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Name: ***Syed Ahtsham Ul Hassan***

Course: ***Advanced Natural Language Processing***

Assignment No***.: 01 – Naïve Bayes and Logistic Regression Implementation***

***Tools Used:***

IDE: PyCharm

Python: Numpy, NLTK, matplotlib

***Source of the Dataset:***

Zeerak Waseem and Dirk Hovy. 2016. Hateful Symbols or Hateful People? Predictive Features for Hate Speech Detection on Twitter. In Proceedings of the NAACL Student Research Workshop, pages 88–93, San Diego, California. Association for Computational Linguistics.

Link to the data repository: https://github.com/zeeraktalat/hatespeech

***Evaluation of Naïve Bayes on decreasing the value of ‘k’:***  
While I changed the value of ‘k’, the model’s accuracy and f\_1 measure changed and varied as can be seen in the Plot of Accuracy, f\_1 measure (on y-axis) and the value of k (on x-axis). F\_1 score did not change much but the accuracy changed.

![A graph with a blue line

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***Changing the Features Set:***  
  
I chose the following feature sets:

1. removing stop words or frequent words
2. stemming or lemmatizing

My motivation to choose the first one was because there were many stop words in the given dataset. Since, we know that tweets are texts belonging to human beings therefore it contained a lot of stop words and frequent words.  
  
Therefore, I removed them because, they were not adding any value to my classifier.  
  
On the other hand, I chose the stemming/lemmatizing over my features, because it reduced my vocabulary drastically and increased the computational power. Also, having words in their root form is better for probabilities computation. We do not need to compute probabilities of every word having different forms.

***Accuracy and F\_1 Score for Naïve Bayes:***

Accuracy: 85.04 %

F\_1 score: 0.78

***Accuracy for Logistic Regression:***  
  
Accuracy: 88.35