**Chapter 7**

**Experimental Analysis and Results**

In this chapter, the performance and experimental analysis of the algorithm implemented in the project and the results obtained are presented.

**7.1 Evaluation Metric**

The algorithm implemented is evaluated for the following three metrics

* Accuracy
* Precision
* Recall
* F measure

**Accuracy:** Accuracy or Accuracy rate (or percent correct), is deﬁned as the number of correct cases divided by the total number of cases.

**Precision:** Precision (also called positive predictive value) is the fraction of retrieved instances that are relevant or it is the percentage of selected items that are correct

**Recall:** Recall (also known as sensitivity) is the fraction of relevant instances that are retrieved or it is the percentage of correct items that are selected.

**F Measure:** A measure that combines precision and recall, it is the weighted harmonic mean or can be considered as a combined measure that assesses the precision recall trade off.

Let us consider a 2-by2 contingency table as shown below

|  |  |  |
| --- | --- | --- |
|  | **actual class (observation)** | |
|  |  |  |
| **predicted class (expectation)** | **tp** (true positive) Correct result | **fp** (false positive) Unexpected result |
| **fn** (false negative) Missing result | **tn** (true negative) Correct absence of result |

Using the above table we can calculate the above mentioned measures using the below discussed formulas.

Accuracy = (tp + tn) / (tp + fp + fn + tn)

Precision = tp / (tp + fp)

Recall = tp / (tp + fn)



In the above formula P is precision, R is recall and α is factor that controls the trade off between precision and recall (0 =< α <= 1).

If we substitute for α = 0.5 (β = 1) we get the F1 measure

F1 = 2 \* *P \* R* / (*P* + *R*)

**7.2 Performance Analysis**

To compute the performance of the Naïve Bayes algorithm implemented we have extracted the test data from the training data.

30 tweets from each of the positive and negative training data and 10 tweets from neutral training data was taken as the test data, hence the test data consisted of 70 tweets.

The algorithm was implemented using test data as the input

The results obtained were as follows

* 28 tweets were predicted correctly
* 42 tweets were predicted incorrectly

Now precision, recall and f measure is calculated as follows

* Case1: Compute precision, recall and F1 measure for positive test data by comparing the program prediction and the actual true result.
* Case2: Compute precision, recall and F1 measure for negative test data by comparing the program prediction and the actual true result.
* Case3: Compute precision, recall and F1 measure for neutral test data by comparing the program prediction and the actual true result.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Accuracy | Precision | Recall | F1-measure |
| Positive | 51.43% | 30% | 8.33% | 13.0394% |
| Negative | 48.57% | 44.44% | 70.59% | 54.5426% |
| Neutral | 81.43% | 14.29% | 1.75% | 3.1181% |

