

**Dept. of Computer Science and Software Engineering**

**COMP 6721 : Applied Artificial Intelligence**

**Winter 2020**

**Project 2**

Submitted To: **Dr. René Witte**

Submitted By:

Team **FL-G06**

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**Analysis**

* **Accuracy** = (number of instances correctly classified / Total number of instances) \* 100

= (734/800)\*100

= **91.75%**

|  |  |  |
| --- | --- | --- |
|  | **Instance in class Spam** | **Instance in class Ham** |
| **Model identified as spam** | 339 | 5 |
| **Model identified as ham** | 61 | 395 |

* **Precision(spam) =** number of instances that are in class Spam & model labeled as spam / total number of instances model labeled as Spam **=** 339/ (339+5) **= 0.985**

**Precision (ham) =** number of instances that are in class Ham & model labeled as ham / total number of instances model labeled as Ham = 395/ (395+61) **= 0.866**

* **Recall(spam) =** number of instances that are in class Spam & model labeled as spam / all instances in class Spam **=** 339/ (339+61) **= 0.848**

**Recall (ham) =** number of instances that are in class Ham & model labeled as ham / all instances in class Ham **=** 395/ (395+5) **= 0.988**

* **F-measure** (a weighted combination of precision & recall)

**F = (β2+1)\*PR / (β2P+R)**; β = 1 since, precision and recall have same importance

**F(spam) =** (2\*0.985\*0.848) /(0.985+0.848) **=** 1.67056 / 1.833 **= 0.911**

Similarly, **F(ham)** = (2\*0.866\*0.988) /(0.866+0.988) = 1.711216 / 1.854 = **0.923**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Accuracy** | **Precision** | **Recall** | **F1-measure** |
| **SPAM class** | 84.75% | 0.985 | 0.848 | 0.911 |
| **HAM class** | 98.75% | 0.866 | 0.988 | 0.923 |

* **Confusion Matrix / Contingency Table**

|  |  |  |  |
| --- | --- | --- | --- |
| correct class  (that should have  been assigned) | classes assigned by the learner | | |
| **Ham** | **Spam** | **Total** |
| **Ham** | 395 | 5 | 400 |
| **Spam** | 61 | 339 | 400 |

This shows test dataset consist of equal distribution of spam and ham files. However, the model identifies 5 Ham files and 61 Spam files incorrectly i.e. it marked them to their opposite classes.

**References**

[1] Word tokenization using python regular expressions:

(<https://stackoverflow.com/questions/6202549/word-tokenization-using-python-regular-expressions>)

[2] Find encoding source

(<https://stackoverflow.com/questions/31019854/typeerror-cant-use-a-string-pattern-on-a-bytes-like-object-in-re-findall>)

[3] Word count source

<https://towardsdatascience.com/very-simple-python-script-for-extracting-most-common-words-from-a-story-1e3570d0b9d0>