Fake News Detection Using Machine Learning

R. Virupaksha Gouda[1], T. Gauthami[2], Karthik T. Vaidya[3], C. Meghana[4*], Nandini Keni[5]

[1]*Assistant Professor, Department of Computer Science and Engineering, Ballari Institute of Technology and Management, Ballari, India*

[2,3,4,5]*B.E. Student, Department of Computer Science and Engineering, Ballari Institute of Technology and Management, Ballari, India*

*Corresponding author: meghanamkv7@gmail.com

***Abstract*: We generally define fake news as something that is verifiably and intentionally false. This project comes up with the application of NLP (natural processing) techniques for detecting the 'Fake News', that is misleading news stories that comes from the non-reputable sources. Since the rise of social media, fake news has become a society problem, in some occasion spreading more and faster than the true information. We propose a work on assembling a dataset of both fake and real news and then employ a Naïve Bayes classifier in order to create a model to classify an article into fake or real based on the dataset given. The most popular attempts include "blacklists of sources and authors that are unreliable. This project is to create a tool for detecting the language patterns that characterize fake and real through the use of machine learning and natural language processing techniques. The result demonstrates the ability for machine learning to be useful in this task. We built a model that catches many intuitive indications of real and fake news as well as application that aids in the visualization of the classification decision. Social network data is one of the most effective and accurate indicators of public sentiment. This paper reports on the design of a sentiment analysis, extracting and training a vast amount of data.**

***Keywords*: NLP, Fake news, Naïve bayes, Dataset, Social network.**

1. Introduction

Fake news is a type of misleading information that misleads or deceive user. With the growth of social media and other sources these things have become one of the major problems for online social media content providers. This news can be created and spread within no time with cheaper amount money as compared to other genuine news and other television report. The main focus of this project is to judge the news being spread on the basis of its genuineness i.e. weather it is true or fake. This is an emerging though important approach as it highly effects the society from the traditional news as well as the news via internet and other sources. Sometimes because of these types of news that has appeared in online platform like Facebook or WhatsApp has misguided the people, which often leads to offline violence and chaos. Detecting these types of news is very much important for the sake of the community, as it is becoming menace to the society. It is often used for personal benefits by attracting viewers and generating revenue from click baits. But it becomes a major threat when people with malicious intent initiate fake news to disrupt peace around the world. With the use of internet these types of news are being spread at very rapid rate. Automatic news/content checking on internet has increased plenty of interest in the field of AI research group. The working of this task is carried out on the study of different prospective from the areas such as Data Mining, ML and Natural language processing (NLP).

2. Literature Survey

In paper [1] 'CSI: A hybrid Deep model for fake news detection' stated that CSI is a model that combines all three characteristic for a more accurate and automated prediction. After incorporating both behavior of the Users and Articles they proposed a model called CSI which is composed of three modules: Capture, Score and Integrate. First two modules based on response, text and sources of an articles using Neural Network to capture the temporal pattern of user on a given article and behavior of users. Based on those two modules third module classify an article as fake or not. This model provides accurate result approximately to 95.3%.

In paper [2], From click bait to fake news detection: A approach based on detecting the stance of read lines to article' aimed in detection of the stance of headlines with regard to their corresponding articles bodies and said that the same approach can be applied in fake news, especially clickbait detection scenarios. They took a dataset of classes (unrelated, related, agree, disagree and discuss). First, they checked whether a particular headlines/articles combination is related or unrelated. This is done on n-gram matching of the lemmatized input using Core NLP Lemmatizer, 3-class classifier and combined classifier. Best accuracy in related pairs (agree, disagree and discuss) in both classifiers as 79.82 and 89.59.

In paper [3],'Fake news detection' proposed a system that classifies unreliable news into different categories after computing an Fscore using various NLP and Classification techniques to achieve accuracy. The aim was to accurately determine the authenticity of the contents of a particular news article.

In paper [4], Automatic Detection of Fake News' focus on the automatic identification of fake content in online news. For this, they introduce two different datasets, one obtained through

International Journal of Research in Engineering, Science and Management
Volume-3, Issue-6, June-2020
www.ijresm.com | ISSN (Online): 2581-5792

119

crowd sourcing and covering six news domains (sports, business, entertainment, politics, technology and education) and another one obtained from the web covering celebrities. They developed classification models using linear sum classifier and five-fold cross-validation, with accuracy, precision, recall and FI measures averaged over the five iterations that rely on the combination of lexical, syntactic and semantic information as well as features representing text readability properties which are comparable to human ability to spot fakes.

In paper [5], Fake news detection on social media aimed to propose a hybrid model for fake news detection on social media using a combination of both human based and machine-based approach. Since traditional and machine-based approach have some limitations and cannot single handedly solve the problem like human literacy and cognitive limitations and the inadequacy of machine based approached. To solve all these problems, they proposed a Machine-Human (MH) model for fake news detection in social media. This model combines the human literacy news detection tool and machine linguistic and network-based approaches. This way two parallel approaches of detection are at work, each helping to provide a balance for the other. The existing systems and research work reveal that most classification algorithms perform well to detect or predict the fakeness of a news article. Though the logistic regression serves best for the purpose. Our system is based on this information and thus we focus to work with classification algorithms like the logistic regression and a much simpler algorithm like the Naïve Bayes classifier and compare the results of both the classifiers.

3. Problem Statement

To design and develop a machine learning approach for detection of fake news using suitable machine learning method.

A. Objectives

- To develop a system that capable of reading datasets.
- To implement an algorithm for automatic classification of text into positive and negative.
- To design the system in such a way that it can easily predict the false news as soon as the user enters the data.
- To process the system to obtain the better accuracy results.

4. Methodology

A. Admin Module

- Admin can login to admin login with the username and password in the web application.
- Admin can doAuthentication and authorization of user.
- Admin stores the data of different news in the database.

- Admin can maintain and update the news data that is stored in the database.
- Admin can manage the troubleshooting and the network problems.

B. User Module

- User can login to the user login with the username and the password in the system after registration.
- User can use the system functionalities.
- User can enter a news and get predicted whether the entered news is true or fake by the system.

C. Prediction Module

- Here, the system reads the input entered by the user.
- Performs comparison of the entered news with the news in the stored database.
- Predicts the entered input news is true or fake.
- Displays the predicted result is output.

5. Implementation

First we collect data from different sources i.e., websites, social media platforms. Then we classify and separate all our data into the datasets on the basis of correctness. We call this data as training data. Then we calculate term frequency of every word in the data set by assigning a unique identity and counting number of times it has occurred in the document by count vectorizer by creating matrix. Then we split the same data into test set and training set. After that we train our model using training set. Then model by itself using Naives Bayes will find the probability of occurances of each word in training set. Now we test our model using holdout test set after that our model will try to finally predict as to whether the given news is true or not.

Python programming language is used to build the code as it is a very powerful programming language which supports building code easily. Using HTML and CSS tools front end is developed PyCharm IDE is used to run the python code as it is a professional and supports web framework.

There are primarily three types of approaches for sentiment classification of opinionated texts;

- Using a machine learning based text classifier such as Naive Bayes.
- Using Natural language processing.
- Using TFIDF method.

Naïve Bayes Classifier (NB): The Naïve Bayes classifier is the simplest and most commonly used classifier. Naïve Bayes classification model computes the posterior probability of a class, based on the distribution of the words in the document. The model works with the BOWs feature extraction which ignores the position of the word in the document. It uses Bayes Theorem to predict the probability that a given feature set belongs to a particular label.

$$P(label|features) = \frac{P(label) * P(features|label)}{P(features)}$$

P(label) is the prior probability of a label or the likelihood that a random feature set the label. P(feature/label) is the prior probability that a given feature set is being classified as a label. P(features) is a prior probability that a given feature set is occurred. Given the Naïve Bayes assumption which states that all features are independent, the equation could be rewritten as follows:

$$\frac{P(label)*P(f1|label)*….*P(fn|label)=P(label|features)}{P(features)}$$

Multinomial Naïve Bayes Classifier Accuracy – around 75%

6. Conclusion

This model has analyzed detection of fake news which is now prevalent in social media platforms and websites. We have used text processing and naive bayes for training our model. Therefore, by using machine learning techniques we can conclude that any news from large or small dataset can be classified as fake or not fake with previous dataset values in less time which the user to believe in particular news that appears on social media and other websites.

References

[1] Natalie Ruchansky, Sungyong Seo, and Yan Liu, "CSI: A hybrid deep model for fake news detection," CIKM '17 Proceedings of the 2017 ACM on Conference on Information Knowledge Management, pp. 797- 806, 2017.
[2] Peter Bourgoje, Julian Moreno Schneider, and Georg Rehm, "From click bait to fake news detection: A approach based on detecting the stance of read lines to article," proceedings of the 2017 EMNLP Workshop on Natural Language Processing meets journalism, pp. 84- 89, 2017.
[3] Manisha Gahrirwal, Sanjana Moghe, Tanvi Kulkarni, Devanish Khakhar, and Jayesh Bhatia, "Fake news detection," International Journal of Advance Research, Ideas and Innovations in Technology, vol. 4, no. 1, pp. 817-819, 2018.
[4] Veronica Perez-Rosas, Kleinberg Bennett, Alexandra Lefevre, and Rada Mihalcea, "Automatic Detection of Fake News," Proceedings of 27th International Conference on Computational Linguistics pp. 3391- 3401, 2018.
[5] E. M. Okoro, B.A. Abara, A. O. Umagba, A. A. Ajonye, and Z. S. Isa, "A Hybrid Approach to Fake News Detection On Social Media," Vol. 37, no. 2, pp. 454- 462, 2018.