CBFDR- Context-Based Fake News Detection and Reporting using Blockchain and Machine Learning

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Abstract

Cases of fake news are increasing at a high pace, especially through social media portals. Even though there are various fact checker websites and portals that distinguish news from real or fake news and ongoing research have been done to stop the propagation of fake new. The major setback is timely detection, prevention and reporting of fake news. The proposed model CBFDR (Context-Based Fake News Detection and Reporting) first analyzes the domain of the given news through Amazon web services (AWS) Comprehend, secondly detects the fake news through RNN-LSTM (Recurrent neural network – Long short term memory & XG -Boost algorithm (extreme gradient) and thirdly includes a set of domain- experts who analyze the set of fake news as well as report in Block-chain (using smart contract and proposed algorithm Proof of Evidence (PoE)) to stop the propagation of fake news at an early stage. The given paper has shown the highest success rate of 98% using RNN-LSTM and 93% using the XG-Boost algorithm for fake news detection. This paper covers detection, prevention and reporting in one application with an average 60-70% faster and more accurate than the existing models.

Keywords Amazon web services (AWS) , Fake News Detection, RNN-LSTM, XG-Boost, Smart contract, Blockchain, Proof of evidence (PoE)

1 Introduction

Fake news has always been there, but now it's been exploited at a tremendous rate through various social media platforms or unauthorized news websites. Even though there are fact-checkers available these fake users can still spread false news without any fear due to multiple unauthorized accounts that enable them to spread without being accountable.

Today billions of users are using social media platforms actively using social media platforms which is growing each day Buster (5). Looking at the above statistics , the rate at which fake news is consumed by users around the world each day is undoubtedly alarming Thus in order to stop this fake news from spreading consumption asset further this paper proposes a novel approach to detecting and reporting fake news using blockchain and machine learning.

Based on the latest survey for the news consumption in the range of social media, news consumption between the age ranges (18 to 44) is the highest approx. 45% which is quite high. As per the Statista Srivastava et al. (2019) almost 80% of fake news was spread between 2020-2021 on COVID19 on social media which 70-75% contained false remedies, death rates and vaccine side effects.

1.1 Importance of Fake News Detection and Reporting

Fake news has created havoc, especially since the rise of various social media platforms. For Example, 2021 according to The Print media was "2021 was the year of fake news" , as quoted by the news headlines 141 (6). The misinterpreted news leads to havoc situations such as fights within or outside the community, hatred among the groups, affects the unity between the society, and health problems such as anxiety, depression etc. are some of the scenarios which may be seen as the after-effects of fake news.

Those who generate this news have their reasons such as to create terror among the people, ruin others' names or things, greed, for pleasure, generate hatred in one another and so on and forth. The question arises at the end of the day: how do we differentiate between real or fake news. The proposed solutions will be discussed in the following sections to generate awareness of fake news and create a safer platform.

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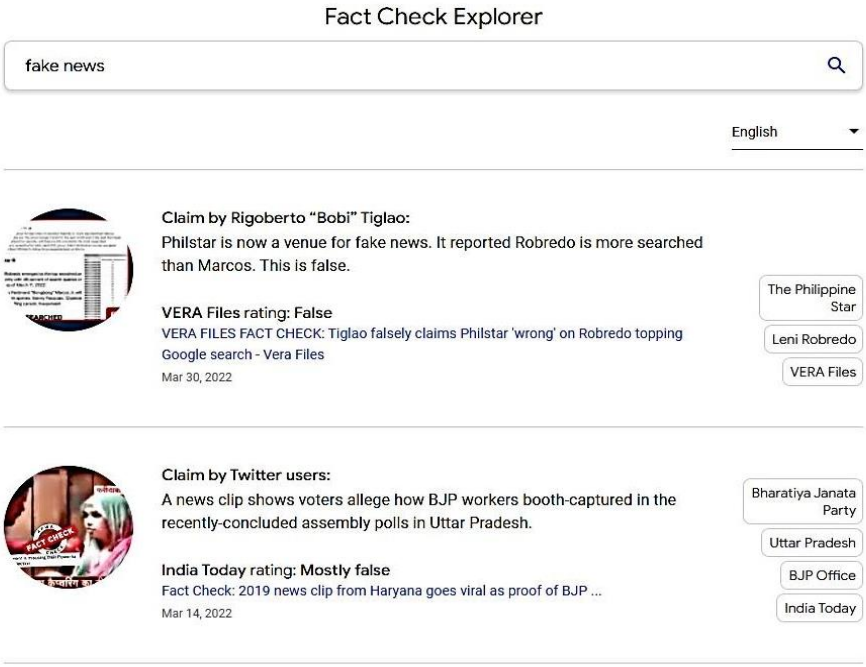

Fig 1 Snippet from Google tool fact news checker on fake news

On National Press Day, which is 16th November 2021, itcame to light during the parliament session that fake news

Should be curbed strictly and ethical principles of journalism should be abided due to the steep increase in fake news.

The given paper proposes a solution to compact the fake news with the help of blockchain, natural language processing and machine learning. New terminology has been slated for the false news or fake news is "infodemic" used to rise in misleading data or information in all modes of the news.

WHO (World Health Organization) has been actively participating in taking actions against the info- demic which caused due to fake news 141 [1].

According to the news, through proper certified channels go through intensive research and collaborations by the various prestigious reporters, authorizes and novel researchers who are well - versed in the given field domain.

But even though the news in today's day is prone to falsehood on a large scale, various digital platforms are equipped with the facilities of the wide-area network, which helps in spreading any kind of fake news. Regardless of any strict actions which may take place on them or the platform but due to lack of traceability, they are never caught which gives them more power to post fake news.

Still , there are a few possible ways by which one can figure out if the news is fake news which is as follows: -

- The given news is written in poor language and context.
- Fake accounts on social media with a fake identity that looks legitimate.
- Usually hold no proper background study and statics/data in order to prove their point.
- Biased over a specific context only.
- Certainly, created to trigger without any bases such as remedies to heal or deaths in coronavirus during the pandemics in waves 1 and 2 were prevalent.

Besides the above-stated points, there are other ways to

check whether a news is fake or not such as fact-checking websites or tools such as google fact-checkers, a new checker.in etc. which are widely available 141 [5]

Even though there are comprehensive solutions yet there is a rise in fake news which can be seen especially after the introduction of various social media platforms where counterfeit accounts are made to post fake news and circulate them effortlessly bots are also set up which is certainly quite concerning 141.

In the years 2020-2021, many cyber threats and cyber-attacks have occurred which made the importance of a decentralized system more critical and to be precisely equipping a secure and authorized platform is the need of the hour in order to fulfill the CIA (Confidentiality, Integrity and Availability) triad for the user's safety.

In order to do so, this paper proposes a decentralized Context Based Fake News Detection and Reporting CBFDR framework that aims in detect and report fake news in order to stop the propagation of fake news.

This paper focuses on creating a decentralized platform for reporting fake news using machine learning and blockchain technology.

This paper proposes an automated system with the help generating the domain and sentiment analysis of the given news article along with a brief report which the subject review experts could consider on the given news domain during the decision making whether the given news is real or fake.

Using blockchain for its decentralized technology makes it more secure against cyberattacks such as single point failure, a man in the middle attack etc.

A decentralized platform would be created using blockchain technology where experts can review the news using the brief report and their expert review using the Proof of Evidence (PoE) algorithm.

Section II gives brief literature on the blockchain and past work fake news reports. Section III explains the proposed methodology of the given blockchain, smart contract and proof of Evidence (PoE) algorithm. Section IV focuses on implementation, Section V Implementation and discussion and Section VI Conclusion and Future work on the proposed paper.

1.2) Contribution

The model for the proposed paper is divided into three phases which are as follows –

- The proposed model focuses on early-stage detection and reporting of fake news in order to stop the propagation of fake news.
- Even though there are various prevention, detection and reporting fake news Research solutions are available, still the given proposed CBFDR model ensures all the three aspects listed above along with the CIA (Confidentiality, Integrity and Availability) triad of security under one application which makes it distinct and unique from the existing solution.
- The primary focus of the proposed model is to detect, prevent and report fake news through safe channels for which machine learning and block chain have been used.
- This paper focuses on three main aspects: prevention, detection and reporting of fake news using the help of blockchain and machine learning.
- Domain Detection of fake news using amazon web services (AWS) comprehend to analyze and categorize a given set of news in there subject domain blocks in the blockchain.
- On an average 60-70% faster and more accurate as compared to the existing models.
- Fake News Detection using RNN-LSTM and XG-Boost algorithm are used for fake news detection aft
- Reporting of fake news using the domain experts based on proposed Proof of Evidence (PoE) gives the evidence of the given reported information which provides clarity and adds points to the respective expert's wallet for their service each time.

2 Related Research

The literature survey explains the various studies done over time by various prestigious researchers. A researcher recently proposed "An incentive- aware blockchain-based solution for internet of fake media things" , published by Qian Chena et all.[22]

The Facebook algorithm has been the subject of speculation, especially since one of the whistleblowers exposed the algorithm's role in spreading false information during the US 2020 election [7]

Fake news has taken over the world through deceptive articles and news that have no basis, resulting in cyberbullying, hostility, and riots against communities that require strong regulation.

According to Song, Kim, Hwang, and Lee (2019), most people have access to content-creation software and applications.

Furthermore, false information spreads exponentially on social media because users are more likely to spread false news farther, faster, and more profound than accurate news through their social networks (Vosoughi & Roy, 2018).

Regardless of national, cultural, and political differences between governments, most agencies are now attempting to combat, both jointly and separately, the misuse of information published and distributed on a large scale.

According to current events, It has become easier to be posted on various social media platforms without any authorized body monitoring the system from time to time has become the need of the hour and understanding.[48]

The vast majority of research in this field is centered on the idea that social media plays a significant role in the spread of fake news. The concept of decentralized was integrated with Ethereum smart contracts in Paul's work, as well as a Breadth-First Search algorithm to calculate a user's closeness (Singh, Parizi, Zhang, Choo, & Dehghantanha, 2020). (2019). The blockchain now includes social networks.

Validators provide reviews as time passes and days pass in the media. As a result, the News will be presented to users with a rating that represents the correctness/authenticity of specific news (with multiple veracity levels) and is followed by a weight-based validation method in which validators in the same area are assigned the same peak weight

The Byzantine Fault Tolerance method was used in another research on a blockchain algorithm.Alfandi, Otoum, and Jararweh (2020; Alfandi, Otoum, and Jararweh, 2020; Alfandi, Otoum, and Jararweh, 2020; Alfandi, Otoum, and Jararweh, 2020; Alfandi, Otoum, and Jararweh.

Muhammed Saad and colleagues, (2019). Similarly, the authors of Song, Kim, Hwang, and Lee (2019) proposed a blockchain-powered social media notarization service. The article aims to complement the work done by Qayyum, Qadir, Janjua, and Sher (2019) to combat the spread of Fake News.

Smart Contracts are frequently used to simplify news registration and publication (Qayyum et al., 2019). Requests from news publishers are accepted into the scheme .After a preliminary check in the current mapping, the publisher is given a public key and secret pair with the status of the verified or unsourced publisher, as well as an initial credibility score that will evolve based on the news published. Even though various researchers have given great viewpoints on the detection and prevention of fake news but keeping in mind today's demand, it has been seen that the requirement of

immediate detection and reporting can help in curbing the fake news. Given that the data is present in a large amount the manual method is not accurate and thus needs an automated process that could generate.

Thus in order to prevent it from propagating further. Understand the current ways by which fake news is being detected to improve the scope of the given method further and come up with a new method for detecting and preventing the fake news in the given scenario of fake news.

Due to the gaps in the study of the given papers , we have proposed fake news detection and prevention using blockchain or available technology machine learning methods , which is still the future.

3. Proposed Approach

The proposed solution focuses on categorizing each news in the blockchain using Amazon Web Services comprehend, early fake news detection using RNN-LSTM and XG-Boost algorithm, and reporting fake news based on severity level using domain-based news experts in blockchain-based on proposed proof of evidence (PoE).
The main reason for combining the human mind, automation, and security monitoring, as well as transaction, is to employ machine learning and blockchain.

Online news is generated in bulk through various mediums such as social media platforms, blogs, websites and various other anonymous sites thus in order to timely detection and reporting of fake news has become an enormous task. Even if there are tools like fact news checkers that can determine whether a story is fake or not, the need for real-time detection and reporting in a secure setting is critical if fake news is to be stopped.

3.1 Proposed Architecture Model Overview

This section covers a brief overview of the proposed architecture model.The proposed model CBFDR is based on one of the machine learning parameters which is part of deep learning called Recurrent Neural Network- Long-short term memory (RNN-LSTM) and uses blockchain-based technology. The following section will cover the implementation of the dataset from various platforms [11],[12],[13] on fake news.

The figure gives an overview of the architecture diagram of the proposed CBDFR model. The experts in the given model are registered using smart contracts, which are the rules and conditions that every expert on the platform must adhere to in order to keep the

network safe, secure, and accurate news.The expert once registered are added to the blockchain where they are given a unique address along with the facility to report fake news based on their domain expertise and wallet in which they would be rewarded if and only if the evidence provided by them was correct

and the news was accurately categorized as fake or real depending upon the news the integrity of the news from wide domains and areas. Once the news is collected, it goes through domain detection which is performed using the amazon web services feature amazon web services comprehend.

The domains were extracted from the given set of news which was further categorized in the given blocks based on their respective domains in the blockchain.[47]
The experts would pick news from the block in the given blockchain. Once the news is selected they would be redirected to give their review based on the following category which is:-

Table I Score Grading for the Evidence Score

Sno.	Score Category	Points
1.	Real News	+5
2.	Fake News	-5
3.	Re-Review required	-6
4.	Not Defined	-8

Once the review score is determined, each expert will be given a score and an amount will be credited to their wallet for their services based on their performance. The subsection will be divided into three sections 3.1) Domain Detection of fake news using amazon web services comprehend., 3.2) Fake News Detection using RNN-LSTM and XG-Boost algorithm and 3.3) Reporting of fake news using the domain experts based on proposed Proof of Evidence (PoE).

3.1) Domain Detection of fake news using amazon web services comprehend

Each news has its domain associated with it which makes it fall under a specific category of news, likewise the given section covers the domain analysis of news using one of the features of Amazon web services that is amazon comprehends. Using the amazon comprehend will help in extracting the domains of each news which will further help in categorizing it into various domain-based blocks in the blockchain. The following steps were performed-

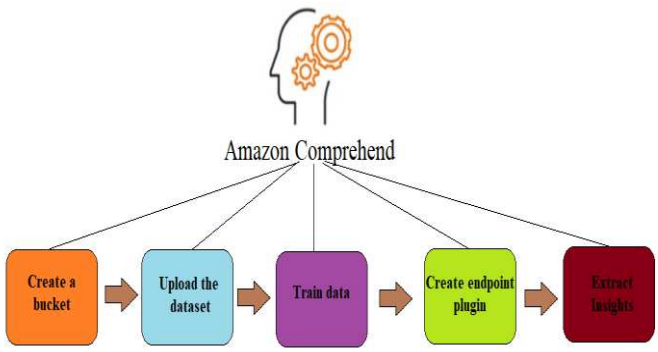

Fig 2 Steps used to perform domain detection using amazon comprehend

The given feature fetches the data using the amazon web s3 bucket where the dataset was uploaded. Once the data is stored in the s3 bucket it is prepared to train the dataset based on the amazon comprehend feature. This feature contains a variety of facilities such as domain detection, sentiment detection and so on which allows the user's to get more significant insights into the big data within a few minutes.

Domain detection using for amazon web services comprehend

Step 1 : Create a **bucket** in **->** (news-report-1) using aws services.

Step 2 : Import the dataset in the s3 bucket while creating an instance **->** (news-report-data)

Step 3 : Console aws comprehend to train the dataset (news-report-train) curated

an **endpoint ->** (news-report-endpoint) to connect the jupyter notebook with the trained dataset.

Fig 3 Steps used to perform domain detection using amazon web services to comprehend

The data is trained using Amazon Web Services, which took 30-35 minutes to process for the given dataset, before passing through the endpoints that are linked to the notebook to infer the information using the Amazon Web Service libraries boto3 and seaborn to plot the domain-specific news that was analysed along with word cloud to generate the set of words for the true dataset as shown above in the figure.

3.2) Fake News Detection using RNN-LSTM and XG-Boost algorithm

The gradient boosted trees technique's XGBoost (eXtreme Gradient Boosting) version is a popular and efficient open-source implementation. [5]

Because of its robust handling of a wide range of data kinds, relationships, and distributions, as well as the diversity of hyperparameters that can be fine-tuned, the XGBoost approach does well in machine learning competitions.

XGBoost can be used to solve regression, classification (binary and multiclass), and ranking problems.

RNN-LSTM (Recurrent Neural Network – Long Short Term Memory) is a type of RNN.LSTM solves the vanishing gradient problem in backpropagation.The news is collected from various sites in order to check the It uses a gating mechanism that controls the memory structure. [4].A sigmoid function was used to keep results between (0 and 1).

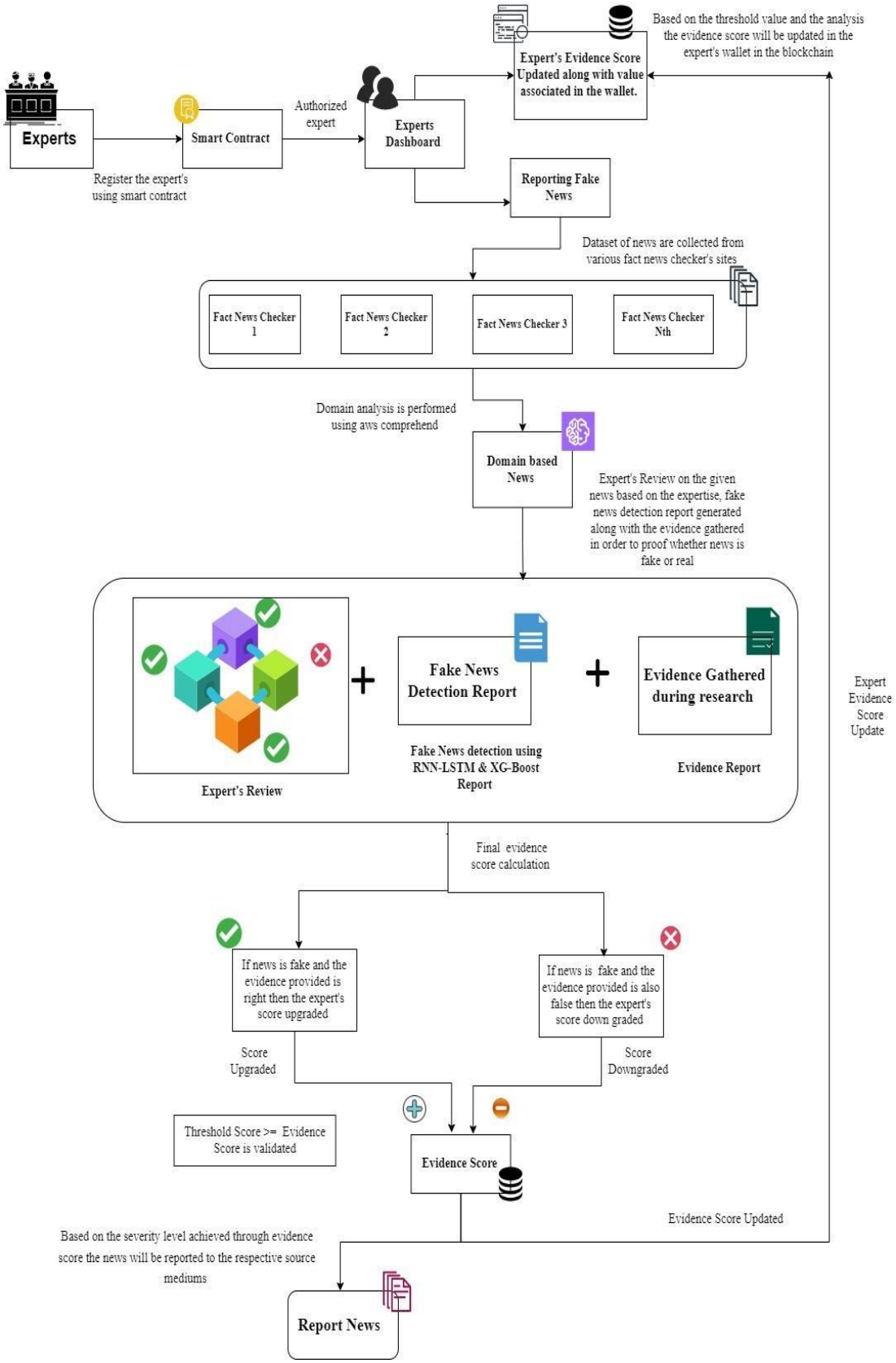

Fig 4 Architecture Flow diagram of the Context-Based Fake News Detection and Reporting using Blockchain

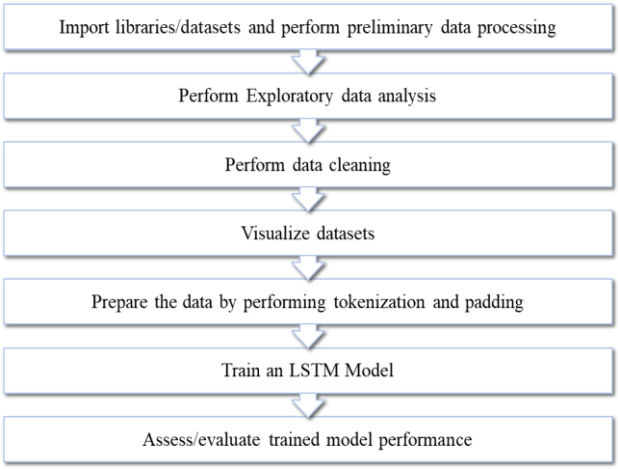

Fig 5 Steps to perform fake news detection using RNN-LSTM

Algorithm 1 CBFDR using Proof of Evidence

Input: fact check news, expert review, Output: Report of news

1. Extract data from the fact news checker websites.
2. Concatenate the news datasets and create one dataset.
3. Load the dataset in the AWS s3 bucket.
4. **Bucket name = news_dataset_1**
5. Uploading the news dataset in the AWS comprehend
6. **S3=news_dataset_1**
7. Let the trained dataset be called: news_dataset_trained,
8. Trained dataset linked to AWS Sagemaker for domain analysis.
9. Trained_dataset = news_dataset_trained
10. Creating an endpoint to join trained_dataste with the AWS Sagemaker with the nearest region end_point= news_dataset_endpoint
11. **region=asia_mumbai3**
12. Classifying the domain of the dataset using the AWS comprehend libraries in AWS Sagemaker
13. Batch_Detect :{ news_dataset_trained:
14. **Domain_Entitie = news_dataset_trained}**
15. Downloading the classified dataset in s3 bucket
16. Result=news_dataset_domain
17. Exporting this dataset to the private blockchain
18. Export = news_dataset_trained Private_blockchain news_dataset_trained
19. Domain-based blocks created contain the various fact news check data results.
20. Expert's Review based on their domain speculation along with news_dataset_trained will be taken into consideration during PoE(Proof of Evidence)
21. Calculating the News accuracy based on PoE (Proof of Evidence)
22. **Final_Result_News (%) = news_dataset_trained+ Domain_Expert_Review * 100**
23. **Output :** Report will be sent to social media platforms with the data such as news accuracy, source of news etc. in order to take action against such fake accounts and news timely.

Fig 6: Algorithm of Repo-Fake Framework and implementation of Proof of Evidence PoE

3.3) Reporting of fake news using the domain experts based on proposed Proof of Evidence (PoE).

The Repo-Fake Framework works on the private blockchain network. Various well-known and widely available fact-checking tools, such as Google's fact-checking tool, PIB's fact-checking tool, and others, can be integrated into this framework. Additionally, with the fact news check review, there would be an expert news review community based on their domain that would give a review based on the novel Proof of Evidence (PoE) that would check the province of the news and based on which the score for the given news piece would be given. (Figure 1)

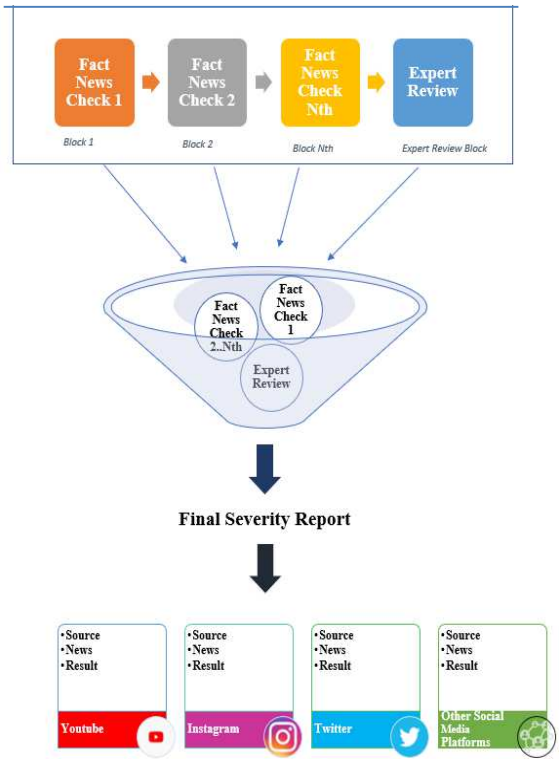

Fig 7 : CBFDR Fake News Detection and Reporting

4) Results and Evaluation

This sections covers The above experiments are performed using Python 3.0, Processor Intel(R) Core(TM) i5-10210U CPU @ 1.60GHz, 2112 Mhz, 4 Core(s), 8 Logical Processor(s) with 12 GB RAM. The dataset on which the experiment is performed is taken from Kaggle [2][3]. Dataset 1:PoliFact Fake News Dataset[11], 2: Covid19 Fake News, Dataset [12] 3: Fake and True News Dataset [13].

	id	tweet	label
0	1	Our daily update is published. States reported...	real
1	2	Alfalfa is the only cure for COVID-19.	fake
2	3	President Trump Asked What He Would Do If He W...	fake
3	4	States reported 630 deaths. We are still seein...	real
4	5	This is the sixth time a global health emergen...	real

Fig 8 Dataset snapshot of the dataset.

Table 2 Accuracy achieved through RNN-LSTM AND XG-Boost algorithm

Sno.	Dataset	Algorithm	Accuracy
1.	Dataset 1	XG boost	76.7%
		RNN-LSTM	87%
2.	Dataset 2:	XG-Boost	80.1%
		RNN-LSTM	82.2%
3.	Dataset 3	XG-Boost	93.6%
		RNN-LSTM	98%

The proposed model was trained in the three datasets given above using the RNN-LSTM algorithm for fake news detection reports and analysis. For domain analysis, amazon web services (AWS) were used to comprehend which is based on natural language processing and domain analysis of each news. The accuracy of the given dataset of the given model with build in available evaluation metrics.

The dataset is divided into training and testing sets in 70:30 ratio respectively for the dataset analysis purpose

The accuracy achieved was best by implementing of the RNN-LSTM algorithm for the given dataset. It was observed that using RNN-LSTM better accuracy as well as the performance of fake news detection was seen with the highest of 98% from all the given datasets. The XG-Boost has shown better performance for dataset three as compared to others with an accuracy of 93%. In the political news fact check dataset, there was a significant difference of 10.3% between both the RNN-LSTM and XG-Boost algorithms with accuracy was 87% and 76.7% respectively.

On the other hand, there was very a slight difference in the accuracy

When the RNN-LSTM method was used to implement dataset two, the results were 80.1 percent using XG Boost and 82.2 percent using the RNN-LSTM technique.

When both algorithms were used, the RNN-LSTM approach produced the best results in terms of fake news identification accuracy.

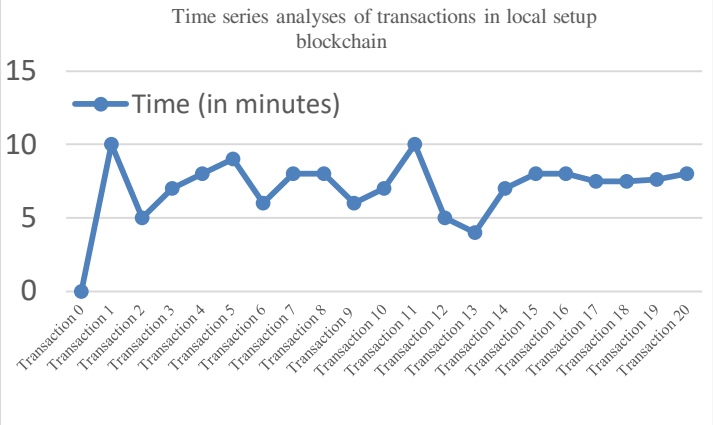

Fig 9 Time series analyses of transactions in local setup blockchain

In order to perform transactions , a local setup of blockchain was performed using javascript programming.
The formation of the first block as shown in the figure took **approx. 10 minutes** which gradually concerning time and the transaction.

Table III Specifications of local setup

Domain	Specifications
Processor	Intel Core(TM) i5-10210U
CPU Logical Processor(s)	1.60GHz, 2112 Mhz 4 Core(s), 8
Ram Memory	12 GB RAM

On average, each transaction took **approx. 6-7 minutes** which is good in terms of performance for small transactions (**20-50 transactions**).

Demerits areas the level of transactions grew the performance started to decline and computation time increased to **12-15 minutes after every 11th transaction.**
Thus, in order to improve usability, the Remix platform was employed, which provides wallets, plugins, transactions, and a considerably faster transaction rate.

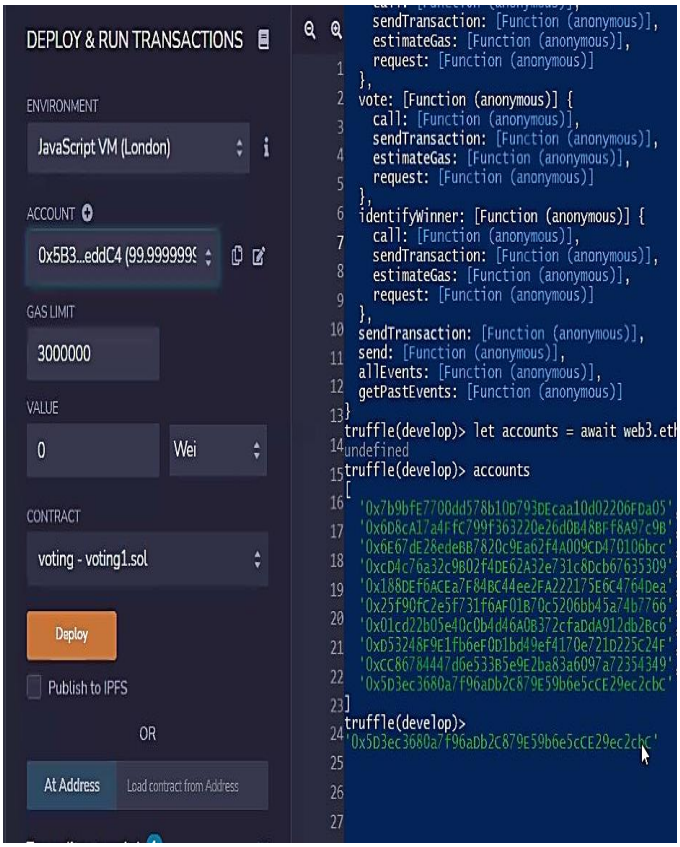

Fig 10 Voting authorized experts through blockchain

The initial transaction through the remix platform **took approx. 20 seconds to form the first block.**On average, it took about 12-14 seconds, which is over 60-70 percent faster than the old local setup technique

Table IV Specification of the remix platform

Sno.	Domain's	Specifications
1.	Coding Platform	Remix-IDEI v0.11.0
2.	Solidity Version	pragma solidity <0.7.0;
3.	Program Language	Solidity 0.5.7
4.	Extension	.sol

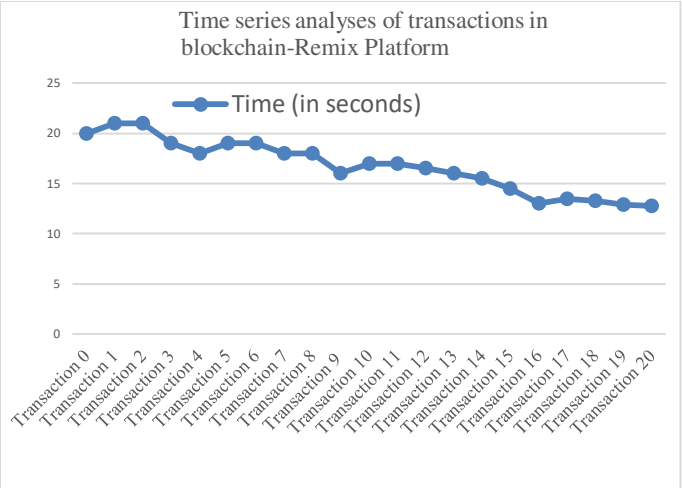

Fig 11 Time series analyses of transactions in blockchain-Remix Platform

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Remix provides 100 free accounts with the provision of the plugin with the add on plugin of metamask and ganache.

Branch formation:-

--Expert Review.sol
|---Contract.sol
|---Vote.sol

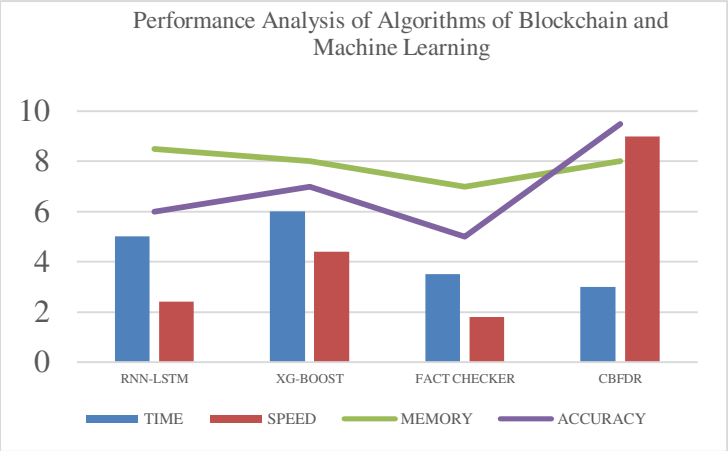

Fig 12 Performance Analysis of Algorithms of Blockchain and Machine Learning

Fake news is an ever-growing area, and fresh fake news is reported every day, therefore in order to raise awareness and comprehend the gravity of it, the supplied proposed paper will try to improve in order to protect the integrity of the information and keep the news safe from manipulation.

The news posted on various platforms which are not authorized could be reported and a list of which could be maintained in order to verify users based on which platforms they have earlier worked on is not matching with the unauthorized list

5) Conclusion and Future Work

This paper successfully gives a novel CBFDR model for detection , prevention and reporting fake news using blockchain and machine learning. The decentralized platform allows experts across the world to interact and give their expert reviews along with giving a platform to report the severity of the news at the level mentioned using the novel algorithm PoE (Proof of evidence). The domain detection performed through AWS Comprehend was using The best performance for fake news detection was shown using RNN-LSTM compared to XG-Boost for fake news detection achieved 98% (highest compared to another dataset in RNN-LSTM only) while XG-Boost achieved 93% highest compared to another dataset in XG-Boost only). In comparison to the local system, the remix platform achieved a 60-70 percent increase on blockchain consensus speed, implying that transactions in the blockchain took an average of 10-14 seconds.

Further future work papers can be elaborated on and can be enhanced with more security checks. Currently the given model focuses on the textual data and is constrained to the English language in the future it could be expanded to video and audio news as well as other languages such as Spanish, Hindi, French etc can be added for a broader range of audiences. In the future, different machine learning algorithms, such as fuzzy logic, can be used to compare the efficiency of fake news.

Declaration

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Human and Animal Ethics: Not Applicable

Consent for Publication: The participant has consented to the

submission of the research paper to the journal.

Availability of supporting data: As per request

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Authors' contributions: Himani Mishra (the first author) carried out the literature review, studied the concepts and design, implemented the fake news detection using Machine Learning and Blockchain, analysed and interpreted data, and drafted the manuscript. Dr Amita Jain (the second author) have suggested and conceptiualised the idea for given manuscript along with the guidance.Ankur Tayal (third author) have conducted a literature survey, refining and editing the manuscript. All authors contributed to manuscript revision. All authors read and approve the final manuscript.

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References

1 NCRB data: 214% rise in cases relating to fake news, rumours https://indianexpress.com/article/india/214-rise-in-cases-relating-to-fake-news-rumours-7511534

2 Fake News Buster: Cupping doesn't remove vaccine from body https://bangaloremirror.indiatimes.com/bangalore/others/fake-news-buster-cupping-doesnt-remove-vaccine-from-body/articleshow/86763513.cms

3 South Korea puts proposed 'fake news law' on ice after backlash https://www.thedrum.com/news/2021/10/04/south-korea-puts-proposed-fake-news-law-ice-after-backlash

4 An incentive-aware blockchain-based solution for internet of fake media things" published by Qian Chena, Gautam Srivastava,, Reza M. Parizic, Moayad, Aloqaily, Ismaeel Al Ridhawie in Elsevier.(2021)

5 India reported 11.8% rise in cybercrime in 2020; 578 incidents of 'fake news on social media: Datahttps://www.thehindu.com/news/national/india-reported-118-rise-in-cyber-crime-in-2020-578-incidents-of-fake-news-on-social-media-data/article36480525.ece

6 How to build data literacy to help students navigate misinformation https://universitybusiness.com/build-data-literacy-students-navigate-misinformation/

7 Facebook Algorithm Fuelled Spread of Misinformation Over Factual News During 2020 US Elections:Studyhttps://gadgets.ndtv.com/social-networking/news/facebook-fake-news-misinformation-more-clicks-read-user-2020-us-elections-twitter-google-2529546

8 Eishvak Sengupta1, Renuka Nagpal,Deepti Mehrotra1 and Gautam Srivastav ProBlock: a novel approach for fake news detection (2021)

9 Alim Al Ayub Ahmed ,Ayman Aljarbouh,Praveen Kumar Donepudi and Myung Suh Choi Detecting Fake News using Machine Learning: A Systematic Literature Review https://arxiv.org/ftp/arxiv/papers/2102/2102.04458.pdf

10 Iftikhar Ahmad ,Muhammad Yousaf,1 Suhail Yousaf ,and Muhammad Ovais Ahmad. Fake News Detection Using Machine Learning Ensemble Methods.

11 Nakamoto, S A peer-to-peer electronic cash system. https://bitcoin.org/bitcoin.pdf. (2008)

12 Aloqaily, M., Boukerche, A., Bouachir, O., Khalid, F., & Jangsher, S. An energy trade framework using smart contracts: Overview and challenges. IEEE Network, 34(4), 1–7. https://doi.org/10.1109/MNET.011.190057 (2020)

13 Srivastava, G., Parizi, R. M., Dehghantanha, A., & Choo, K.-K. R. (2019).

14 Yazdinejad, A., Parizi, R. M., Dehghantanha, A., & Choo, K.-K. R. (2020). P4-to-blockchain: 88, 101629. A secure blockchain-enabled packet parser for software-defined networking. Computers & Security,Wikipedia (2019).

15 Yazdinejad, A., Parizi, R. M., Dehghantanha, A., & Choo, K. R. (2019). IEEE Transactions on Network Science and Engineering. https://doi.org/10.1109/TNSE.2019.2937481 1–1 Blockchain-enabled authentication handover with efficient privacy protection in SDN-based 5g networks. (2019)

16 Yazdinejad, A., Srivastava, G., Parizi, R. M., Dehghantanha, A., Choo, K. R., & Aledhari, M. Decentralized authentication of distributed patients in hospital networks using blockchain. IEEE Journal of Biomedical and Health Informatics(2020)

17 Le Glaz A, Haralambous Y, Kim-Dufor D, Lenca P, Billot R, Ryan TC, Marsh J, DeVylder J, Walter M, Berrouiguet S, Lemey C Machine Learning and Natural Language Processing in Mental Health: Systematic Review (2019)

18 Natural Language Processing(NLP) for Machine Learning Https://towards datascience.com/natural-language-processing-nlp-for-machine-learning-d44498845d5b

19 Haber, S., Stornetta, W.S. How to time-stamp a digital document. J. Cryptology 3, 99–111. https://doi.org/10.1007/BF00196791(1991)

20 M. Dabbagh, M. Sookhak and N. S. Safa, "The Evolution of Blockchain: A Bibliometric Study," in IEEE Access, vol. 7, pp. 19212-19221, 2019, DOI: 10.1109/ACCESS.2019.2895646.(2019)

21 B. Bhutani, N. Rastogi, P. Sehgal and A. Purwar, "Fake News Detection Using Sentiment Analysis," Twelfth International Conference on Contemporary Computing (IC3), pp. 1-5, DOI: 10.1109/IC3.2019.8844880.(2019)

22 Sengupta, E., Nagpal, R., Mehrotra, D. et al. ProBlock: a novel approach for fake news detection. Cluster Comput 24, 3779–3795 https://doi.org/10.1007/s10586-021-03361-(2021).

23 2021 was the year of fake news and misinformation on social media. It's going to get worsehttps://theprint.in/opinion/2021-was-the-year-of-fake-news-and-misinformation-on-social-media-its-going-to-get-worse/792585/(2021)

24 On national press day, netas call to curb fake news, sensationalism https://timesofindia.indiatimes.com/india/on-national-press-day-netas-call-to-curb-fake-news-sennationalism/articles how/87747487.cm

25 Rocha, Yasmim Mendes et al. "The impact of fake news on social media and its influence on health during the COVID-19 pandemic: a systematic review." Zeitschrift fur Gesundheitswissenschaften = Journal of public health, 1-10. 9 Oct. 2021, doi:10.1007/s10389-021-01658-z https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8502082/ (2021)

26 PoliticalNews Fact Checker Data Kaggle , Real and Fake Dataset https://www.kaggle.com/shivkumarganesh/politifact-factcheck-data,https://www.kaggle.com/datasets/clmentbisaillon/fake-and-real-news-dataset

27 Twitter revamps misinformation warning labels to curb fake news menacehttps://www.financialexpress.com/industry/technology/twitter-revamps-misinformation-warning-labels-to-curb-fake-news-menace/2370728/

28 A secure blockchain-enabled packet parser for software defined networking. Computers & Security,Wikipedia (2019). Fake news. https://en.wikipedia.org/wiki/Fake_news. Yazdinejad, A., Parizi, R. M., Dehghantanha, A., & Choo, K.-K. R. (2020). P4-to-blockchain: 88, 101629. https://doi.org/10.1016/j.cose.2019.101629

29 Onik, Md Mehedi Hassan & Miraz, Dr. (2019). Performance Analytical Comparison of Blockchain-as-a-Service (BaaS) Platforms. 3-18. 10.1007/978-3-030-23943-5_1.

30 Z. Shahbazi et al "Fake Media Detection Based on Natural Language Processing and Blockchain Approaches," in IEEE Access, vol. 9, pp. 128442-128453 doi: 10.1109/ACCESS.2021.3112607(.https://ieeexplore.ieee.org/document/9536745) (2021)

31 LSTMhttps://towardsdatascience.com/illustrated-guide-to-lstms-and-gru-s-a-step-by-step-explanation-44e9eb85bf21

32 Haumahu, J & Permana, Silvester & Yaddarabullah, Y. Fake news classification for Indonesian news using Extreme Gradient Boosting (XGBoost). IOP Conference Series: Materials Science and Engineering. 1098. 052081. 10.1088/1757-899X/1098/5/052081. (2021)

33 Tianqi Chen, Carlos Guestrin XGBoost: A Scalable Tree Boosting System , https://arxiv.org/abs/1603.02754 (2016)

34 Survey of popular platforms of news consumptions in US by February 2022 https://www.statista.com/statistics/717651/most-popular-news-platforms/(2022)

35 Ghatkopar: Fake Negative COVID-19 Certificate Scam Unearthed https://www.mumbailive.com/en/crime/fake-negative-covid19-certificate-scam-unheartened-71665 (2020)

36 WHO (World Health Organization) https://covid19.who.int/table

37 Population Statics https://www.populationu.com/india-population#:~:text=India%20population%20in%202021%20is,1.39%20Billion%20(139%20Crores).

38 Data sharing and privacy for patient IoT devices using blockchain. International conference on smart city and informatization. Springer Singapore334–348. (2021)

39 Anup Kumar Paul, Xin Qu & Zheng Blockchain–a promising solution to internet of things: A comprehensive analysis, opportunities, challenges and future research issues Wen Peer-to-Peer Networking and Applications (2021)

40 Robustness against fraudulent activities of a blockchain-based online review system Tanakorn Karode & Warodom Werapun Peer-to-Peer Networking and Applications volume 15, pages92–106 (2022)

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