

**COMP 6721**

Project Assignment - 2

**Spam Detector**

**Submitted to**

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**Team name**

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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**.

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| --- | --- | --- | --- |
| *Test Files = 800* | **Predicted (Spam)** | **Predicted (Ham)** |  |
| **Actual (Spam)** | TP=349 | FN=51 | *400* |
| **Actual (Ham)** | FP=2 | TN=398 | *400* |
|  | *351* | *449* |  |

* **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'**