

Detecting and Mitigating the Dissemination of Fake News : Challenges and Future Research Opportunities

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ABSTRACT

With increasing popularity in the use of social media for news consumption, the substantial widespread dissemination of fake news has the potential to adversely affect individuals as well as the society as a whole. Even in the midst of the current covid-19 pandemic, false information shared on websites such as WhatsApp, Twitter, and Facebook have the potential to cause panic and shock a large number of people in various parts of the world. These misconceptions obscure healthier habits and encourage incorrect procedures, which aid in the transmission of the virus and, as a result, result in poor physical and psychological health results for individuals. Therefore, it is a research challenge to validate the source, content and publisher of a news article for classifying it as genuine or fake. The existing systems and techniques are not efficient enough to accurately classify a given news based on its statistical rating. Machine learning plays an imperative part in categorizing news data and information, despite some limitations. Our project not only aims on fake news detection but also on generation of real news once the fake news is detected. We propose a user-friendly webpage on which the user enters the news article statement. It is then tested by our machine learning algorithm which then classifies it as genuine or fake, after which the important words are extracted from the statement which helps to get the corresponding genuine news by scraping it from trusted sources and show it to the user. We have compared two machine learning algorithms in this which are- Passive Aggressive Classifier and Naïve Bayes algorithm. We got an accuracy of about 93.5% from Passive Aggressive Classifier and about 83.5% from Naïve Bayes algorithm.

Keywords : Social Media, News Consumption, Fake News, Machine Learning Algorithms.

I. INTRODUCTION

In today's society, most of the news consumption by people is through different social media platforms, since it is the most easy and convenient way of sharing news to each other. But with this comes the risk of widespread dissemination of fake news. These fake news not just adversely affect an individual but it also affects the society as a whole. Today our world is fighting against covid19. This pandemic not just destroyed the livelihood of many people but also destroyed many families. Amidst these problems, fake news just acts as a fuel to the fire. These misinformation conceal healthy behavior and encourage erroneous activities which aid in the spread of virus and lead to poor mental and physical health outcomes in people. Thus, it is very important to stop the chain of fake news from the root itself. This can be done only if we have the proof whether the given news is real or fake and also the source of real news. This is where our project will be beneficial.

With the rapid rise of social media and the protean technological advancements in recent years, we have progressed from accessing news from traditional, conventional means such as radio, newspapers and TV news to a more ubiquitous, dynamic sources which can be credited due to the evolution of the internet. Thus, we are living in a period of time where there is an easy access to information that is growing exponentially. However, such conveniences that have been brought on by whole host of social media networks have also added multiple layers of intricacies and complexities which have made it difficult for a news consumer to differentiate between genuine and fake news, and such dissemination of news followed by sharing and forwarding of such news articles without cross verification have

contributed to rise in prevalence of falsification of news that can not only have grave consequences in the events of the real world but also risks the credibility of social media.

While the existence of fake news itself is not new as different civilizations, organizations, nations have been manipulating the news media to sway public opinion in their favor or for propaganda, the prominence of social media have augmented the power that the fake news can have on an individual and in a society.

Taking into consideration the impact that the consumption of fake news can have on the fragility of the ways society's function, we have proposed a system which can not only detect fake news by cross verifying a news article with various trustworthy news sources but also generate real news for the users to consume. Social media have enhanced the experience of news consumption due to its cost effective, easily accessible and widely distributable characteristic. However, it has made an average internet user easily vulnerable to consuming news that is intentionally or unintentionally distorted which can have drastic consequences and puts an individual and society at risk.

Therefore, detecting fake news especially on social media poses a relatively new and unique problem because of which it provides a wide range of research opportunities to tackle such challenges. One such challenge is the different ways in which a news is falsified. Fake news can vary greatly from satirical, inflated news articles that are misinterpreted as genuine to articles that make use of sensationalist, clickbait headlines to grasp the attention of users. News articles can even be fabricated and manipulated with intention to deceive, harm or influence public

opinion that may result in confirmation bias or political polarization. Since fake news also usually emerge out of developing critical real time events, it is difficult to properly check and verify the quality of data itself. Since fake news is riddled with factual inaccuracies, it can mitigate the influence of real news by competing with it. In this project, we propose a system that makes use of machine learning algorithms and various feature extraction methods to detect fake news by cross verifying from various other trusted news sites while also generating and displaying real news from trusted sources in the form of a website. Through this project, we aim to obtain maximum accuracy in fake news detection and real news generation to obtain a perfect result.

II. RELATED WORK

In this paper, Shuo yang et al [1] inspect the matter of Unsupervised discovery of fake news on social media by utilizing the users' reckless social media engagement details. They used current event truths and users' integrity as dormant random factors, and they used users' social media engagements to recognise their views on the validity of current events. They suggest a method for unsupervised learning. This system employs a probabilistic graphical paradigm to model current case truths and, as a result, the users' reputation. To solve the inference dilemma, an effective Gibbs sampling technique is proposed. Their experiment results show that their proposed algorithm outperforms the unsupervised standards.

Kai Shu et al [2] examines two facets of the issue of false news identification:

-a) Characterization- This aspect introduces the fundamental concepts of fake news in both traditional and social media.

b) Detection- The current detection methods, including feature extraction and model construction, are examined from a data mining perspective.

They described fake news and characterized it by evaluating various theories and properties in both traditional and social media. They continue to

systematically describe the issue of detecting fake news and summarize the strategies of doing so. They discussed about the datasets and measurement criteria that are currently used in existing methods. Yuta Yanagi et al [3] proposes a fake news detector that can create fake social contexts (comments), with the aim of detecting fake news early on in its spread when few social contexts are available. It's been trained on a series of news articles and their social situations. They also trained a classify model using news posts, real-posted comments, and generated comments. They compared the quality of produced comments for articles with actual comments and those generated by the classifying model to determine the detector's effectiveness.

Limitation: According to their study, the words "!", "?", "false," "breaking," and other similar phrases are essential signals of fake news.

J Zhang et al [4] in this paper, the false news identification problem has been formulated as a legitimacy inference problem, in which genuine news has a higher reputation than fake news, which has a lower credibility. A deep diffusive network model is proposed based on the interrelationship between various news stories, publishers, and their topics. They also implement a new diffusive unit model called GDU, which acquires multiple inputs from various sources simultaneously and then functionally combines the inputs to generate the necessary output using material "forget" and "change" gates. Substantial deployment of this model on a real-world fake news repository, such as PolitiFact, has yielded remarkable results when it comes to identifying fake news stories, publishers, and material in the network, demonstrating the proposed model's impressive efficiency and ability.

A Thota et al [5] proposes Dissemination and consumption of fake news has become a matter of major concern due to its potential to destabilize governments, which poses a grave threat to society and its individuals. In this paper, Shuo yang et al [1]

inspect the matter of Unsupervised discovery of fake news on social media by utilizing the users' reckless social media engagement details. They used current event truths and users' integrity as dormant random factors, and they used users' social media engagements to recognise their views on the validity of current events. They suggest a method for unsupervised learning. This system employs a probabilistic graphical paradigm to model current case truths and, as a result, the users' reputation. To solve the inference dilemma, an effective Gibbs sampling technique is proposed. Their experiment results show that their proposed algorithm outperforms the unsupervised standards.

An alternative way in which fake news can be detected is through stance detection which functions by automatically detecting the interrelation between different news articles and its contents. This study thus surveys different ways to predict this relationship, with the help of the news article and headline pair provided. Based on the similarity between the news article and the headlines, the stances can be categorized as `_unrelated'`, `_discuss'`, `_agree'` or `_disagree'`. Such an approach has been implemented with various traditional machine learning models to set a standard in order to identify contrasts with respect to the modern, sophisticated Deep neural networks are used to define the relationship between the news story and the headline. Kai Shu et al [6], In this study, proposes a FakeNewsNet which is a comprehensive repository that contains data from a variety of features which were otherwise scarce, such as spatiotemporal information, social context and news material. The repository implements an approach to fetch relevant information from eclectic sources. Furthermore, a preliminary exploration analysis has also been conducted on FakeNewsNet through a variety of features to demonstrate its efficiency and utility in fake news detection tasks. Limitations: -Apart from being time consuming, another limitation of this

study is the presence of significant amount of noise in the selection strategy that is implemented for web search results during the process of fetching data.

Adrian Groza [7], in this paper, proposes that although the consumption and sharing of false, unverified news and pieces of information pertaining to the health and medical domain has been an old practice, there are still a plethora of challenges that still exists and is needed to be tackled in order to save people from falling prey to medical myths. The study aims to identify fake news related to the Covid-19 by integrating natural language processing with ontology reasoning. They look into the way in which reasoning in Description Logics (DLs) can identify inconsistencies between information from trusted medical sources and information that is not verified and is presented in natural language. Limitation: - System assessments and verbalizing explanations for each conflicting information are some limitations of this paper.

Subhadra Gurav et al [8] proposes that the current techniques and systems are ineffective in providing an accurate statistical rating for any news. Moreover, the limitations in terms of news categorization and feedback makes the systems less diverse. In this study, an innovative system for detecting false news using machine learning algorithms is proposed. Based on Twitter feedback and the application of classification algorithms to identify such news events, this model takes news events as input and calculates the percentage of news that is real or false.

Limitations: Some of the major limitations of this paper is the accuracy of the model as well as the limited information that the model can fetch from different sources.

Kai-Chou Yang et al [9] in this paper treats the problem as a natural language inference (NLI) task where the sentences can be classified as —premise| (P) and —hypothesis| (H). For such a task, NLI models tend to be more reliable and accurate. The collective

utility of gradient boosting and fine-tuning with noisy labels demonstrated its significance in the model.

Limitations: The performance of the model was not satisfactory and the research was adversely affected by time constraints.

Limeng Cui et al [10], In this paper, proposes a robust COVID-19 misinformation dataset known as CoAID, which includes news articles, posts on social media platforms as well as the user interaction that pertains to such misinformation. In addition to the description of the datasets fetched for this study, data analysis has also been conducted to illustrate the distinctive characteristics between fake and factual information, as well as to demonstrate the potential future research opportunities that can be addressed through such methods with the implementation of modern techniques.

Limitations: A major limitation of this paper is the difficulty regarding authenticity of news or a piece of information as the study addresses a fairly recent and ongoing issue which adds to the complexity of the problem, as well as the process of fetching datasets since it is dynamic and frequently changing.

III. PROPOSED SYSTEM

We have moved from receiving news from old, traditional means such as radio, newspapers, and TV news to a more widespread, dynamic outlets which can be attributed to the growth of the internet, thanks to the rapid rise of social media and the protean technological advances in recent years. Thus, we are living in a time when knowledge is readily available and increasing exponentially. However, such conveniences that have been brought on by whole host of social media networks have also added multiple layers of intricacies and complexities which have made it more complicated for a news consumer to differentiate between genuine and fake news, and such dissemination of news followed by sharing and forwarding of such news articles without cross-

verification have contributed to rise in prevalence of falsification of news that can not only have grave consequences in the events of the real world but also risks the credibility of social media.

We suggest a model in this project that makes use of machine learning algorithms and various feature extraction methods to identify fake news by cross-referencing it with other reliable news sources, as well as producing and displaying real news from reliable sources in the form of a website. To achieve a perfect result, we strive to achieve maximum accuracy in fake news detection and real news generation in this project.

These are the steps followed:

- A model is proposed to check whether a given stance of information or news article is true or false.
- Basically, the title content and domain name are checked.
- The new model can be constructed from algorithms like Passive Aggressive Classifier, Naïve Bayes algorithm and keyword search algorithm.
- Once we know that a piece of information is not real, it will give genuine news from trusted sites so the dissemination of false information can be stopped.

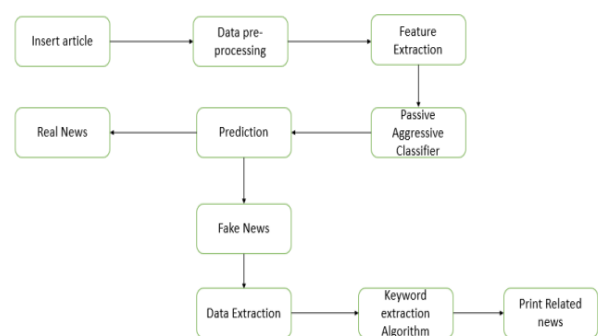


Fig 1. Architecture Diagram

DATA COLLECTION:

In the proposed system, the data is collected keeping in mind the current covid situation. So, we have collected the dataset which were publicly available on Kaggle. We went through various datasets and at last came up with dataset with maximum number of records.

PRE-PROCESSING:

In the pre-processing step, the data is cleaned such that the unwanted and unnecessary information can be removed and only the relevant details will be kept. In this project we have used Stemming and stopwords. There are different methods used in pre-processing. Some of the methods are mentioned below-

□ Stemming: - The method of minimizing various words to their root or basic word is known as stemming. For example: If we have words like retrieval, retrieves, retrieved etc., these words will be reduced to its root form which is retrieve. Stemming is an important part of Natural language processing and is widely used. In a domain analysis, the stemming is used to evaluate the main vocabularies.

□ Stopwords: - Stopwords are the common words present in a text such as a, an, the etc. In the pre-processing, these are the steps which will be filtered out and are not necessary. These are the words which add very little meaning to a sentence in any language. They can be easily overlooked without jeopardizing the sentence's purpose. When we remove the stopwords, the dataset size also decreases which helps in faster processing of data and it also enhances the performance.

□ Tokenization: - Tokenization refers to splitting of text or words into small tokens. For example, in a paragraph, a line is a token. Similarly, in a line a word is a token. Tokenization is important because, by studying the words in a document, the meaning of the text can be easily deduced. There are different types of tokenization present such as word tokenization, line tokenization, regular expression tokenization etc.

FEATURE EXTRACTION

In Feature extraction, after identifying the key feature from the document, the data is reduced so that it can be cleaned and further be tested on various machine learning algorithms. There are various feature

extraction methods. In this project, we have used the TFIDF vectorizer.

TFIDF vectorizer TFIDF vectorizer is an abbreviation for Term Frequency and Inverse Document Frequency. It checks that how significant a word is in the whole document.

The term frequency function determines how often a term appears in the text.

The inverse document frequency determines whether a word is uncommon or common across a document.

The TFIDF will thus check the authenticity. So, if a word occurs frequently in many documents like what, if etc., they have the chances that they are fake, while the words that appear often in one text but not in all others have a good chance of being true.

IV. RESULTS AND DISCUSSION

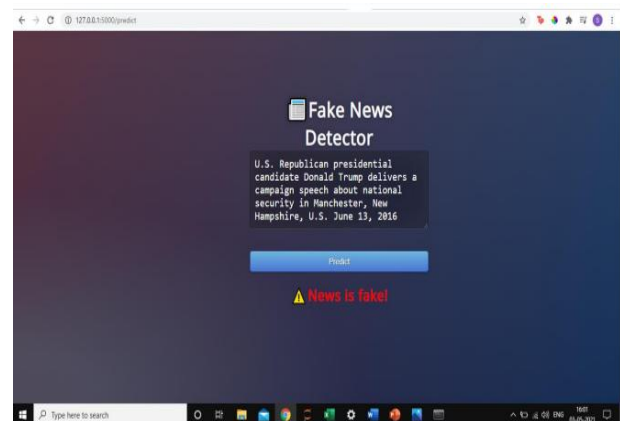


Fig 2. Fake news detected on website

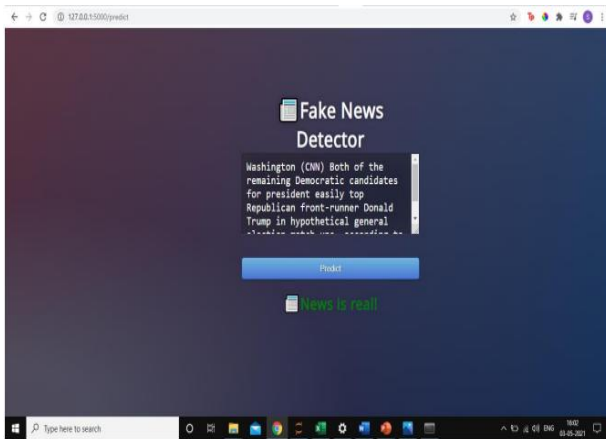


Fig 3. Real news detected on website

V. CONCLUSION AND FUTURE WORK

With the increased use of social media for news consumption and in prevalence, the widespread distribution of false news has the potential to harm both individuals and society as a whole. Even in the midst of the current covid-19 pandemic, false information on platforms like WhatsApp, Twitter and Facebook can cause panic and have a shocking impact not just on an individual but to a society as a whole. The objective is to detect the fake news through latest technologies and algorithms like Passive aggressive classifier. We used fake news detection where the user will enter the text and this text will go through our various models and at last give a prediction whether it is true or false. Further, our real news generation will check and validate the news and give us some news from trusted sites.

Our proposed model consists of two components, one where the detection takes place and the other where its correction takes place, if the news is found out to be false corresponding correct news is given as output. We determine the accuracy of these models and discuss about their limitations. In our project, the user can enter the text. Various machine learning algorithms are performed and we found out that Passive aggressive classifier gives a better accuracy as compared to Naïve Bayes. Further, the data is extracted and then real news generation is done using

the keyword extraction algorithm. On the basis of our analysis, we can successfully remove the fake news if any.

The future work would extend the same for implementing an false news detection system in a social media scenario where we can predict if a news is reliable or not the moment it is being posted in the web and to delete it completely from the media and avoid its transmission in the internet, Several other features may include identifying the false urls, or finding out if videos are morphed and trying to remove it from the media. For better accuracy results, we can plan to store the results in the cloud. Storing the data in the cloud can enable the possibility of performing classification algorithm at a faster rate.

VI. REFERENCES

- [1]. Yang, S., Shu, K., Wang, S., Gu, R., Wu, F. and Liu, H., 2019, July. Unsupervised fake news detection on social media: A generative approach. In Proceedings of the AAAI conference on artificial intelligence (Vol. 33, No. 01, pp. 5644-5651).
- [2]. Kai Shu , Amy Sliva , Suhang Wang , Jiliang Tang , and Huan Liu, 2017 september. Fake News Detection on Social Media: A Data Mining Perspective
- [3]. Yanagi, Y., Orihara, R., Sei, Y., Tahara, Y. and Ohsuga, A., 2020, July. Fake News Detection with Generated Comments for News Articles. In 2020 IEEE 24th International Conference on Intelligent Engineering Systems (INES) (pp. 85-90). IEEE.
- [4]. Zhang, J., Dong, B. and Philip, S.Y., 2020, April. Fakedetector: Effective fake news detection with deep diffusive neural network. In 2020 IEEE 36th International Conference on Data Engineering (ICDE) (pp. 1826-1829). IEEE.

- [5]. Thota, A., Tilak, P., Ahluwalia, S. and Lohia, N., 2018. Fake news detection: A deep learning approach. *SMU Data Science Review*, 1(3), p.10.
- [6]. Shu, K., Mahudeswaran, D., Wang, S., Lee, D. and Liu, H., 2020. FakeNewsNet: A Data Repository with News Content, Social Context, and Spatiotemporal Information for Studying Fake News on Social Media. *Big Data*, 8(3), pp.171-188.
- [7]. Groza, A., 2020. Detecting fake news for the new coronavirus by reasoning on the Covid-19 ontology. *arXiv preprint arXiv:2004.12330*.
- [8]. Gurav, S., Sase, S., Shinde, S., Wabale, P. and Hirve, S., 2019. Survey on Automated System for Fake News Detection using NLP & Machine Learning Approach. *International Research Journal of Engineering and Technology (IRJET)*, 6(01), pp.308-309.
- [9]. Yang, K.C., Niven, T. and Kao, H.Y., 2019. Fake news detection as natural language inference. *arXiv preprint arXiv:1907.07347*.
- [10]. Cui, L. and Lee, D., 2020. Coaid: Covid-19 healthcare misinformation dataset. *ArXiv preprint arXiv:2006.00885*.
- [11]. Qi, P., Cao, J., Yang, T., Guo, J. and Li, J., 2019, November. Exploiting multi-domain visual information for fake news detection. In *2019 IEEE International Conference on Data Mining (ICDM)* (pp. 518-527). IEEE.
- [12]. Srivastava, A., Kannan, R., Chelmiss, C. and Prasanna, V.K., 2019, December. RecANt: Network-based Recruitment for Active Fake News Correction. In *2019 IEEE International Conference on Big Data (Big Data)* (pp. 940-949). IEEE
- [13]. Long, Y., 2017. Fake news detection through multi-perspective speaker profiles. *Association for Computational Linguistics*.
- [14]. Wang, W. Y. 2017. || liar, liar pants on fire||: A new benchmark dataset for fake news detection. *arXiv preprint arXiv:1705.00648*
- [15]. Jin, Z.; Cao, J.; Zhang, Y.; and Luo, J. 2016. News verification by exploiting conflicting social viewpoints in microblogs. In *AAAI*, 2972–2978.

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