Concordia University

Engineering and Computer Science

COMP 6721 Report

Spam Detector using Naïve Bayes Approach

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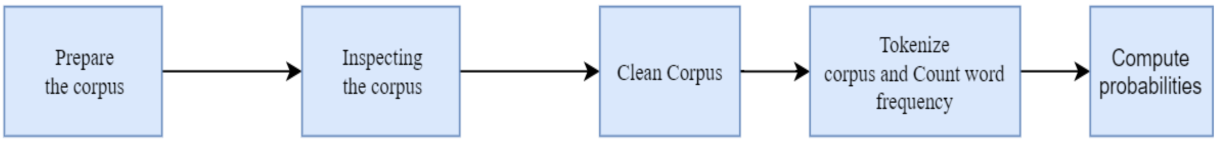
Analysis

In order to calculate the accuracy, precision, recall and F1-measure for Spam & Ham Class as well as a confusion matrix, series of steps performed to generate classification result such as Common Aspect of Text Mining and Naïve Bayes Classifier Approach.

1. Common Aspect of Text Mining:



2. Naïve Bayes Classifier Approach:

   Step 1: Build the Vocabulary of words by separating Spam and Ham from training Data.
   Step 2: Store Vocabulary of words in a file.
   Step 3: Train Classifier on Vocabulary.
   Step 4: Evaluate Performance on Test data.
   Step 5: Display Confusion and Evaluation Matrix

Confusion Matrix:

	SPAM	HAM
SPAM	336	6
HAM	6	394

Evaluation Matrix:

- **Accuracy**: $\frac{\mathrm{TP + TN}}{\mathrm{TP + TN + FP + FN}}$
- **Recall**: $\frac{\mathrm{TP}}{\mathrm{TP+FN}}$
- **Precision**: $\frac{\mathrm{TP}}{\mathrm{TP + FP}}$
- **F1-Score**: $\frac{2 * \mathrm{Recall} * \mathrm{Precision}}{\mathrm{Recall + Precision}}$

Accuracy	91.25
Precision	98.24
Recall	84
F1	90.566

In our model, there is high probability of getting mail in SPAM class due to very high precision. It was also found that in our model, around 16 % of a mail is predicted as HAM class instead of SPAM due to lower recall.

References

[1] https://www3.nd.edu/~steve/computing_with_data/20_text_mining/text_mining_example.html#/
[2] https://towardsdatascience.com/spam-filtering-using-naive-bayes-98a341224038
[3] https://medium.com/coinmonks/spam-detector-using-naive-bayes-c22cc740e257
[4] https://en.wikipedia.org/wiki/Naive_Bayes_spam_filtering