Fake News Detection Using Machine Learning

2023 International Conference on Artificial Intelligence and Smart Communication (AISC) | 979-8-3503-2230-9/23/$31.00 ©2023 IEEE | DOI: 10.1109/AISC56616.2023.10085488

[1]Garima Rawat
department of Information Technology
ABES Engineering Collage
Ghaziabad, India
garima.rawat@abes.ac.in

[2]Tejaswika Pandey
department of Information Technology
ABES Engineering Collage
Ghaziabad, India

[3]Tarushi Singh
department of Information Technology
ABES Engineering Collage
Ghaziabad, India

[4]Sonal Yadav
department of Information Technology
ABES Engineering Collage
Ghaziabad, India

[5]Punnet Kumar Aggarwal
department of Information Technology
ABES Engineering Collage
Ghaziabad, India
puneetaggarwal7@gmail.com

ABSTRACT- In the previous ten years, the volume of information shared online, particularly on social networks, has increased tremendously. The phenomenon of fake news has grown to be a serious issue that jeopardizes the legitimacy of these social networks. The use of machine learning (ML) techniques offers a potential remedy for this issue. To this end, Recently, a number of approaches and algorithms that employ machine learning to identify fake news produced by various platforms supporting social media have been put out in the literature. In order to assess and compile research on the use of machine learning techniques to identify fake news, this chapter will undertake a comprehensive mapping analysis. False propaganda on social media and other platforms is widespread which is a cause of great worry because it can wreak widespread social and national damage with devastating effects. On figuring things, there has already been a lot of research. In order to model a product using supervised machine learning algorithms that can categories fake news as genuine or false using the necessary tools, a survey of the literature on fake news detection is presented in the article. Classic machine learning models are also explored. Feature extraction and vectorization are the results of this technique. We advise using this package to tokenize and extract functions from text input in Python because it has useful tools like the count vectorizer and tiff vectorizer. Then, using feature selection approaches, we investigate and select the most appropriate features to obtain the best accuracy based on the Confusion Matrix results.

KEYWORD: Cyber Security, Testing, Scripts

I. INTRODUCTION

False information in fake news can be harmful to everyone. These times, it is creating various issues ranging from fabricated news to sarcastic articles and planned government propaganda. for gaining popularity out of the confusion caused due to false information. Fake news and a lack of trust in the media are rising issues in our society, with far-reaching consequences [1] [2]. This perpetuates in a country, lying about a specific statistic or exaggerating the cost of certain services for a country, causing hubbub and disturbance at all levels of the society.

We all know that people have grown accustomed to using digital-media sites such as Facebook, WhatsApp, Twitter, and others, rather than newspapers, in recent years. More than anything, their phones and everything on it remain the most accessible thing to them. We've all seen WhatsApp forwards about spirituality, health, and other topics. Many people in India were influenced by the news about the after effects of covid vaccine is and shared a lot of death-related news. There was a hubbub about the entire situation that led to more problems in that covid pandemic. Not only that, but there are numerous news articles about celebrities and politicians for them (fake users) to gain attention on social media [3] [4] [5].

Internet and electronic devices are so accessible that people eventually read anything and everything that came to them but did not know whether it was true or fake. This led to wrong decision making and advertised the people who got attention because of fake news. Many people also gave their lives because of false information as it could never be decided whether the news was fake or real [6] [7] [8] [9]. The situation worsened day by day in the lives of many people. People used to fight for themselves but achieved nothing as there was not anything that could tell whether the news was fake or true. In our nation, millions of items are either published or withdrawn every minute. The most recent news is posted on social media and on television every minute. As a result, this cannot be held responsible for or is something that can be tracked. The creation of a system that offers a reliable automatic index scoring, or rating, for the reliability of different publishers and news settings may be one answer. In this paper, a methodology for building a website that can identify whether an article is real or fake is proposed. The methodology uses supervised machine learning algorithms to analyse an annotated dataset that has been manually classified and guaranteed based on its words, phrases, sources, and titles. This would aid in obtaining the utmost degree of precision to deliver outcomes of the highest calibre. A variety of categorization techniques were used to build the proposed model. Data that has never been seen before will be tested using the product model [10] [11] [12] [13]. The result will be a model that can be used in the future and integrated with any system, one that can categorise and recognise fake goods. We'll map the outcomes. The functionality of the model relies on data that has already been stored as well as new data that will be added when machine learning methods are used to identify any breaking news.

II. BACKGROUND STUDY

The public rating of online reviews and networks has received the majority of the attention in studies on machine learning algorithms for fraud detection. Community Newspapers A lot of literature has been written about the problem of identifying "fake news," particularly since the end of 2016 and the US presidential elections. Conroy, Rubin, and Chen list some efficient techniques for categorizing constituents with clarity. They point out that superficial content-related n-grams and POS (Surface Parts of Speech) tags are insufficient for the classification task and have repeatedly been shown to disregard important contextual information. Instead, these methods were only used with a variety of advanced analysis methods. Preis has thoroughly examined probabilistic context-free grammar (PCFG), particularly when used with n-gram strategies. Feng, Banerjee, and Choi are capable of 85% to 91% accuracy on categorization tasks including dishonesty [14] [15].

Use the online review corpus. In addition to Feng's initial deep syntax model, Feng and Hirst improved a linguistic analysis of conflicts in 'object: descriptor' pairings with the text. Rubin, Lukoianova, and Tatiana investigate rhetorical structures using a vector model of the home with equal effectiveness [16] [17]. Use language pattern similarity networks, which require a knowledge foundation beforehand.

Fake News on social media: Some examples of social media websites and programming are forums, social websites, microblogging, social bookmarking, and wikis. On the other hand, other academics believe that fake news is the result of sporadic events like educational shock or unintentional diffusion. similar to what was done in the wake of the earthquake in Nepal. In 2020, false health information was widely circulated, compromising global health. The WHO warned that the COVID-19 epidemic is a "infodemic," or a flood of real and false news, including a lot of misinformation, in early February 2020 [18] [19]. Machine learning (ML) is a collection of techniques that help software systems produce results that are more accurate without the need for direct recoding. Data scientists specify the alterations or traits that the model should investigate and make use of to produce forecasts [20] [21]. The algorithm splits the groups of learnt levels after training is complete.

The foundation of random forests is the idea of building many decision tree algorithms, each of which yields a different result. The outcomes of several different tree options are predicted using the random forest method. To provide diversity in decision trees, Random Forest chooses a selection of qualities from each category at random. Uncorrelated decision trees are a better fit for Random Forest. The overall result will be similar to that of a single decision tree when applied to comparable trees. Uncorrelated decision trees can be produced using the Bootstrap and Random functions [22] [23].

Support Vector Machine (SVM): Each data point in the range of dimensions n (the number of characteristics available) is designed as a point, and the value of a given attribute is the number of specified coordinates. The SVM approach depicts a data item in an n-dimensional space, with coordinates designating the values of each function, given a set of n Functions. The hyperplane created by splitting the two groups is used to categorise the data [24] [25] [31].

Naive Bayes: This approach, which is employed in numerous machine learning issues, works with the Bayesian theory under the premise that it has no predictors. In brief, Naive Bayes asserts that one property in a category has no bearing on another. Fruit, for example, is categorized as an apple if it is red, whorled, and nearly 3 inches in diameter. Whether these functions are dependent on one another or on various functions, and even whether they are dependent from one another or on other processes, Naive Bayes believes that each of these features share an Apple test [26] [27].

III. PROPOSED METHODOLOGY

The categorising method is described in this section. This method results in the creation of a tool for detecting fake articles. In this method, directed machine learning is used to classify the dataset. The initial stage in this classification problem is dataset collection, which is followed by preprocessing, selecting highlights, preparing and testing the dataset, and then running the classifiers.

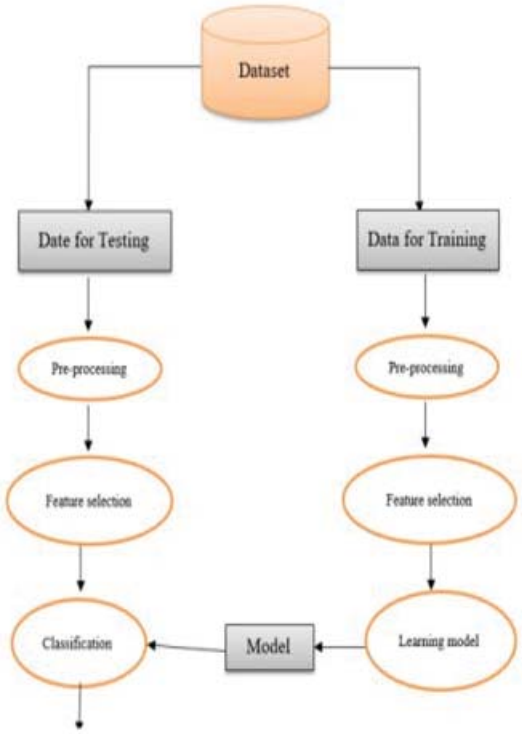


Fig. 1. Proposed System Methodology

Figure 1 shows the recommended framework method. The method is based on doing a number of tests on datasets using the calculations mentioned in the section named Random Forest, SVM & Nave Bayes, majority voting, and other classifiers in the previous section. The tests are performed separately on each computation as well as jointly to ensure the highest degree of precision and accuracy.

The main goal is to apply a series of classification calculations to obtain a classification proven to be used as a scanner for fake news by subtle features of news discovery and to embed the presentation in a Platform to be used as a revelation for the false news information. Additionally, the Program code has undergone the necessary refactoring to produce efficient code. K-Nearest Neighbors, Linear Regression, Bayesian Network, Decision Tree, and Support Vector Machine are used to classify this show. These calculations all become as accurate as they can be. Compare them when they are reliable with the typical of these. To identify fake news, the database is connected to many formulas. To determine the end result, the accuracy of what transpires is reviewed.

The strategy to spotting political false news within the framework of model construction is as follows: The first stage is to acquire political news datasets (the Liar dataset is used for the demonstration), and then do pretreatment using aggressive noise evacuation. The next step is to use the NLTK to conduct POS and feature selection. The information is then processed, and ML techniques are used to create the suggested classifier model. Following the application of the NLTK, the Dataset is successfully normalized within the system, at which moment a signal is prepared for doing operations on the learned section. After applying the architecture response with N.B & Random Forest, the model is created with a text field. After testing is completed on a validation set and the findings are validated, the accuracy is screened for acceptability. The model is then linked to unseen data selected by the customer [28] [29 [30].

The full set is created with 50% of the knowledge being false and half of the material being real, giving the model a 50% reset precision. An arbitrary selection of 80percent of overall material is made from the false and real datasets to be included in our entire dataset, with the remaining 20% used as a test dataset after our model has been built. Text data must be preprocessed before applying a classifier to it, therefore we are continuing spotless noise, utilizing Stanford NLP (Processing (NLP) for POS processing and text categorization of words, after which we need to encapsulate the received data as numerals and dangling values to be recognized as an insight to ML estimations. This procedure will result in extracting a SVM algorithm; the research will use the py sklearn package to accomplish tokenization and extraction of features of content information since this library provides useful tools such as Check Vectorizer with Tiff Vectorizer.

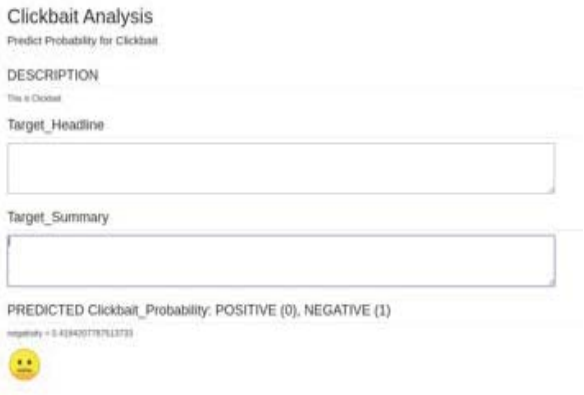
IV. RESULTS

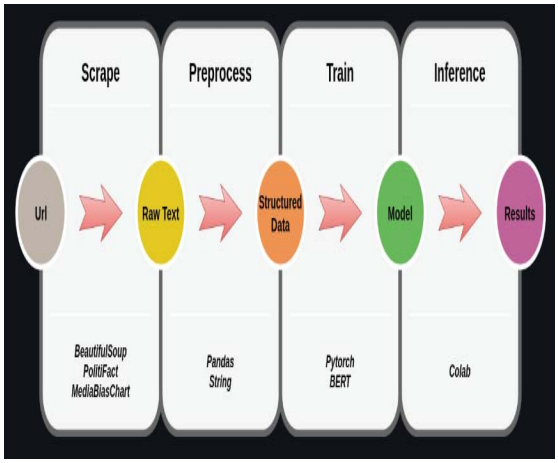
The outcomes for each model are listed below:

Political hoaxes: The architecture has a 70% accuracy rate on the test set, making it the most accurate model architecture out of all those we tested. This is far more accurate than what the document claims.

Clickbait: We use and adapt the LSTM attention model to the provided data set in the clickbait challenge to reach an accuracy of 76 inches for the test set.

Article on hoaxes: We use perfectly matched BERT on our model, which was trained on a customized span record. Ours has an 81% accuracy rate.





V. CONCLUSION

Fake News in Politics: Our model is very extensible and future-proof. On the US dataset, a false news model for politics is currently being trained. The issue of fake news had a significant role in the 2016 US election, and it is anticipated that it will get worse in India. This will be expanded to the Indian dataset in later research.

Link-Bit: Social media headlines that are overstated primarily with the intention of misleading readers. For the internet user, this is annoying.

Fake News Reports: Models can identify patterns and recognize patterns in unrealistic data. For your model to work, you only need a working URL.

REFERENCES

[1] Lunt, B. M., Ekstrom, J. J., Gorka, S., et al., Information Technology 2008: Curriculum Guidelines for Undergraduate Degree Programs in Information Technology. Association for Computing Machinery (ACM); IEEE Computer Society, 2008.

[2] Dale C. Rowe, Barry M. Lunt and Joseph J. Ekstrom, "The role of cyber-security in information technology education", In Proceedings of the 2011 conference on Information technology education, , pp. 113–122, 2011.

[3] Souza, P. d., Rowe, D. C., Ali, A., et al., Cyber Dawn: Libya. Cyber Security Forum Initiative (CSFI), May 2011.

[4] Falliere, N., Murchu, L. O. and Chien, E., W32.Stuxnet Dossier. Symantec, February 2011.

[5] P. K. Aggarwal, S. Sharma, Riya, P. Jain, Anupam, "Gaps Identification for User Experience for Model Driven Engineering", in Proceedings of the International Conference on Cloud Computing, Data Science & Engineering- Confluence, 2021.

[6] Naedele, M., Dzung, D. and Stanimirov, M., Network Security for Substation Automation Systems, Lecture Notes In Computer Science, Vol 2187, pp 25--34, 2001.

[7] F. Khalid, ―Understanding university students' use of facebook for collaborative learning, International Journal of Information and Education Technology, vol. 7, no. 8, pp. 595-600, August 2017.

[8] P. K. Aggarwal, P. Jain, J. Mehta, R. Garg, K. Makar, and P. Chaudhary, "Machine Learning, Data Mining and Big Data Analytics for 5G-Enabled IoT", Blockchain for 5G enabled IoT: the new wave for Industrial Automation, pp. 351-375, Springer, 2021

[9] F. Annasingh and T. Veli, ―An investigation into risks awareness and e-safety needs of children on the internet, Interactive Technology and Smart Education, vol. 13, no. 2, pp. 147-165, 2016.

[10] V. Ratten, ―A cross-cultural comparison of online behavioral advertising knowledge, online privacy concerns and social networking using the technology acceptance model and social cognitive theory, Journal of Science & Technology Policy Management, vol. 6, no. 1, pp. 25-36, 2015.

[11] P. Jain, P. K. Aggarwal, P. Chaudhary, K. Makar, J. Mehta, and R. Garg, "Convergence of IoT and CPS in Robotics", Emergence of Cyber Physical Systems and IoT in Smart Automation and Robotics, pp.15-30, Springer, 2021

[12] M. D. Griffiths and D. Kuss, ―Online addictions, gambling, video gaming and social networking, The Handbook of the Psychology of Communication Technology, Chichester: John Wiley, pp. 384-406, 2015.

[13] L. Mosalanejas, A. Dehghani, and K. Abdolahofard, ―The students' experiences of ethics in online systems: A phenomenological study, Turkish Online Journal of Distance Education, vol. 15, no. 4, pp. 205-216, 2014.

[14] P. K. Aggarwal, P.S. Grover, and L. Ahuja, "Security Aspect in Instant Mobile Messaging Applications," In Proceedings of IEEE International Conference on Recent Advances on Engineering, Technology and Computational Sciences (RAETCS), pp.1-5, 2018.

[15] P. Jain, Anupam, P. K. Aggarwal, K. Makar, V. Shrivastava, S. Maitrey, "Machine Learning for Web Development: A Fusion", in Proceedings of AIST2020, 2020.

[16] P. Jain, Amit Singhal, Diksha Chawla, Vineet Shrivastava, "Image Recognition and Segregation using Image Processing Techniques", TEST Engineering and Management, 2020.

[17] N. Ahmad, U. A. Mokhtar, Z. Hood et al., ―Cyber security situational awareness among parents, presented at the Cyber Resilience Conference, Putrajaya Malaysia, pp. 7-8, November 13-15, 2019.

[18] R. S. Hamid, Z. Yunos, and M. Ahmad, ―Cyber parenting module development for parents, in Proc. INTED2018 Conference, 5th-7th March 2018, Valencia, Spain, 2018

[19] F. Khalid et al., ―An investigation of university students' awareness on cyber security, International Journal of Engineering & Technology, vol. 7, pp. 11-14, 2018.

[20] [20] C. S. Kruse et al., ―Cybersecurity in healthcare: A systematic review of modern threats and trends, Technology and Health Care, vol. 25, no. 1, pp.1-10, 2017.

[21] M. Singh, N. Sukhija, A. Sharma, M. Gupta, P. K. Aggarwal, "Security and Privacy Requirements for IoMT-Based Smart Healthcare System". Big Data Analysis for Green Computing, 17–37, Taylor & Francis, 2021.

[22] Puneet Kumar Aggarwal, Parita Jain, Poorvi Chaudhary, Riya Garg, Kshirja Makar, Jaya Mehta, "AIIoT for Development of Test Standards for Agricultural Technology", accepted for the book Intelligence of Things: AI-IoT Based Critical-Applications and Innovations, pp. 77-99, Springer, 2021.

[23] Poorvi Chaudhary, Sachin Goel, Parita Jain, Mandeep Singh, Puneet Kumar Aggarwal, Anupam, "The Astounding Relationship: Middleware, Frameworks, and API", In Proceedings of the International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), pp. 1-4, 2021.

[24] Parita Jain, Puneet K Aggarwal, "Mobile Phone Maintainability Prediction using MCDM Methodology" International Journal of Recent Technology and Engineering (IJRTE), Vol. 8, Issue 3S2, pp. 410-415, 2019.

[25] P. Dong et al., ―A systematic review of studies on cyber physical system security, International Journal of Security and Its Applications, vol. 9, no. 1, pp. 155-164, 2015.

[26] P. Jain, S. Sharma, Monica, P.K. Aggarwal, "Classifying Fake News Detection Using SVM, Naive Bayes and LSTM", in Proceedings of the International Conference on Cloud Computing, Data Science & Engineering- Confluence, 2022.

[27] V. K. Reshma, Ihtiram Raza Khan, M. Niranjanamurthy, Puneet Kumar Aggarwal, S. Hemalatha, Khalid K. Almuzaini, and Enoch Tetteh Amoatey, "Hybrid Block-Based Lightweight Machine Learning-Based Predictive Models for Quality Preserving in the Internet of Things- (IoT-) Based Medical Images with Diagnostic Applications", Computational Intelligence and Neuroscience, Vol. 2022, pp. 1-14, 2022.

[28] Kshirja Makar, Sachin Goel, Prabhjot Kaur, Mandeep Singh, Parita Jain, Puneet Kumar Aggarwal, "Reliability of Mobile Applications: A Review and Some Perspectives", In Proceedings of the International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), pp. 11-14, 2021.

[29] Parita Jain, Puneet Kumar Aggarwal, Kshirja Makar, Riya Garg, Jaya Mehta, Poorvi Chaudhary, "Machine Learning in Risk Analysis" Applications of Computational Science in Artificial Intelligence to be published by IGI Global, pp. 190-213, 2022.

[30] Anupam Sharma, Mandeep Singh, Megha Gupta, Namrata Sukhija, Puneet Kumar Aggarwal, "IoT and Blockchain Technology in 5G Smart Healthcare", Blockchain Applications for Healthcare Informatics published by Elsevier, pp. 137-161, 2022.

[31] Pranshu Saxena & Anjali Goyal, "Computer-assisted grading of follicular lymphoma: a classification based on SVM, machine learning, and transfer learning approaches" The imagining Science Journal, Vol. 58, 2023.