



COMP 6721

Project Assignment - 2 **Spam Detector**

Submitted to
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Team name
FL-G08

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Analysis

- **Problem formulation for training the Naïve Bayes Classifier:** Each line of every single file provided within Training dataset (**1000 HAM and 997 SPAM**) was passed through a series of tokenization steps to arrive a **vocabulary of size 60751 unique words**.
- **Confusion Matrix:** Considering **SPAM as a positive class** and **HAM as the negative class**, the below given confusion matrix was computed based on predictions made by our trained model over the provided **test dataset**.

<i>Test Files = 800</i>	Predicted (Spam)	Predicted (Ham)	
Actual (Spam)	TP=349	FN=51	<i>400</i>
Actual (Ham)	FP=2	TN=398	<i>400</i>
	<i>351</i>	<i>449</i>	

- **Evaluation Metrics:** Based on the above confusion matrix values following evaluation metrics were calculated.

Accuracy: $TP + TN / (TP + TN + FP + FN)$

Recall: $TP / (TP + FN)$

Precision: $TP / (TP + FP)$

F1-Score: $2 * Recall * Precision / (Recall + Precision)$

Evaluation Metric	Value
Accuracy	93.375
Precision	99.43
Recall	87.25
F1-Score	92.943

Overall in general the model was able to show very high Precision signifying that there is high possibility of a mail being SPAM if our model predicts it to be one. However a slightly lower Recall signifies that in some 13% of the cases model was actually not able to capture a mail as SPAM and predicted it to be HAM.

References

1. <https://stackoverflow.com/questions/28931224/adding-value-labels-on-a-matplotlib-bar-chart>
2. <https://stackoverflow.com/questions/265960/best-way-to-strip-punctuation-from-a-string>

Instructions to run the project:

- Download/Clone the Project Repo to your local machine –
[IntroToAI-SpamDetector](<https://github.com/apoorvsemwal/IntroToAI-SpamDetector.git>)
or access it from Google drive –
(<https://drive.google.com/open?id=1hFeO5xocprJfMTZcDSfcwEt-uOsAlrHS>)
- Navigate to '**\IntroToAI-SpamDetector\src**' in your terminal
- Run CMD:
python launcher.py
- Check results folder '**\IntroToAI-SpamDetector\results**'