

## P02 - Naive Bayes classifier for Fake News recognition

Fake news are defined by the New York Times as "a made-up story with an intention to deceive", with the intent to confuse or deceive people. They are everywhere in our daily life, and come especially from social media platforms and applications in the online world. Being able to distinguish fake contents from real news is today one of the most serious challenges facing the news industry. Naive Bayes classifiers [1] are powerful algorithms that are used for text data analysis and are connected to classification tasks of text in multiple classes. The goal of the project is to implement a Multinomial Naive Bayes classifier in R and test its performances in the classification of social media posts. The suggested data set is available on Kaggle [2]. Possible suggested labels for classifying the text are the following:

- True - 5
- Not-Known - 4
- Mostly-True - 3
- Half-True - 2
- False - 1
- Barely-True - 0

The Kaggle dataset [2] consists of a training set with 10,240 instances and a test set with 1,267 instances.

- divide the dataset into a training, validation and testing set;
- tokenize each word in the data set (convert uppercase to lowercase) and split into tokens;
- clean the collection of words from stop words;
- perform token normalization: create equivalence classes so that similar tokens are mapped in the same class
- build the vocabulary and perform feature selection
- show the results

Apply the developed methods and technique to a new dataset [3] which is characterized by only two labels: 1  $\rightarrow$  **unreliable** and 0  $\rightarrow$  **reliable**.

Draw your conclusions on the results obtained on the two data sets.

## Bibliography

- [1] C. D. Manning, Chapter 13, *Text Classification and Naive Bayes*, in *Introduction to Information Retrieval*, Cambridge University Press, 2008.
- [2] Fake News Content Detection, KAGGLE data set: <https://www.kaggle.com/datasets/annolkumar/fake-news-content-detection?select=train.csv>
- [3] Fake News: build a system to identify unreliable news articles <https://www.kaggle.com/competitions/fake-news/data?select=train.csv>