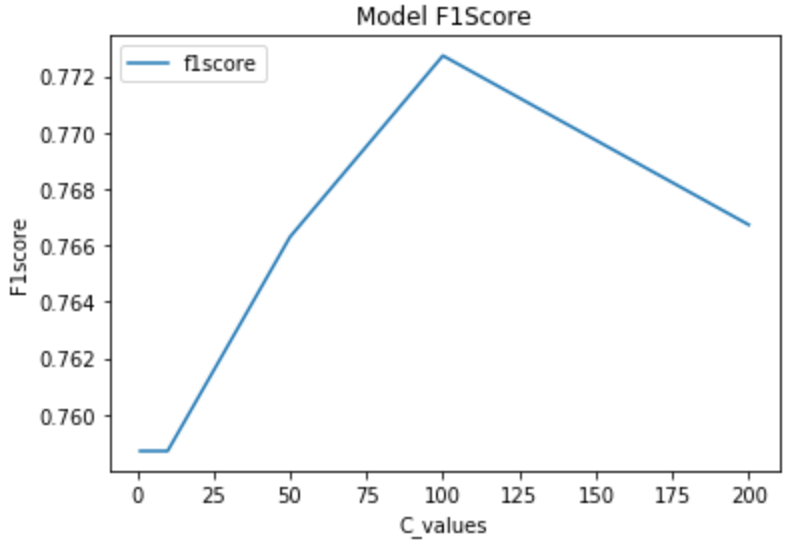




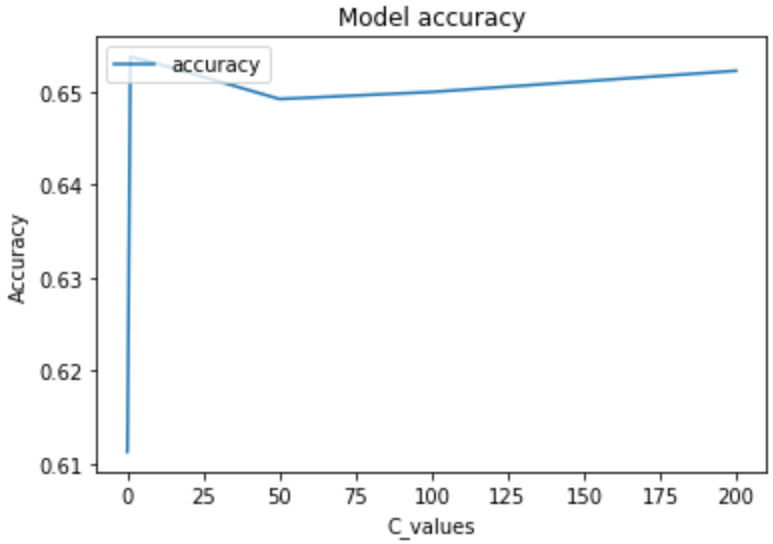
3. Using Count Vectorizer:

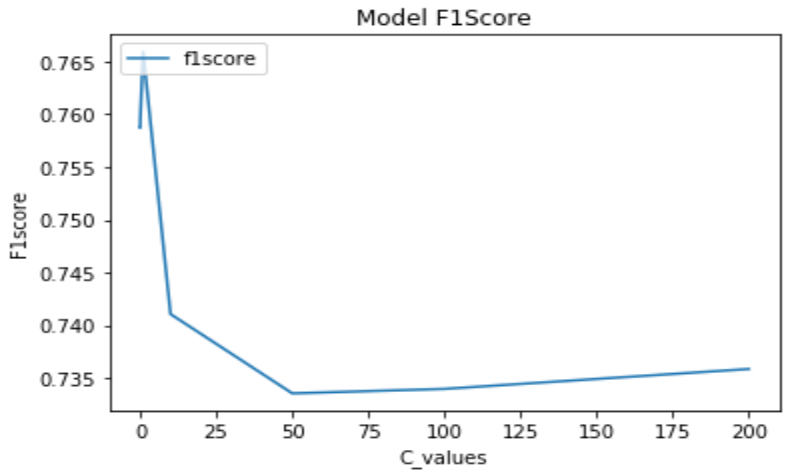
Using SVM:



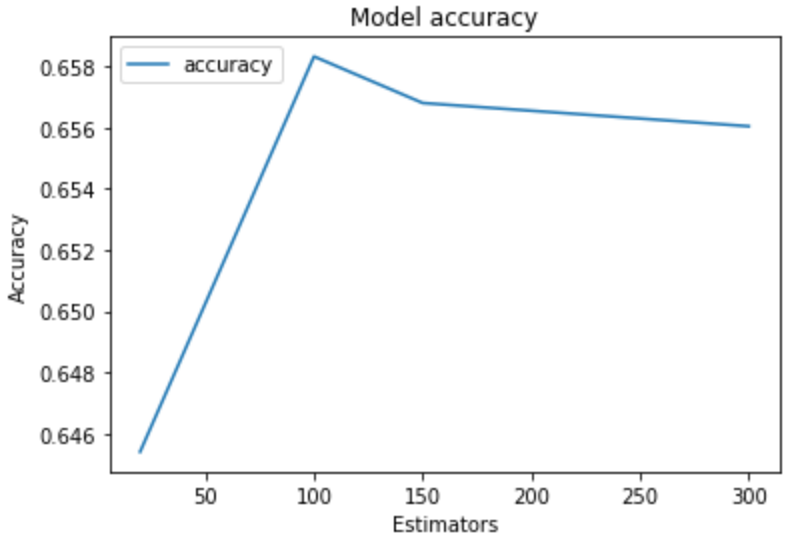


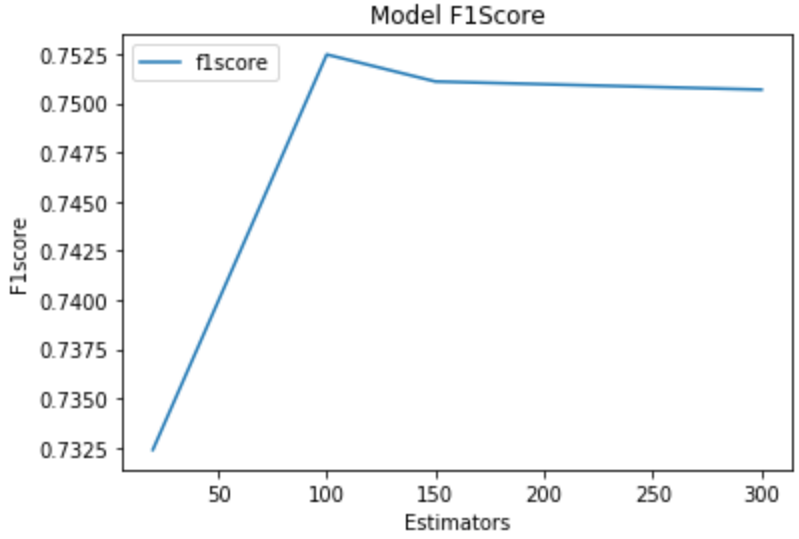
Using Logistic Regression:





Using Random Forest:





Observation:

As we can see from the above graphs that data vectorized using TF-IDF Vectorizer and SVM classifier outperforms all the other classifiers and vectorizers and hence selected it as the classifier for the final prediction.

```
[0 0 1 ... 0 0 0]
0.6935483870967742
0.6434755380457037
              precision    recall  f1-score   support

           0       0.64      0.43      0.51       395
           1       0.71      0.85      0.78       659

    accuracy                           0.69      1054
   macro avg       0.67      0.64      0.64      1054
weighted avg       0.68      0.69      0.68      1054
```

The above confusion matrix shows how well the classifier performed.

How to run the program:

The paths are specified in the program itself. Those are absolute paths. So if one needs to run the program, he/she needs to change the paths in the program manually
And then run the program as a normal python file.