JOURNAL OF BASIC SCIENCE AND ENGINEERING

A REVIEW PAPER: FAKE NEWS DETECTION

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Abstract. In today's time when it is very easy to send any data to anyone in just a few minutes, to identify whether the information is accurate or not we have fake news detection algorithms. Fake news detection helps to find out fraud and detect the accurate information shared by anyone. In this review paper, we re-viewed the different techniques and methods used for fake news detection. This review paper helps to find out the accuracy which is already 99% achieved in some algorithms and the different popular data sets which are being used for the fake news detection systems.

Keywords: Fake News Detection, Information, Algorithm

1 Introduction

People are connected to a smart platform where they can share their information without verifying whether it is true or not [1]. It is very easy to spread content on social media like Facebook, Twitter, and etc. [2]. Content sharing on social media takes very less time and that's why it's very easy to spread fake news over there. Ru-mors, negative thoughts among people or the specific category of the people and many more things can be used which are not good for society [3]. News and infor-mation are always available at our fingertips and that is sometimes also dangerous for us. According to a survey in 2012, 49% of US adults saw the news on social media but in 2019 it's 62% which means there is a rapid growth in this type of users over social media [4]. The statistics have proven that 6 out of 10 people believe the news is updated on social media. In the last couple of years' fake news is getting more and more attention as we can see in the example of the US election in 2016. In Brazil's presidential election what's app is a popular political campaign platform. Anyone can spread fake news according to their views and can spread easily to any of the platform easily [5]. Sometimes the worst conditions are also raised due to the unauthentic con-tent on the social media. Social media users are biased toward their friends, relatives, and a group of persons thinking, in the influence of their thoughts the user's spread

unauthentic information without even knowing its authenticity. There can be different forms by which we can define the anti-social behavior of the users but when we relate in some closer manner we find out two forms for that [6]. The 1st form is for that that spreads inappropriate information and 2nd form is for that who manipulates the point of view of the users with their discussions.

Fake news is something that is spread exactly to change someone's point of view. And as we discussed about fake news, we can easily say that fake news detection is very necessary for today's time, and for that, we need a system by which we can check whether the news is fake or not [7]. It is important to issue to find out fake news forms the different social media platforms. As we know about INFODEMIC, the actions took time of COVID-19 for spreading inappropriate or unauthentic infor-mation on social media by world health organization [8]. Depending upon the differ-ent functionalities we have different methods to detect fake news.

2 Basic Terminology Used in Fake News Detection:

Whenever the fake news detection algorithm is applied to any format there are some basic terms which used as same in every place. We have a basic terminology that should be followed in every fake news detection system. Let's discuss the procedure by the following diagram:

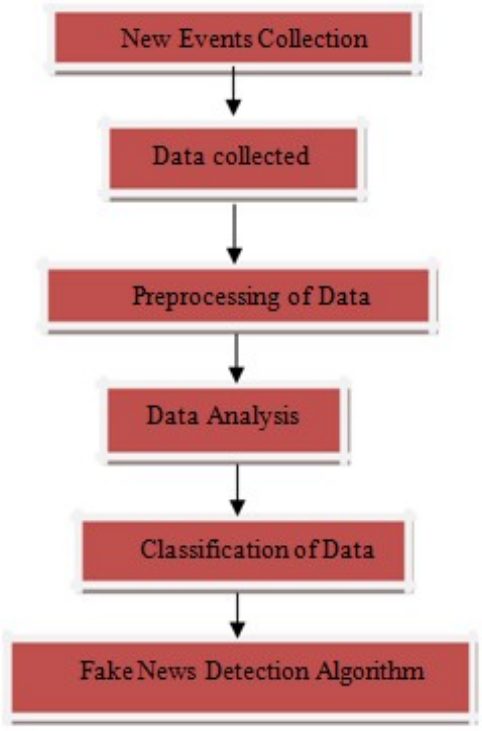

Fig. 1 Fake News Detection Basic Procedure

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ISSN: 1005-0930

The data is firstly collected from the different events or we can say different sources. After data is collected next step is preprocessing means we have to clean the noisy or unstructured data. Whenever preprocessing is done we analyze the data according to the requirements of the algorithms we are using.

After the analysis part is performed we classify the data into different categories to perform our fake news detection algorithm on that.

According to the different fake news detection algorithms different results and con-clusions were derived and better accuracy and performance were given.

3 Comparative analysis of different papers:

In this paper, we review the different papers on fake news detection to analyze the different algorithms and procedures used in 2015 - 2022.

The different research papers use different methods to make the system more secure in terms of different parameters. The parameters like accuracy, integrity, flexibility, F1 score, and précised data are used for checking whether the proposed method is positive. These parameters are different in different proposed methods and by using parameter's value the system's performance is also analyzed.

The different authors tried their best to achieve the approx. 100% accuracy in their methods which is also achieved and can be seen in the results. In the following table, we make a comparative analysis of their algorithms, techniques, and advantages as given:

Table 1. Comparative Analysis of paper's 2015 to 2022

SR. No.	Authors	Years	Technique Purposed	Advantages
1.	Yimi Chen,Niall n J. Conroy, Victoria L. Rubin [9]	2015	Combi nes the analy sis approa network k and linguistic cue	Aim is make flexi- ble fake news detecting

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			ch	system
2.	Sheri Saad, f Hadeer Ahmed, Issa Traore [10]	2017	Machi learni "N ne ng & " analysis Gramapproach used	Accuracy give is n up to 92%.
3.	Cody Buntain, Jennifer Golbeck [11]	2017	Automatic fake news de- tection on twitter by using learning predicate	Improves the accuracy and credibilit y
4.	Mykhailo Granik, Vo- lodymyr Mesyura [12]	2017	Implemented on Face- book's post by using naïve Bayes classifiers	Accuracy achieved- 75%
5.	Gaurav Bhatt, Aman Sharma, Ankush Mittal, Shivam Sharma, Ankush Nagpal, Balasubramani- an Raman [13]	2018	Combination of two tech- nique is applied for finding fake news by Appling "n" gram model and heuristics from external sources	Average results shown by using this technique.
6.	Akshay Jain, Amey Kasbe [14]	2018	Naive Bayes classification method is used to	Accuracy is im- proved if

			find out	words

			whether the news is real /fake.	with more length used.
7.	Haohui Liu [15]	2019	Bag-of-words model and e pre-trained GloVe word embedding's with BiLSTM is used on location de- pendent data sets.	Improves accura- cy, précised
8.	Amit Kumar Gupta, Anjali Jain, Avinash Shakya and Harsh Khat- ter [3]	2019	Support Vector Machine is used for detection of fake news	The results show us 93.6% accuracy for detection of fake news.
9	Viera Maslej Kresnakov ´ a,Martin Sar- novsky,Peter Butka [16]	2019	Using textual data with deep learning to find out the fake news.	Average results shown by using this method
10.	Abdullah-All-Tanvir, Mohammad	2019	For determining forged news messages from	Improved accura- cy than the

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	Rezwanul Huq, Ehesas Mia Mahir and Saima Akhter [17]		twit-ter post	previ-ous methods.
11.	Tarang Barua , Ashish Kumar Layek Ranojoy Barua , Rajdeep Maity and Dipankar Minj [18]	2019	LSTM and GRU are used in this method	Accuracy-82.61% F1 Score-0.83
12.	Rohit Kumar Kaliyar, Anurag Goswami, Pratik Narang [19]	2019	Gradient boosting with different parameters are used to achieve the high level of accuracy in differ-ent data sets.	Accuracy -86%
13.	Ponnurangam Kumara-guru, Shin'ichi Satoh, Shivangi Singhal, Rajiv Ratn Shah and Tanmoy Chakraborty [20]	2019	VCG 19 pre trained data set is used with BERT algo-rithm in this paper.	77.77 & 89.23 % Accuracy in differ-ent data sets are achieved.

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14.	Fabrıcio Benevenuto, Julio C. S. Reis, Andre Correia, Fabrıcio Murai and Adriano Veloso [21]	2019	New set of features and data sets are used to pro- duce the better results.	95% accuracy and F1 score has been produced by this technique.
15.	Paweł Ksieniewicz, Michał Wozniak, Paweł Zyblewski, Michał Cho- ras, Rafał Kozik and Agata Giełczyk [22]	2020	Firstly used fact checker and secondly used AI algo- rithm to detect the fake news.	Improved results and scores.
16.	Okuhle Ngada, Bertram Haskins [23]	2020	6 machine learning algo- rithms are used in one technique.	Precision-99.3% Accuracy-99.4% Recall-99.4% FMeasure-99.4% ROC-99.3%
17.	Jasmine Shaikh, Rupali Patil [24]	2020	Support Vector Machine (SVM), Naïve Bayes, and Passive Aggressive	Accuracy is achieved up to 95.5%

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			Classifi-	
			er are used.	
18.	Awf Abdulrahman, Muhammet Baykara [25]	2020	4 traditional methods were applied to extract features and employing 10 different machine learning	Accuracy is achieved from 81 to 100%
19.	Rahul R Mandical, Matha N, Shivakumar N, Monica R, Krishna A N, Member IEEE [5]	2020	Hybrid technique used such as Naive Bayes, Passive Aggressive Classifier and Deep Neural Networks	Accuracy achieved up to 99.9%
20.	Rajesh Kumar, Mayank Kumar Jain, Dinesh Gopalani and Yogesh Kumar Meena [26]	2020	ML classifier is used in this paper by using two different data sets TF & TFIDF to achieve the accuracy.	90 % Accuracy is achieved
21.	Vanya Tiwari, Ruth G. Lennon, Thomas	2020	Two different classification algorithms are combined	Accuracy -71%

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	Dowling [27]		to achieve the accuracy in TF IDF algorithm.	
22.	Sanket Mhatre, Akhil Masurkar [28]	2021	NLP for preprocessing & TFIDF to train models	Improve classification and reliable results.
23.	Saumya Chaturvedi, Ansh Saxena, Akash Gupta and Farhan Alam [7]	2021	For correcting error in the given algorithm and update it whenever needed	Better accuracy with 96% accurate results.
24.	Dilip Kumar Sharma, Sonal Garg, Priya Shrivastava [29]	2021	LSTM and BI-LSTM are used for fake news identification on KAGGLE set	Accuracy is improved up to 91.51%
25.	S Devi, V Karthik, S Bagavathi Bavatharani, K Indhumadhi [30]	2021	LR, Gaussian Naïve Bayes and tampered image classification using CNN for fake news detection.	The accuracy is improved up to 95.33%
26.	Ankit kumar Patel, Kevin	2021	This method using LR,	Gives highest

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	Meehan [31]		MultinominalNB, and SVM with CV and Term Fre- quency	accuracy in Reddit data set
27.	Kian Ming Lim, Kian Long Tan and Chin Poo Lee [32]	2021	An CNN model that is referred to as FN-Net is devised for fake news detection	Accuracy- 99.39%
28.	Amit Neil Ramkissoon, Wayne Goodridge [33]	2021	This paper contains unique EML model to accomplish Credibility Based Fake News Detection.	Improved accura- cy, recall, F1score
29.	Swatej Patil, Suyog Vairagade, Dipti Theng [6]	2021	A new technique in ma- chine learning to provide TFIDF vectorizer.	Precision- 1.0 Accuracy- 97.2%
30.	Danish Shakeel, Dr Nitin Jain [34]	2021	New technique in which style based approaches are	Improved F1 score and accuracy
			used to detect the fake news by Fast TransE	level.

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			model and algorithms.	
31.	Pratik Narang, Rohit Kumar Kaliyar and Anurag Goswami [35]	2021	BERT based deep learning approach is used in this paper by combining the different parallel ap-proaches.	In this accuracy level is achieved up to 98.90%
32.	Dr.S.Gowri, Jenila J, Bathula Sowmya Reddy, M.Antony Sheela [36]	2021	TFIDF is proposed in this paper with SGD algorithm for better efficiency.	93.29% accuracy is achieved by using this algorithm.
33.	Sherry Girgis, Eslam Amer [37]	2022	CNN with GRU model of RNN and RFT is used	Improves perfor-mance and shows the best results in LIAR dataset.
34.	Satish Anamalamudi and K Raghavendra Asish, Adarsh Gupta, Arpit Kumar, Alex	2022	Tool to detect the fake news using naive bayes technique	Used to improve the accuracy

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	Ma- son and Murali Krishna Enduri [38]			
35.	Tashko Pavlov and Georgina Mirceva [8]	2022	Uses BERT and RoBERTa models for detecting fake news during pandemic.	Better accuracy, F1 SCORE achieved
36.	Eappen Zachariah Mathews, Dr Preethi N [39]	2022	Automatic fake news de- tection system that is used by ML	Accuracy-96.7 F1 Score-96.9 Recall-97.5 Precision-96.2 achieved.
37.	Aniket Sharma, Ishita Singh, Dr. Vipin Rai [4]	2022	Used Examination zones and future bearings for the exploration on fake news identification on social media.	Comparison of different tech- niques to find out the impact of social media.
38.	N. Leela Siva Rama	2022	DT algorithm and SVM	Accuracy- 91.74%

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	Krishna, M. Adimoolam [30]		algorithm is used in pur- posed research	Precision- 92.2510%
39.	D. Jaswanth Babu, G. Sushmitha, D. Lasya, D. Gopi Krishna, V. Rajesh [40]	2022	Machine learning classifi- cation methods are used collectively SVM, NB, LR, DT, and RF are used to detect fake news.	Accuracy- 99.49% achieved.
40.	Muhammad Fayaz, Sana Ullah Khan, Atif Khan and Muhammad Bilal [41]	2022	Random Forest is applied on ISOT fake news data set with four best selection techniques to achieve the best results.	In total data sets 97.25% accuracy is achieved in four different data sets.

41.	Asutosh Mohapatra & Nithin Thota & P. Prakasam [42]	2022	A hybrid deep learning model with BiLSTM is used in this paper.	Accuracy is achieved up to 98.65%
42.	Mr. Akash Dnyandeo	2022	Block chain based system	95.20% accuracy is

	Waghmare, Dr. Girish Kumar Patnaikm [2]		used LIAR data set as pro- posed algorithm in this paper.	achieved.

4 Conclusion:

In this paper, we analyze the techniques used for fake news detection and found that many algorithms provide better accurate results means approx. 99% accuracy is al-ready achieved in fake news detection algorithms which help us to identify fake news from different sources. Different sources are used to take different types of data and different data sets are used accordingly to detect whether the news is genuine or not by using different algorithms. The algorithm/method/technique used in different pa-pers is reviewed in this paper to show their advantages, accuracy, performances, etc.

The performance of a fake news detection system can vary widely depending on fac-tors like the quality and diversity of training data, the sophistication of the algorithms used (e.g., machine learning, deep learning, natural language processing), and the specific features or indicators considered for classification (e.g., linguistic patterns, source credibility, fact-checking results). It's important to strike a balance between precision and recall to avoid both false positives and false negatives, as the conse-quences of misclassifying news can be significant. It's important to note that fake news detection is a challenging and evolving field, and no system is perfect. Re-searchers and developers continually work to improve these systems to reduce false positives and negatives and keep up with the evolving tactics used by purveyors of misinformation.

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