Fake News Detection using Passive Aggressive and TF-IDF Vectorizer

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Abstract: Consuming news from social media is becoming increasingly popular nowadays. Social media brings benefits to users due to the inherent nature of fast dissemination, cheap cost, and easy access. However, the quality of news is considered lower than traditional news outlets, resulting in large amounts of fake news. Detecting fake news becomes very important and is attracting increasing attention due to the detrimental effects on individuals and the society. The performance of detecting fake news only from content is generally not satisfactory, and it is suggested to incorporate user social engagements as auxiliary information to improve fake news detection. Thus it necessitates an in- depth understanding of the correlation between user profiles on social media and fake news. We perform a comparative analysis over explicit and implicit profile features between these user groups, which reveals their potential to differentiate fake news.

Keywords: Fake news, vectorizer, machine learning, classification

I. INTRODUCTION

With the increasing popularity of social media, more and more people consume news from social media instead of traditional news media. Fake news is now viewed as one of the greatest threats to democracy, and freedom of expression. It has weakened public trust in government. The reach of fake news will be best highlighted all the time. The extensive spread of fake news has the potential for extremely negative impacts on individual and society. A type of yellow journalism, fake news encapsulates pieces of news that may be hoaxes and is generally spread through social media and other online media. This is often done to further or impose certain ideas and is often achieved with political agendas. Such news items may contain false and/or exaggerated claims, and may end up being verbalized by algorithms, and users may end up in a filter bubble.

II. OBJECTIVES

The main objective of this project is to study the fake news detection (including tweets, fake posts, subjects) problem in online social networks and make people to easily understand the difference between fake and real news.

Based on various types of information sources, including both textual content/profile/descriptions and the authorship and article subject relationship among them, we aim at identifying fake news from online social network simultaneously.

This paper aims to develop a systematic framework for the comprehensive study of fake news.

III. LITERATURE

Primarily, we take input in the form of a dataset through the user and then the dataset is handled using the model build based on the count vectorizer or a tf-idf matrix (word tallies how often they are used in other articles in our dataset).[1]

Now the next step is to extract the most optimal features for count vectorizer or tfidf-vectorizer, this is done by using a n-number of the most used words mainly removing the stop words which are common words such as “the”, “when”, and “there” and only using those words that appear at least a given number of times in a given text dataset.

Since this problem is a kind of text classification, Implementing Combination of Naive Bayes classifier, passive aggressive algorithm will be best as this is standard for text-based processing. The actual goal is in developing a model which was the text transformation (count vectorizer vs tfidf vectorizer) and choosing which type of text to use.

Finally, we are obtaining the accuracy and printing the true and false positives and negatives using confusion matrix. Confusion matrix is nothing but a table used to describe the performance of classification model or classifier on set of data set.

We obtain the accuracy based on how well our classifiers are working and the data set is bet fit in it. Accuracy is calculated based on true and false positives and negatives.

Accuracy = TP+TN/ TP+FP+TN+FN.

IV. METHODOLOGIES

A. COUNT VECTORIZER

This provides a simple way to both tokenize a collection of text documents and build a vocabulary of known words, but also to encode new documents using that vocabulary

B. TFIDF VECTORIZER

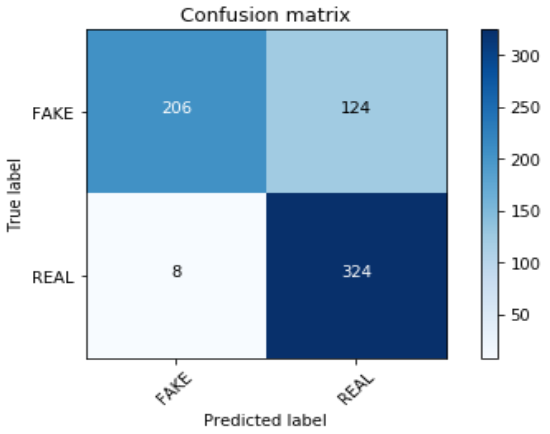
Transforms text to feature vectors that can be used as input to estimator vocabulary Is a dictionary that converts each

token (word) to feature index in the matrix, each unique token gets a feature index

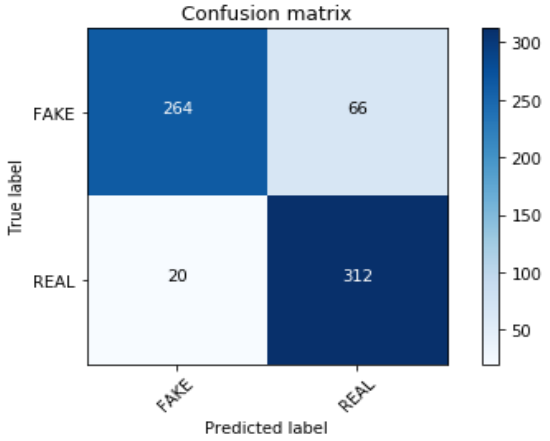
C. NAÏVE BAYES CLASSIFIER

A Naive Bayes classifier is a probabilistic machine learning model that's used for classification task. The crux of the classifier is based on the Bayes theorem.

- *USING TFIDF VECTORIZER*



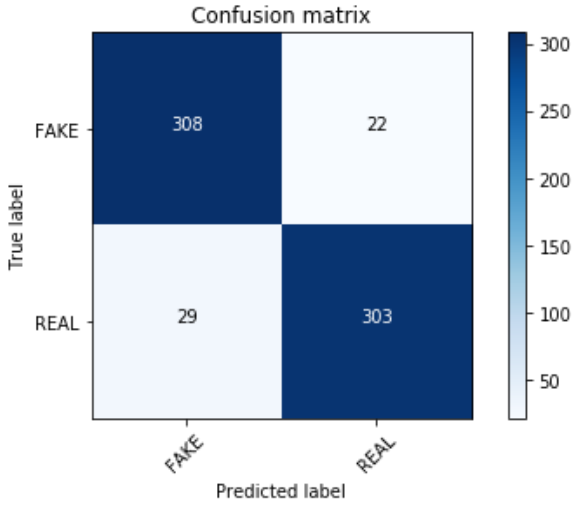
- *USING COUNT VECTORIZER*



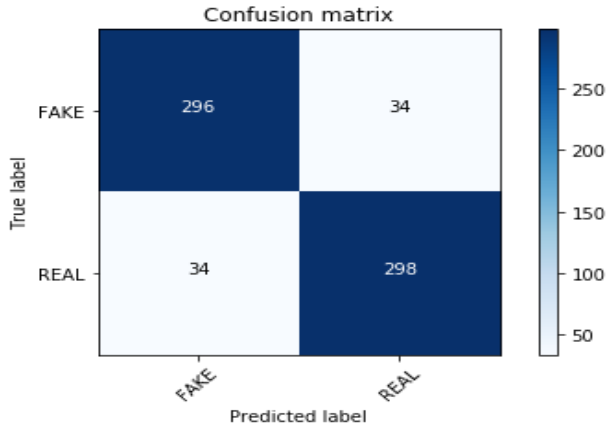
PASSIVE AGGRESSIVE CLASSIFIER

The passive-aggressive algorithms are a family of algorithms for large-scale learning. They are similar to the Perceptron in that they do not require a learning rate. However, contrary to the Perceptron, they include a regularization parameter.

- *USING TFIDF VECTORIZER*



USING COUNT VECTORIZER



V. CONCLUSION

However, social media has also been used to spread fake news, which has strong negative impacts on individual users and broader society. The goal of this project is to comprehensively review, summarize, compare and evaluate the current research on fake news. By this paper concluds that using passive aggressive and TF-IDF vectorizer is efficient as we obtained 90% of accuracy from this model.

VI. REFERENCES

[1] Kushal Agarwalla, Shubham Nandan, Varun Anil Nair, D. Deva Hema –"Fake News Detection on Machine Learning and Natural Language Process".

[2]Kai Shu , Amy Sliva , Suhang Wang , Jiliang Tang and Huan Liu- "Fake News Detection using Data Mining Perspective".

[3]Study-on-machine-learning-methods - Junaed Younus Khan , Md. Tawkat Islam Khondaker , Anindya Iqbal and Sadia Afroz –"A Benchmark

[4]https://data-flair.training/blogs/advanced-python-project-detecting-fake-news/

[5]https://towardsdatascience.com/train-test-split-and-cross-validation-in-python-80b61beca4b6