Cyber Bullying Detection Using Machine Learning

Objective:

- There is no system present in the real world to detect bullying texts. So , we wanted to build a model which detect those sort of texts.
- This bullying has a physical and mental impact on the victim. The victims choose self-destructive acts like suicide because the trauma of cyberbullying which is hard to be endured. Thus, the identification and prevention of cyberbullying is important to protect teenagers.
- Cyber bullying creates toxic environment in social media, detecting and preventing it can help users to provide a healthy environment.

Results:

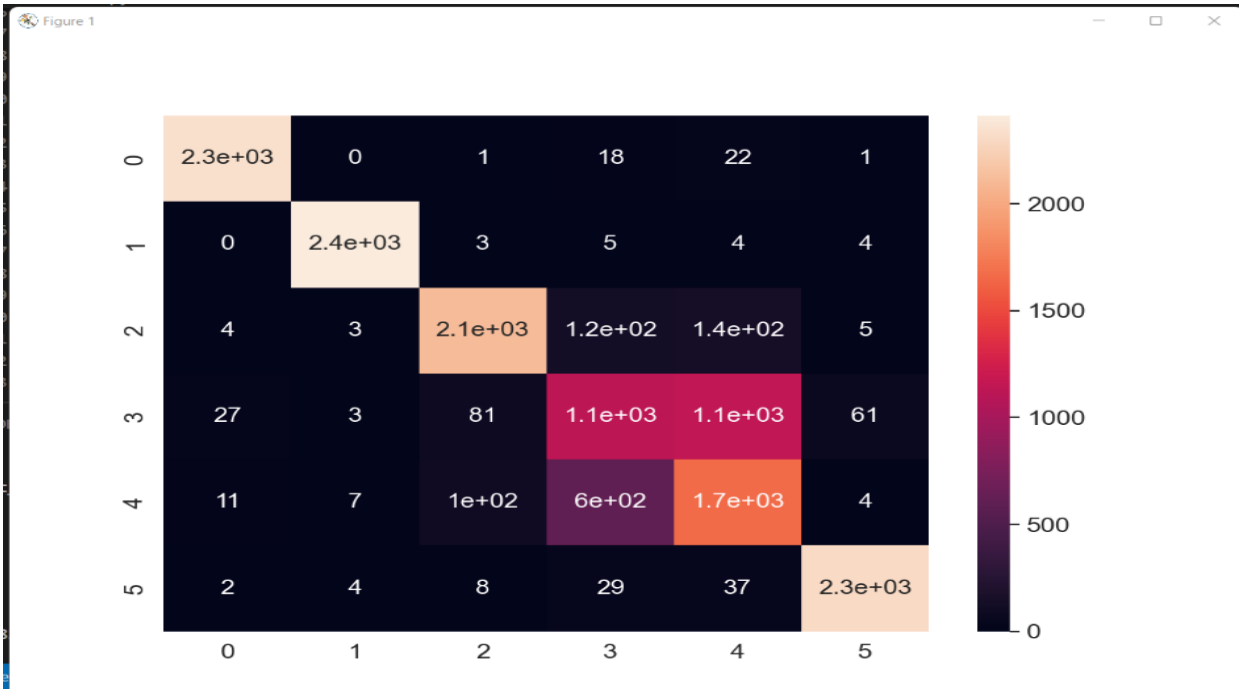
```
Enter Text you want to classify: Dont allow black people to this country
Result of Random Forest model :  ['ethnicity']
Result of Naive Bayes Model :  ['religion']
Result of the Support Vector Machine :  ['ethnicity']
Result of the Decision Tress MOdel :  ['ethnicity']
Result of Neural Networks Model :  ['ethnicity']
```

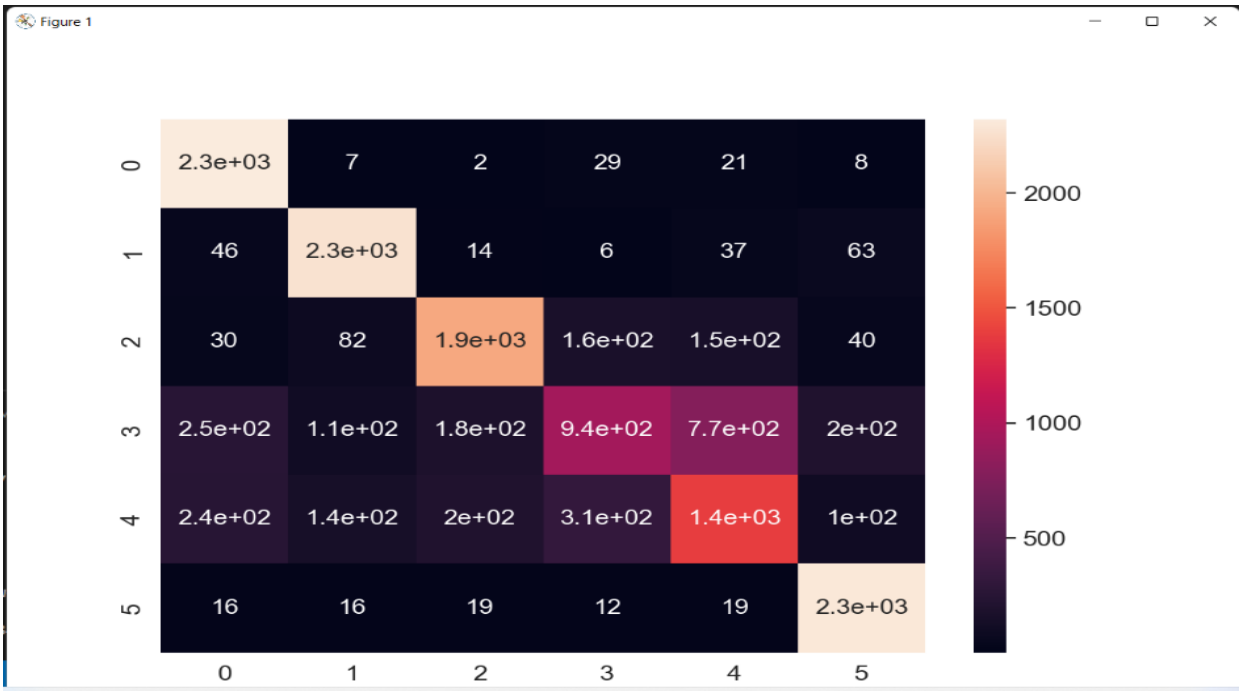
```
Enter Text you want to classify: you are a nigga
Result of Random Forest model :  ['ethnicity']
Result of Naive Bayes Model :  ['ethnicity']
Result of the Support Vector Machine :  ['ethnicity']
Result of the Decision Tress MOdel :  ['ethnicity']
Result of Neural Networks Model :  ['ethnicity']
```

```
Enter Text you want to classify: go home
Result of Random Forest model :  ['not_cyberbullying']
Result of Naive Bayes Model :  ['not_cyberbullying']
Result of the Support Vector Machine :  ['not_cyberbullying']
Result of the Decision Tress MOdel :  ['not_cyberbullying']
Result of Neural Networks Model :  ['not_cyberbullying']
```

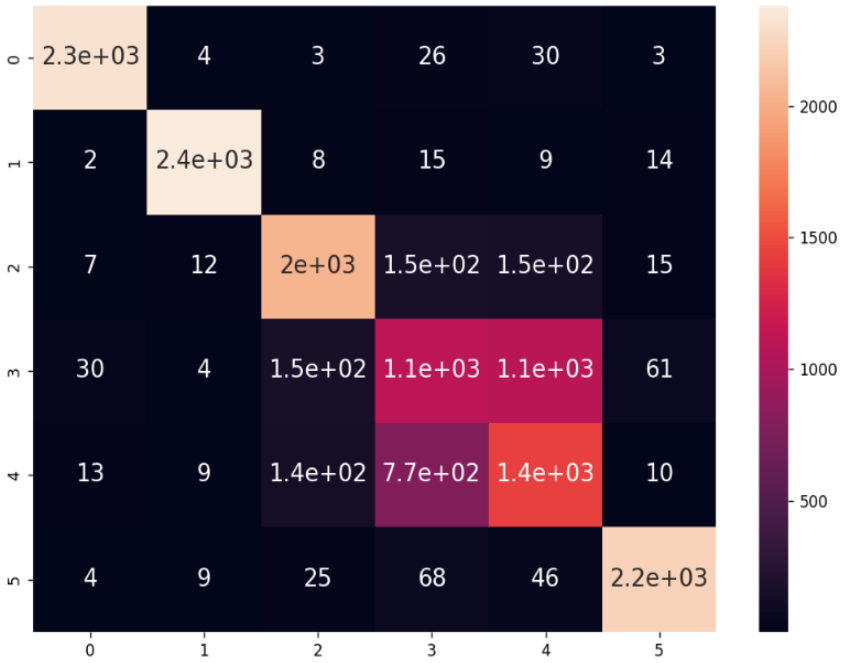
Heat Maps of machine learning models

i)heat map of random forest classifier



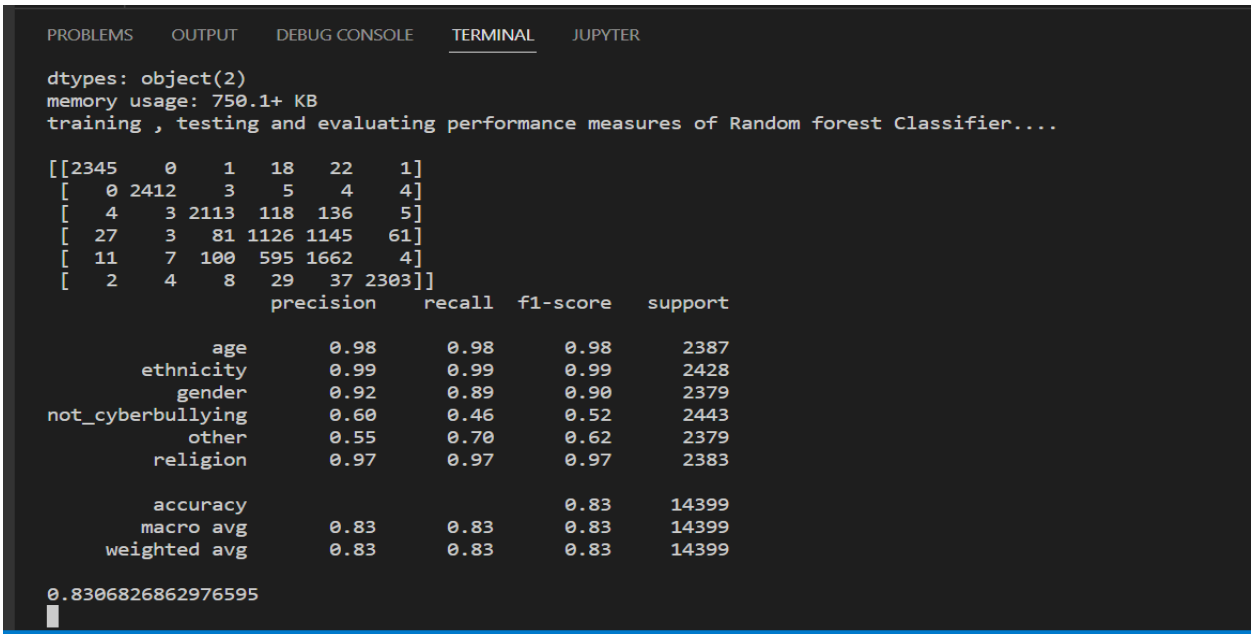


iii)Decision Tree classifier



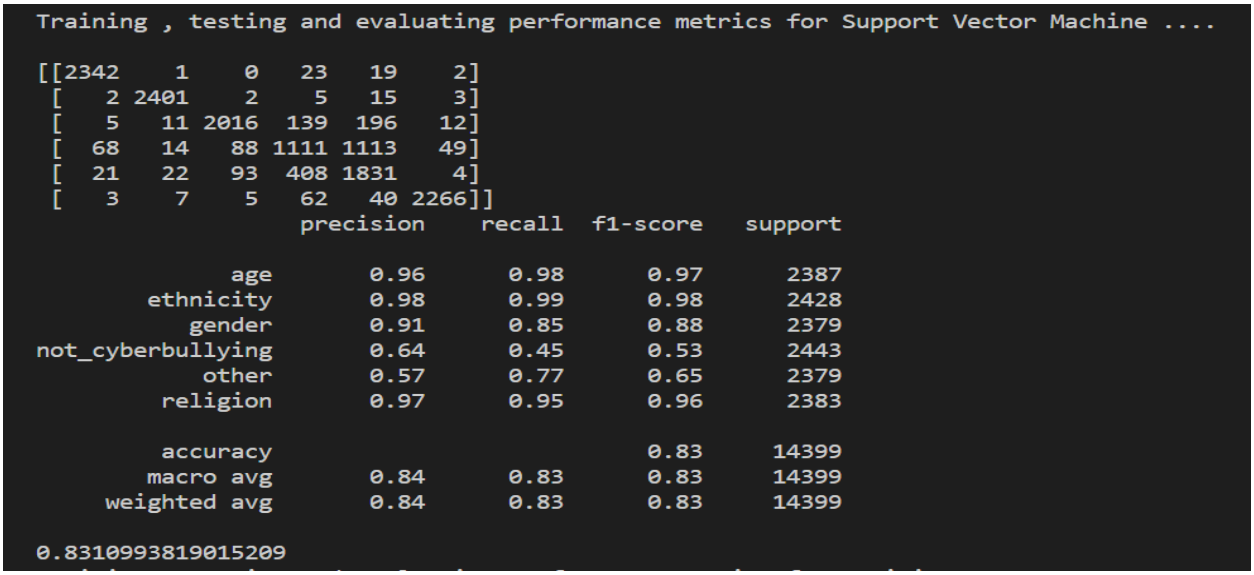
Accuracy Scores of ML models

i)Random Forest Classifier



```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   JUPYTER

dtypes: object(2)
memory usage: 750.1+ KB
training , testing and evaluating performance measures of Random forest Classifier....

[[2345    0    1   18   22    1]
 [   0 2412    3    5    4    4]
 [   4    3 2113  118  136    5]
 [  27    3   81 1126 1145   61]
 [  11    7  100  595 1662    4]
 [   2    4    8   29   37 2303]]
                  precision    recall  f1-score   support

             age       0.98      0.98      0.98      2387
       ethnicity       0.99      0.99      0.99      2428
          gender       0.92      0.89      0.90      2379
not_cyberbullying       0.60      0.46      0.52      2443
           other       0.55      0.70      0.62      2379
        religion       0.97      0.97      0.97      2383

        accuracy                           0.83     14399
       macro avg       0.83      0.83      0.83     14399
    weighted avg       0.83      0.83      0.83     14399

0.8306826862976595
```

ii)Naïve Bayes classifier



```
Training , testing and evaluating performance metrics for Support Vector Machine ....

[[2342    1    0   23   19    2]
 [   2 2401    2    5   15    3]
 [   5   11 2016  139  196   12]
 [  68   14   88 1111 1113   49]
 [  21   22   93  408 1831    4]
 [   3    7    5   62   40 2266]]
                  precision    recall  f1-score   support

             age       0.96      0.98      0.97      2387
       ethnicity       0.98      0.99      0.98      2428
          gender       0.91      0.85      0.88      2379
not_cyberbullying       0.64      0.45      0.53      2443
           other       0.57      0.77      0.65      2379
        religion       0.97      0.95      0.96      2383

        accuracy                           0.83     14399
       macro avg       0.84      0.83      0.83     14399
    weighted avg       0.84      0.83      0.83     14399

0.8310993819015209
```

iii)Decision tree Classifier

```
Training , testing and evaluating performance metrics for Decision Tree....

[[2321    4    3   26   30    3]
 [   2 2380    8   15    9   14]
 [   7   12 2042  153  150   15]
 [  30    4  154 1099 1095   61]
 [  13    9  136  773 1438   10]
 [   4    9   25   68   46 2231]]
                   precision    recall  f1-score   support

              age       0.98      0.97      0.97      2387
        ethnicity       0.98      0.98      0.98      2428
           gender       0.86      0.86      0.86      2379
not_cyberbullying       0.51      0.45      0.48      2443
            other       0.52      0.60      0.56      2379
         religion       0.96      0.94      0.95      2383

         accuracy                           0.80     14399
        macro avg       0.80      0.80      0.80     14399
     weighted avg       0.80      0.80      0.80     14399

0.7994305160080561
```