

MINIMIZE THE SPREADING OF FAKE NEWS AND FORMING FAKE USER GROUP

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ABSTRACT

Due to the widespread use of social media-based international news, confirmation and identification has become a difficult undertaking. Most social networking sites make it simple to obtain news from anywhere on the internet at any time, but they also create a lot of fake news and information at the same time. As a result, in such a situation, it is vital to establish whether the information given is authentic, that is, whether it is fake or real. This causes people to become perplexed and lose faith in social media. To address these issues, the suggested blockchain-based false news detection using machine learning is applied. In training and validation evolution, the suggested classification algorithm was applied to detect bogus news. Another significant goal of this project is to revoke the offenders who update the news that has already been published or fake in blockchain framework. Even in a vulnerable context, the blockchain-based decentralized peer-to-peer ecosystem was leveraged to protect the published data. To produce successful training rules and verify the test classifier, a variety of feature extraction and selection strategies were applied. On the LIAR dataset, an exhaustive experimental investigation reveals the prediction performance of detecting false news with hybrid classification algorithm. The 94.6% accuracy obtained for fake news detection as well as detection of fake users' identification. The major outcome of this research it reduces the frequency of spreading the fake news using blockchain majority algorithm with trust building strategy for end user.

Keywords: *Fake news detection, Supervised machine learning, Blockchain, Peer to peer, Majority voting, Consensus*

1. INTRODUCTION

Several researches have proven that the social internet is a fertile ground for swiftly disseminating false information. Fake news is defined as the creation or manipulation of news items by a social media influencer in order to change its perceived meaning or background, infecting it with their beliefs or prejudices, with the goal of financially or ethically harming or endangering a person, organization, or society. Fake news includes things like slander, memes, fraudulent ads, false political announcements, and rumors. A fake news perpetrator is someone who promotes incorrect information. Depending on its veracity, the news might be characterized as factual, half-true, or false. Fake news may be disseminated using photographs, videos, and text. The full lifespan of fake news has been characterized as the creation, publication, and spread of misleading information. Detecting false

news is still difficult due to the long-term ramifications and implications. Its beginnings might be traced back to twentieth-century advertising, which developed into deception during the Cold War.

This problem has become substantially worse in recent years as a result of the emergence of social media networks. In recent years, social media platforms like Instagram, Twitter, and Snapchat have emerged as venues for rapid information dissemination and extraction. According to several data, social media is used by roughly half of industrialized nations to obtain information. The importance of social media cannot be emphasized, and it is a critical tool in times of crisis, as seen by its use in breaking news. Nonetheless, one drawback of social media's effectiveness is the quick spread of fake news. Users may update social media, unlike traditional media such as newspapers

or TV, allowing them to contribute their ideas or preconceptions to the material. This might drastically alter the news' content or perspective.

One drawback of social media's effectiveness is the quick spread of fake news. Users may update social media, unlike traditional media such as newspapers or TV, allowing them to contribute their ideas or preconceptions to the material. This might drastically alter the news' content or perspective. The social media can also apply a heavy fine to punish the perpetrators of fake news. The social media can block the users who change the real news into fake news.

The aim of this research is to minimize the spreading of fake news in blockchain framework. It is very difficult to completely stop the spreading of fake news but we are totally able to reduce the spreading of fake news through tracing the user and forming the fake user group.

We present a secure customized blockchain to detect and combat the spreading of social media fake news. Our model is used for social media news but it can be extended to any information source.

The organization of paper is described below, in section II, represents the literature survey related to fake news detection in a blockchain environment. Section III discusses the proposed model's proposed system design and architectural explanation. Section IV demonstrates the algorithm design for blockchain implementation, fake news detection, and minimizing the influence of fake news. Section V discusses results and discussion in detail with experimental analysis. Final section VI discusses the conclusion and future direction of the proposed research.

2. LITERATURE REVIEW

According to [1], In recent years, fake information has traveled faster than ever before because of the widespread availability of the internet and social media. Fake news might be more appealing than actual news in certain instances. As a result, individuals get misled. We'll talk about how to identify false news on social media using the benefits of Blockchain's peer-to-peer network ideas. Social media is the primary source of global and local news for most of this generation. However, when a person or group uses it to promote false news, it backfires. Because clickbait tales only take a little time to spread rapidly on social media.

Within days, the news had gone viral all across the globe. These opportunistic organizations or individuals take advantage of people's propensity for spreading interesting news without verifying its veracity or repercussions.

According to [2], a new blockchain system solves current problems and prevents the transmission of fake news throughout the network. We examine the information flow in social networks and develop an ideal detection method that can be implemented with little overhead. Furthermore, our suggested technique may be used on other online platforms and social networks—a proof-of-concept blockchain system to combat the spread of false news on social media. We suggest a viable technique that may be readily implemented in real-world systems to enhance the naive implementation of traditional design.

According to [3], To combat the spread of false news, a rudimentary blockchain and watermarking-based social media infrastructure are suggested. To address the current issues in this industry, we propose a new blockchain paradigm. Furthermore, by locating the source or origin of fake news on social media, the unique method may prevent the propagation of fake news. The material is presented in a manner that seems factual but has no facts or proof and is often ingested by millions via social networking websites, television, and other forms of digital media. Fake news is a term used to describe this sort of incorrect information. False information distributed on social networking platforms has a huge impact, and it can wreak chaos in society for millions of people within hours.

According to [4], an integrated solution for many components of Blockchain and natural language processing (NLP) to identify false news and better forecast bogus user accounts and postings using machine learning methods. This procedure employs the Reinforcement Learning technique. The decentralized blockchain architecture, which offers the outline of digital content authority proof, was used to increase the platform's security. This technology aims to provide a safe platform that can forecast and recognize fake news on social media networks. A mix of blockchain and machine learning approaches is being used to give answers and develop a trust-based architecture for online sharing news.

According to [5], developing a decentralized program based on the Ethereum blockchain will be used to battle false news and disinformation. The

developed framework is presented as a method for presenting trustworthy news sources while also allowing users to self-verify the source's reliability. A decentralized application built using Solidity and running on the Ethereum network, The proposed application's goal is to assist government communication, and media agencies combat fake news.

According to [6], a high-level overview of a blockchain-based framework for preventing false news emphasizes the many design difficulties and considerations of such a blockchain-based framework for combating fake news. The advancement of artificial intelligence (AI) techniques for content customization, dissemination, and generation, combined with the increasingly digital habitat of human lives. An unfortunate situation in which sensationalized fake content and misinformation thrives and spreads like wildfire while establishing the authenticity of the truth and distinguishing reality from fakes becomes increasingly tricky. This poses a slew of technological, legal, and ethical difficulties.

According to [7], a blockchain-based architecture can legitimately archive information on social media. An instant messaging scenario is shown based on the suggested technique as a proof-of-concept. The introduction of smartphones and tablets has become an undeniably popular method to connect with others. However, the fast growth of social media has several unintended consequences in our culture. Due to a large selection of accessible content generation technologies, the blockchain application is used for notarizing social media information. On a blockchain, a new sort of assault called a falsifying data attack was introduced, along with a strategy to counteract it. The central concept is to allow authorized service providers to give valid data that has been signed with their private key. Users may scarcely escape accountability for their material under this arrangement.

According to [8], "fake news" is a means of spreading misinformation. We review recent attempts to define and automate the "fake news" detection process. We develop a new fluid definition of "fake news in terms of relative bias and factual correctness." We develop a unique framework for detecting false news based on our suggested concept and a machine learning model. From the perspective of information warfare, they define false news. We look at the socio-political ramifications of false news and look into prior

attempts to automate the identification of fake news.

According to [9], a new machine learning model based on Natural Language Processing (NLP) approaches for detecting "fake news" by combining content-based and social characteristics of news. Using a unique machine learning model based on natural language processing, we automatically identified fraudulent news items in the network. The results were obtained without using a sample and are completely unbiased. The generated model was more resilient and speedy due to these preprocessing activities.

According to [10], for detecting fake news, we employed machine learning methods and three classifiers: Passive Aggressive, Nave Bayes, and Support Vector Machine. Because classification algorithms are not specialized for false news, simple classification is not accurate in detecting fake news. We can identify false news and construct classifiers that can categorize news data using the combination of machine learning and text-based processing. Text classification is primarily concerned with extracting different textual properties and then merging those aspects into categorization. The absence of an effective mechanism to distinguish between fake and non-fake due to the lack of corpora is a significant difficulty. On two publicly accessible datasets, we used three distinct machine learning classifiers.

According to [11], a rudimentary blockchain and watermarking-based social media infrastructure are presented to combat the spread of false news. To address the current issues in this industry, we propose a new blockchain paradigm. Furthermore, by locating the source or origin of fake news on social media, the unique method may prevent the propagation of fake news. A new blockchain-based social networking system has been developed to combat the rising issue of false news. The system we propose is scalable, secure, and has a high throughput. The bulk of blockchain systems has scalability issues. We employ Blockchain Distributed Network (BDN) with bloXroute servers to handle the scalability problem, which significantly increases scalability in our situation.

According to [12], a framework for predicting fake news on social media, Identifying features from datasets is an essential element since the data mining technique (K-Nearest Neighbor) uses them to categorize news articles on social media. Every day, confusing information is disseminated via

many channels such as news blogs, online newspapers, and social media. Today's youthful generation spends most of their time on social media and the internet, making it the primary source of news and information rather than conventional sources. News on social media is more attractive and less costly than conventional news organizations. It is simple to share, like, and comment on, but, despite these advantages, social media news is inferior to traditional news sources.

According to [13] produce feature vectors, several feature engineering approaches such as count vector, TF-IDF, and word embedding are utilized. Seven distinct Machine Learning Classification algorithms are trained to categorize news as false or genuine, and the top one is chosen based on accuracy, F1 Score, recall, and precision. Three separate feature extraction approaches were employed: Count vectorizer, TF-IDF Vectorizer, and Word Embedding. Furthermore, many classification methods are used.

According to [14], FakeNewsTracker, doc2vec, Support Vector Machine (SVM), and decision trees were used to evaluate the performance of numerous machine learning techniques. Our first findings suggest that the SVM and decision trees are adequate for detecting false news with a decent level of accuracy. In most cases, the decision trees technique outperforms the SVM method. The topic of future research directions will be discussed.

According to [15], the experimental examination of identifying false news on Bangla social media, since this subject still necessitates a great deal of focus. To distinguish Bangla fake news, we used two supervised machine learning algorithms, Support Vector Machine (SVM) and Multinomial Naive Bayes (MNB) classifiers. Inverse Document Frequency - Term Frequency Vectorizer and Count Vectorizer extracted features. Their proposed approach detects fake news based on the polarity of the related post.

According to [16], are Designing machine learning models that can identify the text as false or not has been an active topic of study to fight the spread of fake news. While new models are constantly being created, the emphasis has thus far been on enhancing the models' accuracy for specific datasets. As a result, there has been limited study on the explain ability of deep learning (DL) models built to detect false news. The architecture, although significant, is not a determining factor in whether or not a natural language processing model

is adequate. Several other factors must be considered for it to be effective. The length, intricacy, and preprocessing processes of the text significantly influence the training process.

According to [17], an automated fake news detecting system backs up or refutes the claims while delivering a collection of papers from trusted sources. The system is made up of many modules and employs a variety of machine learning, deep learning, and natural language processing approaches.

According to [18], Major social media and networking sites are actively creating techniques and systems to counter such efforts to recognize and deal with organized misinformation networks. Machine learning methods, particularly neural networks, play a critical role in this endeavor. The current research focuses on popular and promising graph representation approaches. It reviews studies that utilize Graph Convolutional Networks (GCNs) to identify fake news, fraudulent accounts, and rumors that propagate via social media. It also emphasizes the current research's accessible benchmark datasets for verifying the suggested approaches' performance.

According to [19], a supervised machine learning approach detects fake news in Romanian-language web sources. This paper also compares the findings of recurrent neural networks with sizeable short-term memory or gated recurrent unit cells, a convolutional neural network. The findings of two conventional classification techniques, Nave Bayes and Support Vector Machine, are compared to the results of deep learning architectures. The suggested method is based on a Romanian news corpus with 25,841 real and 13,064 false news items.

According to [20], Online social media (OSM) has had a significant impact on disseminating news, boosting its speed and lowering obstacles to reaching a large audience. On the other hand, OSM is severely lacking in terms of systems for verifying the integrity of news sent via its network. The bulk of research on automated fake news detection focuses on English publications, with few studies examining other languages and none comparing language-independent properties. Furthermore, since the propagation of false news is a global issue, this research assesses textual qualities that are not bound to a single language when defining textual data for news detection. Complexity, stylometric, and psychological text aspects were

investigated using corpora of American English, Brazilian Portuguese, and Spanish news articles. Fake, real, and satirical news may be detected using the extracted behaviors.

In the view of above literature, use of blockchain technology for detection of malicious user who spread the fake news, has laid down solid platform to minimize the spreading of fake news, news tampering and making a healthy social trust among the people about social media. Activities can be tracked through various ways in blockchain framework but it is not identifying all malicious users.

At this juncture, the research of traceability of user through blockchain is in the development stage and development of traceability system need to be explored. Some literature allow the user to self verify the source's reliability.

3. PROPOSED SYSTEM ARCHITECTURE

In the initial work on NLP-based feature extraction for data selection and a hybrid classification algorithm has been utilized to determine if a certain piece of information is factual or not. The LIAR dataset is used to detect fake news, and the blockchain is a secure decentralized architecture designed for the distributed storage of data. Proposed system architecture is depicted in Figure 1 with a detailed description of each step.

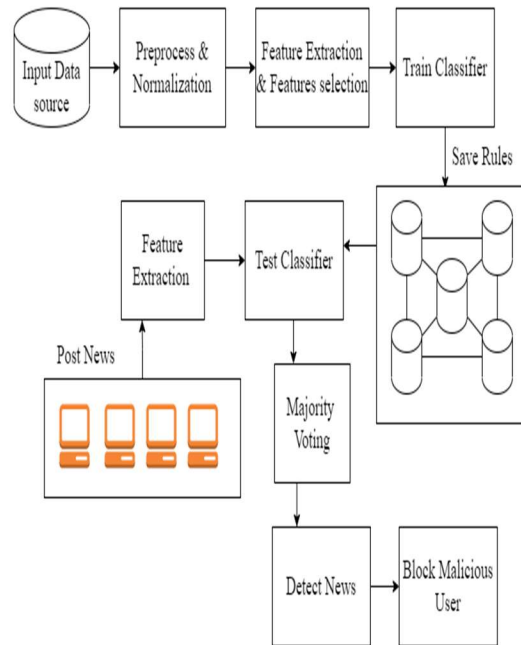


Figure 1 : System architecture for detection of fake news and malicious user

Preprocess and Normalization: In this phase, punctuation marks are removed from both datasets and contractions such can't, isn't, and others are replaced with cannot and is not. Training and testing phrases are cleaned of stop words and a stemmer is used to create new ones.

Lemmatization: Lemmatization is a natural language processing technique that substitutes a meaning of a word suffix with an alternative one or eliminates the suffix entirely to reveal the fundamental word form lemmas features.

Weighted Words: The most basic type of weighting word extraction of features is TF, in which each word is transferred to a number that represents the number of times it appears in the corpus. Word frequency is often used as a Boolean or logarithmically scaled weighting in methods that extend the findings of TF. Each content is converted into a vector (with the same length as the content) holding the prevalence of the words in that content in all weight words techniques. Although obvious, this method is constrained by the fact that some terms regularly used in the vernacular may predominate in such representations.

Bag of Words (BoW)

BoW for short, is a method of extracting text attributes for use in modeling, such as data mining algorithms. The method is straightforward and adaptable, and it may be used to extract information from texts in a variety of ways.

Term Frequency

The occurrence in document d reflects the amount of times a given word t appears. As a result, we can observe that when a term occurs in the text, it gets more significant, which is reasonable. We can use a column to represent the text in the bag of word models since the sequencing of terms isn't important. There is an entry for each individual phrase in the document, with the number being the term frequency.

Inverse Document Frequency

It mostly assesses the word's relevance. The main goal of the search is to find relevant records that match the requirement. Because tf considers all words to be equally relevant, the term frequency may be used to determine the weight of a term in a document.

Feature Extraction and Selection: When features are retrieved from the training dataset, a hybrid feature set is created by extracting two different kinds of features from it. The following characteristics were gleaned from the data. The frequency with which certain phrases appear in a text provides useful context information. In many systems, features are prioritized based on the frequency with which they are used. Text mining and NLP make extensive use of this technique. In simple terms, n -grams are essentially a grouping of related words inside a narrow window. A wide range of uses may be found for these items. It is possible to develop bigram and trigram models using these models as well as single-letter model building techniques. A POS tagger is used to identify bi-tagged aspects in sentences. The term "bi-tagged features" refers to those aspects in a phrase that have a strong connection to the next two words after them. POS tagging of raw text is used in numerous NLP applications, such as summary creation, query to answer, and SA. Information conveyed by nouns, verbs, adjectives, and adverbs is conveyed in context. As a result, text mining applications benefit from the inclusion of such key aspects.

Build a blockchain: A customized chain of block is created. For Hash Generation SHA 256 algorithm is used. Protocol for peer to Peer node verification is implemented and Transaction Mining Algorithm is used to generate valid hash.

Test Classifier: The hybrid classification algorithm that is to be used in the proposed system has been modified. This is an addition to the current system. The LIAR dataset is used to test it. It is the purpose of the method described to determine whether or not a piece of news is real or fraudulent. A variety of feature extraction methods have been employed to glean information from a sentence. First, the weights of each feature are allocated, and the one with the most weight is selected. When selecting the remaining features in each category, the association between features is taken into consideration. By utilizing weight support and correlation, it is possible to eliminate duplicate data and only keep what is necessary.

Detection of fake user and Minimize the spreading of fake news: Using a majority voting algorithm, we evaluate each user's uploaded news. All nodes have a trained module for the entire system. After uploading all users' communication, majority voting has calculated and detected the suspicious users and blocked them, eliminating the spreading of fake news. The system reduces the spreading of fake news through tracing the source of malicious user. Once the fake users are detected, block them and form the group of fake users.

4. ALGORITHM DESIGN

The k^{th} component is chosen at random during the setup procedure. Any previous knowledge of the issue will aid the method in startup. At each iteration fitness computation compares a node's competence to other nodes. The primary goal is to determine fitness for the best node on the tree. After implementing treatment efficiency, these nodes are considered the best characteristics of a tree. During each phase, every node chooses its placement using its maximum form position and evidence from its nearby neighbors. This improves the algorithm's orientation of the nodes in the classification phase.

Algorithm : Algorithm for detection of fake news and fake user

Input: Kth Test instance Tr[], Training dataset as Db

Output: Optimized Result Tr[new]

Initialization: $Wa_k = 1.0$

$Ma_k = 1.0$

$lfrand_1 = \text{Math.Random}()$

$lfrand_2 = \text{Math.Random}()$

$bgr_{max} = \text{Mean} \sum_{k=0}^n \text{fitness}(k)$

$bpr_{max} = \text{Max} \sum_{k=0}^n \text{fitness}(k)$

These above values will update for each node

Step 1 : Initialized the Tr according to generated by weight by each training instance.

Step 2 : calculate the fitness of each instance in matrix

For each (nd in matrix)

$$Ma_{nd+1} = Ma_{nd} + lfrand_1(bgr_{max} - Wa_{nd}) + lfrand_2(bpr_{max,nd} - Wa_{nd})$$

Step 3 : After that update the location using below criteria

$$Wa_{nd+1} = (Wa_{nd} + Ma_{nd})/\pm 0.5$$

Step 4 : if ($Wa_{nd+1} > Wa_{nd}$)

Replace Wa_{nd} with Wa_{nd+1}

End for

Step 5 : Apply elitism for get best set

Step 6 : return optimized result set

Step 7: return percentage of fake news spread by users

Step 8: block users and form group of fake users

Testing instance is simultaneously mapped with every tree node and then we get weight or mapping as per class labels. Highest among these weight will be the prediction of given testing instance as pants-fire, false, barely-true, half-true, mostly true, or true.

5. RESULTS AND DISCUSSIONS

The implementation has done on open source java environment. The device runs with an INTEL 2.8 GHz i3 machine and 4 GB RAM with a distributed manner on the java 3-tier analytics platform. LIAR dataset has used for detection the news is fake or real. Proof of Work (PoW) is used to authenticate the blockchain in minimum 4 nodes. For the

validation of results, we have demonstrated first experiment analysis on blockchain implementation.

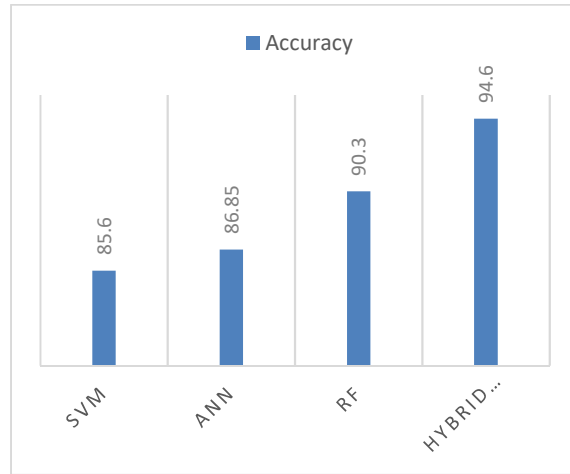


Figure 2 : Comparative analysis of accuracy for fake news detection using proposed algorithm with other machine learning algorithms

The above Figure 2 demonstrates the classification accuracy of the proposed system and comparative analysis with various state-of-art systems. To improve classification accuracy, a variety of feature extraction approaches have been used to build a solid training module. Initially, malevolent or false information spreads through sporadic news reports.

In the proposed work, we extract the numerous features such as TF-IDF, Lemmas and TF with correlational coefficient features and feed them to classify for validation. The proposed classifier has been used for the detection of fake news and gives highest accuracy, up to 94.60%.

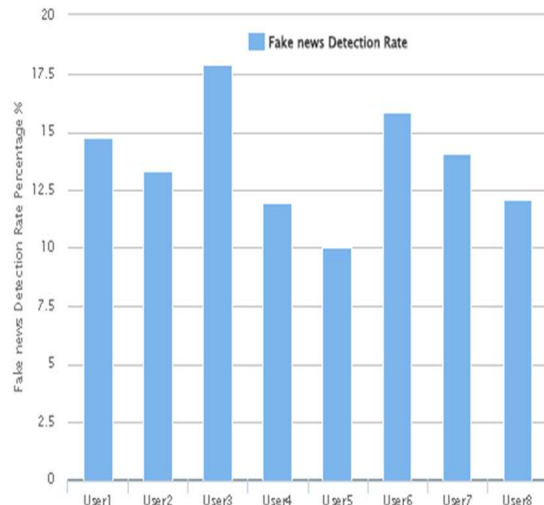


Figure 3 : Percentage of Fake News Spread by each User

The above Figure 3 demonstrates the percentage of fake news spread by each user. User 3 is spreading more number of fake news, so we can block User 3. Also we can block all the users who spreads fake news and from group of fake users.

As per the literature review limited fake users are identified by existing system but the implemented approach identifies all malicious users with their fake news detection rate which help to minimize the spreading of fake news.

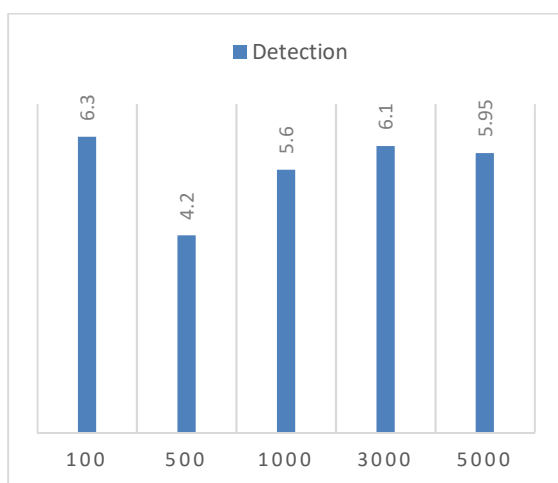


Figure 4 : Reduce the influence for spreading the fake news using proposed supervised classifier and majority voting with number of instances

The above Figure 4 demonstrates how spreading fake news has revoked using proposed classification algorithm and majority voting classification algorithm. The efficiency of the proposed algorithm is due to the selection of hybrid features such as TF-IDF, N-Gram features, Dependency based NLP features. The classification algorithm gets scope for evaluation according to all possibilities, which is why the system produces higher accuracy than other classification algorithms.

6. CONCLUSION

This paper presents a novel hybrid supervised machine learning approach for detecting and reducing the spreading of fake news in the blockchain. Information on the blockchain cannot be altered by others. The module was trained using the predicted characteristics, and the remaining

testing data was supplied to the test classifier. In comparison to typical machine learning classification techniques, our approach is more accurate.

In blockchain, all the activities can be monitored and we are able to trace all the fake users who spreads the fake news. After identification, fake user groups are formed. Then, we can block or ban them to minimize the spreading of fake news.

Blockchain is consuming much more computational power for processing, verifying, mining and adding new block in it.

Future work for this system will be to construct a deep learning classification algorithm with multiple consensus techniques to resist the spreading of fake news.

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