

FAKE NEWS DETECTION USING PASSIVE AGGRESSIVE CLASSIFIER

Submitted by
ROHIT RATTAN (1906135)
SACHIN KUMAR (1906136)
SUMAIRA NABI (1906153)

Under the Guidance of

Dr/Er. RUPINDERJIT KAUR
Department of COMPUTER SCIENCE AND ENGINEERING

In Partial Fulfillment of the Requirements

for the Award of Degree of

Bachelor of Technology

COMPUTER SCIENCE AND ENGINEERING



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
GULZAR GROUP OF INSTITUTES
LUDHIANA
AUG-DEC 2022

TABLE OF CONTENT:

S. No.	Content	Page No.
1	Introduction	2
2	Objective	4
3	Literature Review	5
4	Tools and Technology Used	7
5	Process Description and Various Stages of Project Implementation	8
6	Conclusion	10
7	References	11

INTRODUCTION:

The fake news has been rapidly increasing in numbers. It is not a new problem but recently it has been on a great rise. According to Wikipedia Fake news is false or misleading information presented as news. Detecting the fake news has been a challenging and a complex task. It is observed that humans have a tendency to believe the misleading information which makes the spreading of fake news even easier. According to reports it is found that human ability to detect deception without special assistance is only 54%.

Fake news is dangerous as it can deceive people easily and create a state of confusion among a community. This can further affect the society badly .The spread of fake news creates rumors circulating around and the victims could be badly impacted. Recent reports showed that due to the rise of fake news that was being created online it had impacted the US Presidential Elections. Fake news might be created by people or groups who are acting in their own interests or those of third parties.

The creation of misinformation is usually motivated by personal, political, or economic agendas.

Since a lot of time is spent by users on social media and people prefer online means of information it has become difficult to know about the authenticity of the news. People acquire most of the information by these means as it is free and can be accessed from anywhere irrespective of place and time. Since this data can be put out by anyone there is lack of accountability in it which makes it less trustable unlike the traditional methods of gaining information like newspaper or some trusted source. In this paper, we deal with such fake news detection issue. We have used the techniques of NLP and ML to build the model .We have also compared text vectorization methods and obtained the one which gives a better output.

“Fake news” has been used in a multitude of ways in the last half a year and multiple definitions have been given. For instance, the New York times defines it as “a made-up story with an intention to deceive”. This definition focuses on two dimensions: the intentionality (very difficult to prove) and the fact that the story is made up. This implies that honest mistakes (no matter how major they are, as long as they are accidental) are not considered to be fake

news. First, an organization dedicated to improving skills and standards in the reporting and sharing of online information, has recently published a great article that explains the fake news environment and proposes 7 types of fake content:

- 1.False Connection: Headlines, visuals or captions don't support the content.
- 2.False Context: Genuine content is shared with false contextual information.
- 3.Manipulated content: Genuine information or imagery is manipulated.
- 4.Satire or Parody: No intention to cause harm but potential to fool.
- 5.Misleading Content: Misleading use of information to frame an issue/individual.
- 6.Imposter Content: Impersonation of genuine sources.
- 7.Fabricated content: New content that is 100% false.

OBJECTIVE:

- The spreading of fake news has given rise to many problems in society. It is due to its ability to cause a lot of social and national damage with destructive impacts. Sometimes it gets very difficult to know if the news is genuine or fake. Therefore it is very important to detect if the news is fake or not.
- "Fake News" is a term used to represent fabricated news or propaganda comprising misinformation communicated through traditional media channels like print, and television as well as non-traditional media channels like social media. Techniques of NLP and Machine learning can be used to create models which can help to detect fake news. In this we have presented many models using the techniques of NLP and ML. The datasets in comma-separated values format, pertaining to political domain were used in the project. The different attributes like the title and text of the news headline/article were used to perform the fake news detection.
- The results showed that the proposed solution performs well in terms of providing an output with good accuracy, precision and recall. Further, a larger dataset for better output and also other factors such as the author, publisher of the news can be used to determine the credibility of the news. Also, further research can also be done on images, videos, images containing text which can help in improving the models in future.

LITERATURE REVIEW:

M. Granik et.al proposed a simple approach for the detection of fake news by using Naive Bayes Classifier. They tested it against a dataset of Facebook news posts. They also made use of the BuzzFeed news dataset. They achieved classification accuracy of approximately 74% on the test set.

Niall J.Conroy et.al designed a basic fake news detector that provides high accuracy for classification tasks. They used the linguistic cues approaches and network analysis approach in it. Both approaches adopt machine learning techniques for training classifiers to suit the analysis. They achieved an accuracy of 72% which could be improved. This could be done if the size of the input feature vector is reduced and also by performing cross-corpus analysis of the classification models.

R. Barua et.al identified if a news article is real or misleading by using an ensemble technique using recurrent neural networks (LSTM and GRU). An android application was also developed for determining the sanctity of a news article. They tested this model on a large dataset which was prepared in their work. The limitation of this method was that it required the article to be of a particular size. It would give wrong predictions if the article was not enough to generate a summary.

B. Bhutani et.al used sentiment as an important feature to improve the accuracy of detecting fake news. They have used 3 different datasets. They used Count vectorizer, Tf-Idf vectorizer along with cosine similarity and Bi-grams ,Tri-grams methods. The methods used to train the model are Naive Bayes and Random forest. They used different performance metrics to evaluate the model. They got an accuracy of 81.6%.

M. Vohra et.al proposed, a rumor detection system which determine the authenticity of an information and classify it as rumor or not a rumor. Data was collected by Twitter API. To generate topics from the preprocessed data, topic modelling was performed via Latent Dirichlet Allocation(LDA).They did web scraping on 4 trusted news website. After scraping these sites for

articles the links of these articles are save and displayed in the GUI. These keywords were searched on their selected four news websites and news articles were extracted from the results. If no article was found in all the four sites the new assigned that topic as rumor otherwise if article was found its was assigned as not a rumor.

Tools and Techniques:

The dataset we'll use for this python project- we'll call it news.csv. This dataset has a shape of 7796×4. The first column identifies the news, the second and third are the title and text, and the fourth column has labels denoting whether the news is REAL or FAKE.

This advanced python project of detecting fake news deals with fake and real news. Using sklearn, we build a TfidfVectorizer on our dataset. Then, we initialize a PassiveAggressive Classifier and fit the model. In the end, the accuracy score and the confusion matrix tell us how well our model fares.

Passive Aggressive algorithms are online learning algorithms. Such an algorithm remains passive for a correct classification outcome, and turns aggressive in the event of a miscalculation, updating and adjusting. Unlike most other algorithms, it does not converge. Its purpose is to make updates that correct the loss, causing very little change in the norm of the weight vector.

TF (Term Frequency): The number of times a word appears in a document is its Term Frequency. A higher value means a term appears more often than others, and so, the document is a good match when the term is part of the search terms.

IDF (Inverse Document Frequency): Words that occur many times a document, but also occur many times in many others, may be irrelevant. IDF is a measure of how significant a term is in the entire corpus.

The TfidfVectorizer converts a collection of raw documents into a matrix of TF-IDF features.

Process Description and Various Stages of Project Implementation:

You'll need to install the following libraries with pip:

```
pip install numpy pandas sklearn
```

Follow the below steps for detecting fake news and complete your first advanced Python Project

1. Make necessary imports:

```
import numpy as np
import pandas as pd
import itertools
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import PassiveAggressiveClassifier
from sklearn.metrics import accuracy_score, confusion_matrix
```

2. Now, let's read the data into a DataFrame, and get the shape of the data and the first 5 records and get the labels from the DataFrame.

3. Split the dataset into training and testing sets.

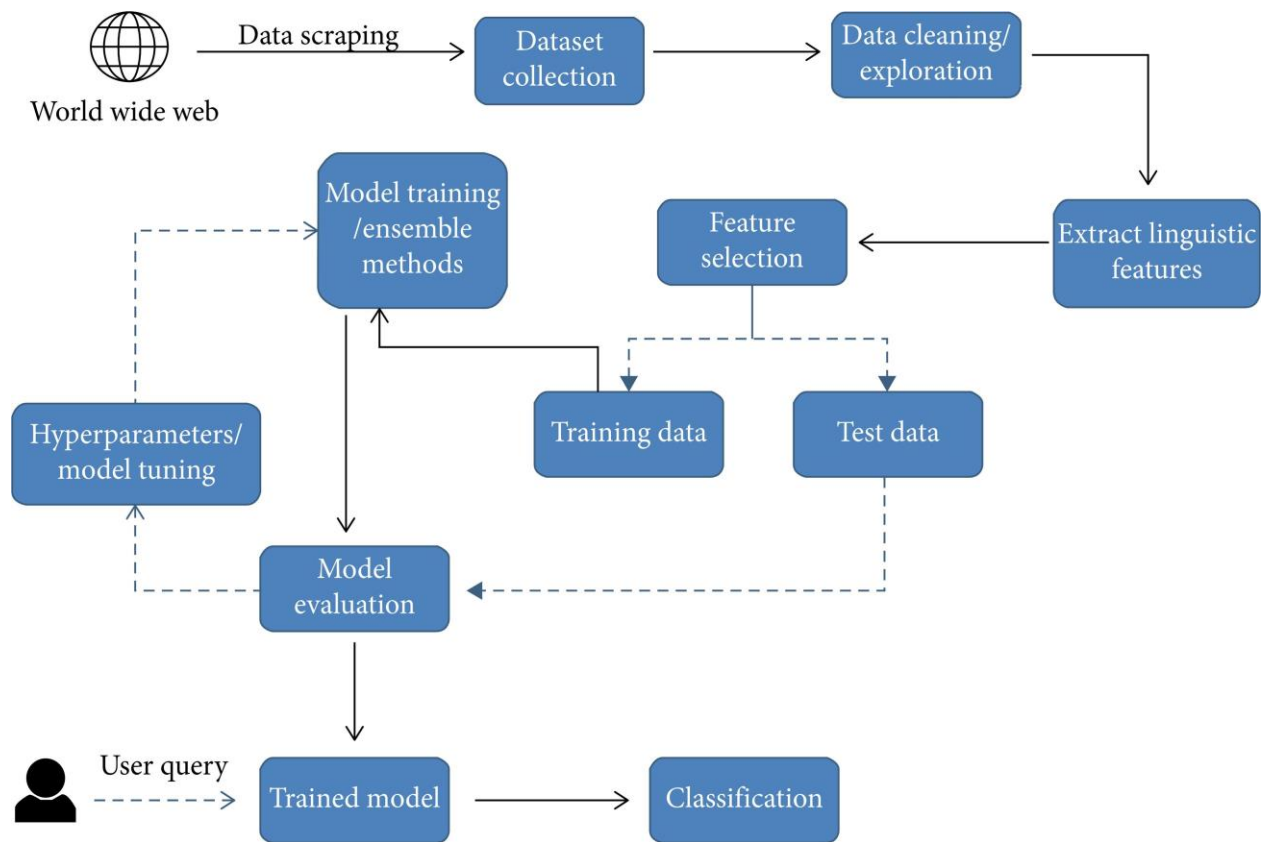
4. Let's initialize a TfidfVectorizer with stop words from the English language and a maximum document frequency of 0.7 (terms with a higher document frequency will be discarded). Stop words are the most common words in a language that are to be filtered out before processing the natural language data. And a TfidfVectorizer turns a collection of raw documents into a matrix of TF-IDF features.

Now, fit and transform the vectorizer on the train set, and transform the vectorizer on the test set.

5. Next, we'll initialize a PassiveAggressiveClassifier. This is. We'll fit this on tfidf_train and y_train.

Then, we'll predict on the test set from the TfidfVectorizer and calculate the accuracy with accuracy_score() from sklearn.metrics.

Finally, let's print out a confusion matrix to gain insight into the number of false and true negatives and positives.



Flowchart no. 1

Conclusion:

We can print a confusion matrix to gain insight into the number of false and true negatives and positives

Fake news detection techniques can be divided into those based on style and those based on content, or fact-checking. Too often it is assumed that bad style (bad spelling, bad punctuation, limited vocabulary, using terms of abuse, ungrammaticality, etc.) is a safe indicator of fake news.

More than ever, this is a case where the machine's opinion must be backed up by clear and fully verifiable indications for the basis of its decision, in terms of the facts checked and the authority by which the truth of each fact was determined.

Collecting the data once isn't going to cut it given how quickly information spreads in today's connected world and the number of articles being churned out.

References:

- Fake news detection in social media by Kelly Stahl.
- <https://www.kaggle.com/code/barkhaverma/fake-news-detection>
- <https://colab.research.google.com/>
- https://en.wikipedia.org/wiki/Natural_language_processing
- https://www.researchgate.net/publication/343916946_Fake_News_Detection_Using_Machine_Learning_Algorithms