# A Novel NLP-Blockchain Framework For Fake Media Detection

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## I. INTRODUCTION

### 1.1 NATURAL LANGUAGE PROCESSING (NLP)

The field of software engineering known as "natural language processing" (NLP) focuses on making it possible for computers to comprehend text and spoken words in a manner that is similar to that of humans. NLP blends computational etymological rule-based demonstration of human language with facts, artificial intelligence, and advanced learning models. With the help of these advancements, PCs can now completely "comprehend" human language as message or audio information, including the speaker's or essayist's expectation and point of view. Computer programmers that translate text between languages reply to spoken commands, and summaries enormous volumes of text quickly and even constantly are all powered by NLP. NLP is used in voice-activated GPS systems, digital assistants, speech-to-message transcription programmers, Chatbots for customer care, and other shopping conveniences. However, NLP also contributes significantly to large-scale commercial strategies that improve critical business processes, promote employee productivity, and simplify operations.

### 1.2 BLOCKCHAIN

With the use of a block chain, data may be stored in a form that makes system modifications, hacking, and fraud difficult or impossible. The simplest definition of a block chain is a network of computers that copies and disseminates a digital record of transactions throughout the whole network. Each participant's ledger receives a copy of every new transaction that occurs on the block chain, and each block in the chain consists of several transactions. The decentralized database that is controlled by several users is known as distributed ledger technology (DLT). A block chain is a continually expanding database of unchangeable transactional records that have undergone cryptographically authentication and have been shared by all network participants. Each record has a time stamp and references previous transactions. Anyone with access rights can use this information to travel back in time to any moment in a transactional event's past that belongs to any participant. A block chain is one form of the more generic concept of networked ledgers.

### 1.3 FAKE MEDIA

Fake news is information that is false or misleading yet is reported as news. The destruction of someone or something's reputation or the generations of advertising revenue are frequent objectives of false news. Despite the reality that false information has always been shared throughout history, the term "fake news" was first used in the 1890s, a time when spectacular newspaper tales were common. The term, which has no specific definition, is frequently used to describe all false information. High-profile people have also used it to describe any negative news that pertains to them. Disinformation is also the deliberate spread of misleading information, and it is commonly produced and spread by hostile foreign actors, especially during election seasons. Stories with sensationalist or click bait headlines without any underlying material are some examples of fake news, as are satirical articles that are misconstrued as the genuine thing. Due to the variety of false news sources, researchers are beginning to adopt the term "information disorder" since it is more objective and informative.

## II. LITERATURE REVIEW

### 2.1 ELSTREAM: AN ENSEMBLE LEARNING APPROACH FOR CONCEPT DRIFT DETECTION IN DYNAMIC SOCIAL BIG DATA STREAM LEARNING

The surge in data traffic due to the rapid increase in communication technologies and smart devices has led to the generation of a massive amount of data every second by various applications, users, and devices. This has created a need for solutions to analyse the changes in data over time despite resource constraints, which are identified as concept drifts. In their paper, Ahmad Abbasi [1] et.al. propose a novel approach called ElStream that uses ensemble and conventional machine learning techniques to detect concept drifts using both real and artificial data. ElStream utilizes the majority voting technique to make only the optimum classifier vote for decision. Experimental analysis shows that the ensemble

learning approach provides consistent performance for both artificial and real-world datasets, with ElStream providing better accuracy than previous state-of-the-art studies and conventional machine learning algorithms. Big data has gained significant attention in the last decade due to its potential to provide invaluable insights and benefits such as cost reduction, faster decision-making, and innovation in new products across various industries. However, the fact that this data is often in the form of continuous streams poses a challenge for analysis. The complexity of big data renders the traditional approach to data analysis ineffective. Instead, Machine Learning approaches provide a solution by allowing systems to identify patterns and learn without explicit programming.

### 2.2 FNU-BICNN: FAKE NEWS AND FAKE URL DETECTION USING BI-CNN

The issue of fake news [2] has become a significant problem in today's world, largely due to the widespread use of social media. To ensure the authenticity of information posted on social media, it is crucial to verify that it comes from reputable sources. However, the intensity and sincerity of internet news remain a challenge. In this study, we propose an FNU-BiCNN model that utilizes NLTK characteristics such as stop words and stem words for data pre-processing. We then compute the TF-IDF using LSTM, batch normalization, and dense, and choose features using the WORDNET Lemmatize. Bi-LSTM with ARIMA and CNN are used to train the datasets, and various machine learning techniques are employed to classify them. By deriving credibility ratings from textual data, this model develops an ensemble strategy for concurrently learning the depictions of news stories, authors, and titles. To achieve greater accuracy, we use a Voting ensemble classifier and compare it with several machine learning algorithms such as SVM, DT, RF, KNN, and Naive Bayes. Our results show that the voting ensemble classifier achieved the highest accuracy of 99.99%. We assess the performance and efficacy of classifiers using accuracy, recall, and F1-Score. A trust computational model has been integrated with a collection of URL-based characteristics to identify malicious URLs. The credibility of tweets is evaluated using Bayesian learning and Dempster-Shafer theory for the purpose of malicious URL detection, achieving an accuracy rate of 95%.

### 2.3 STRUCTURED REPRESENTATION LEARNING FOR ONLINE DEBATE STANCE PREDICTION

Chang Li [3] et.al. have proposed in their paper that online debates can provide valuable information on various perspectives. However, understanding the expressed stances in these debates is a difficult task that requires modeling both the textual content and the users' conversational interactions. Current approaches take a collective classification approach, disregarding the relationships between different debate topics. In this study, we suggest treating this task as a representation learning problem and jointly embedding the text and authors based on their interactions. We evaluate our model using the Internet Argumentation Corpus and compare different approaches for embedding structural information. The experimental results demonstrate that our model outperforms previous competitive models significantly. In recent years, social media platforms have played an increasingly important role in shaping political discourse. Online debate forums enable users to express their opinions and engage with others who hold different views. Understanding the interactions between users on these platforms can provide insights into current political discourse, argumentation strategies, and public sentiment on policy issues on a large scale. The significance of understanding debate dialog has driven extensive research efforts that aim to model the dependencies between authors and their content while capturing the debate structure. For instance, the interactions between users can indicate agreements or disagreements, which can influence the prediction of similar or different stances associated with their content. The stance decision can also be seen as a user-level decision, as users tend to maintain the same stance throughout the debate, leading to stance agreement in all of their posts. Unfortunately, despite these research efforts, stance classification remains a challenging problem.

### 2.4 CLASSIFICATION USING MACHINE LEARNING

Umar Mohammed Abatcha [4] et.al. have presented in their paper the concept of grouping reports, which is a significant aspect in the fields of data and software engineering. This involves accurately organizing archives into specific categories, which is considered to be a crucial method for sorting information. With the continuous advancement of personal computers and technology, the number of reports has been constantly increasing. Therefore, it is essential to arrange these archives based on their content. Text classification is commonly employed to categorize text into different classes, and it involves multiple stages that can be approached using various methods. The selection of the appropriate method for each category plays a vital role in enhancing the efficiency of text processing. The task of organizing archives into categories based on their content is a complex challenge that is central to the efforts of data experts and researchers. It plays a fundamental role in various applications, including designing, organizing, ordering, and efficiently managing large volumes of information. This is particularly important for publishers, news outlets, bloggers, and individuals dealing with extensive

content repositories within an organization. The completion of tasks in that area can be easily achieved by grouping and sorting records. The number and size of both online and offline records are experiencing a significant increase.

### 2.5 CONFUSION MATRIX-BASED FEATURE SELECTION

Aparna Kumari [5]et.al has proposed in this paper the introduction of a novel technique for feature selection and its application on a real data set. Specifically, the suggested approach generates subsets of attributes based on two criteria: (1) individual attributes exhibiting high discrimination (classification) power; and (2) the attributes within the subset complement each other by misclassifying different classes. The method evaluates one attribute at a time, utilizing information from a confusion matrix. While achieving good accuracy in classification is the primary objective in classification problems, the identification of attributes with the greatest separation power is also of interest. Moreover, in the case of large data sets, such as MRI images of the brain, feature selection greatly influences the classification process. This is primarily due to the fact that as the number of attributes increases, the data becomes moresparse, necessitating a significantly larger amount of training data to accurately represent such a vast domain. Consequently, high-dimensional data sets are typically underrepresented, a phenomenon commonly referred to as "the curse of dimensionality" in literature. For instance, a 2-attribute data set with 10 examples can adequately cover the domain defined by the corners (0,0) and (1,1). However, if the domain to be learned is a 3-D cube defined by the corners (0,0,0) and (1,1,1), 10 points will not effectively cover this expanded domain. Therefore, reducing the number of attributes in a classification problem is an extensively studied area.

## III. EXISITING SYSTEM

Social media is heavily relied upon by users for news consumption and sharing, resulting in the widespread dissemination of both genuine and fake stories. The presence of misinformation across various social media platforms poses significant consequences for society. One major challenge in effectively detecting fake news on Twitter lies in the difficulty of distinguishing between different forms of false information. To address this issue, researchers have made progress by focusing on methods that can identify fake news. In this study, the FNC-1 dataset, which consists of four categories for identifying false news, will be utilized. To evaluate and compare the state-of-the-art techniques for detecting fake news, big data technology (Spark) and machine learning will be employed. The methodology employed in this study involves the use of a decentralized Spark cluster to create a stacked ensemble model. After performing feature extraction using N-grams, Hashing TF-IDF, and count vectorizer, the proposed stacked ensemble classification model is utilized.

## IV. PROPOSED SYSTEM

A combination of Natural Language Processing, Reinforcement Learning, and block chain technology is proposed for detecting false news. The system involves collecting a large dataset of news articles with metadata such as source, date, and author. The collected data would be pre-processed using NLP techniques to clean and tokenize the text. From the pre-processed data, features such as word frequencies, sentence length, and readability would be extracted. An RL agent would be trained on the extracted features to identify patterns that distinguish between true and false news. The agent would be rewarded for correctly identifying false news and penalized for incorrectly identifying true news as false. Once the agent is trained, it can be used to classify new news articles as true or false based on their extracted features.

## V. MODULE DESCRIPTIONS

### 5.1 ORGANIZATION OF NEWS

One potential method for combating the dissemination of disinformation and fake news is through the utilization of natural language processing and blockchain techniques to identify and detect fake media. A viable approach to this issue involves examining the organization of news articles, encompassing elements such as the headline, introduction, body, and conclusion. By scrutinizing the structure of news, it becomes feasible to uncover discernible patterns that could potentially signify the existence of fake media. Natural language processing, a subfield of artificial intelligence that concentrates on the interaction between computers and human language, can be employed to analyse the content of news articles and identify patterns that may indicate the presence of fake media. For instance, NLP methodologies can be utilized to assess the language employed in news articles and identify irregularities that may suggest the presence of fake media.

### 5.2 DATA AUTHENTICATION

Data authentication techniques can further enhance the improvement of fake media detection based on natural language processing and blockchain approaches. Ensuring the legitimacy and integrity of the analysed information is crucial in detecting fake media. One effective method to incorporate

data authentication is through the utilization of digital signatures, which authenticate the source of the news article. These digital signatures, created using cryptographic algorithms, serve to verify the authenticity of the information. By attaching the digital signature to the news article and storing it on a blockchain, the tamper-proof nature of the signature is ensured, allowing for easy verification. Additionally, machine learning algorithms can be employed to detect inconsistencies within the data. For instance, language inconsistencies between the headline and the body of a fake news article can be identified through training these algorithms. Such inconsistencies can then be flagged as potentially fake media.

### 5.3 PROOF-OF-AUTHORITY (POA)

A group of reliable validators are designated in a PoA framework to authenticate transactions on the blockchain. These validators are typically reputable organizations or individuals known for their honesty and integrity. Their responsibility is to validate the credibility of news articles and add them to the blockchain. PoA enables the creation of a system that can detect fake media and is resilient to attacks from malicious actors. Since the validators are trustworthy and have a reputation to maintain, they are less likely to engage in fraudulent activities or collude with other validators to manipulate the system. Natural language processing techniques can be utilized to analyse the language used in news articles and identify potential instances of fake media. The results of the analysis can then be presented to the validators for verification.

### 5.4 FAKE MEDIA

The utilization of natural language processing and block chain techniques can serve as a potent solution for detecting and combating the proliferation of fake media. Fake media pertains to news articles, images, or videos that are intentionally created to deceive or mislead the public. Natural language processing methods can be employed to scrutinize the language used in news articles and identify potential instances of fake media. For instance, NLP can detect inconsistencies in the language used in a news article, such as a discrepancy between the headline and the body of the article. Additionally, NLP can analyse the sentiment of the article and identify any bias or misinformation. Block chain technology can be utilized to establish a secure and tamper-proof system for storing and verifying news articles. Each news article can be assigned a unique digital signature that is stored on the block chain, making it effortless to authenticate the article's legitimacy. By implementing a block chain-based system, it is feasible to create a system that is impervious to tampering and fraud, ensuring that the information being analysed is authentic.

## VI. RESULT ANALYSIS

Various metrics, such as precision, recall, and F1 score, can be used to evaluate the proposed system's effectiveness in detecting false news. The ratio of true positives to all actual positives is measured by recall, while the ratio of true positives to all predicted positives is measured by precision. A higher F1 score indicates better performance because it is a weighted average.

| algorithm | accuracy | precision | recall | f1 score |
|---|---|---|---|---|
| NLP | 89.67 | 88.78 | 86.18 | 87.46 |
| RL | 93.75 | 92.86 | 94.67 | 93.76 |
| block chain | 94.43 | 92.68 | 94.18 | 93.43 |

**Table 1. Comparison table**

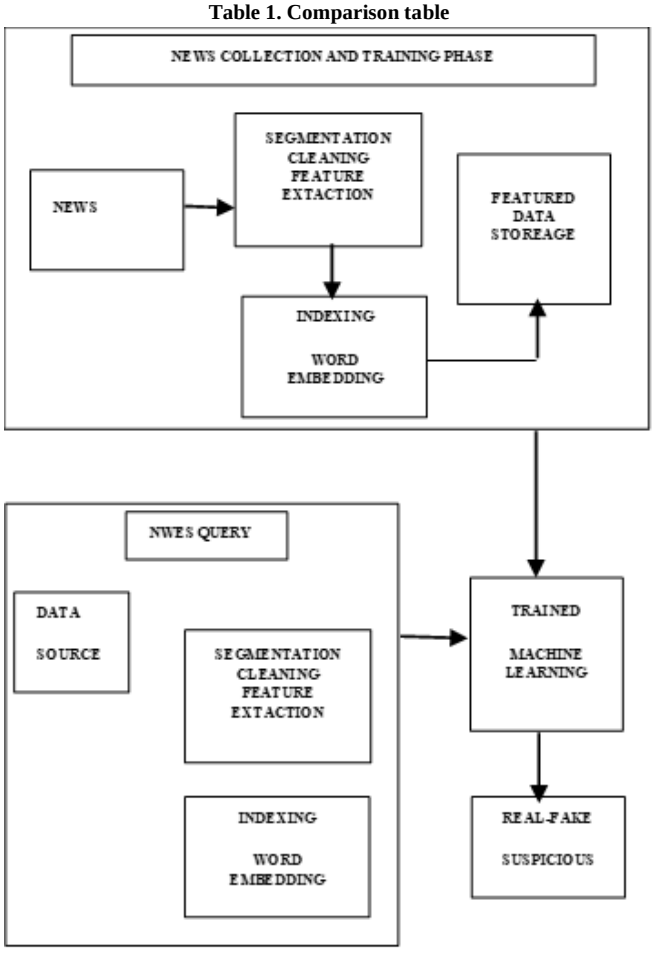


**Figure 1. Block diagram**

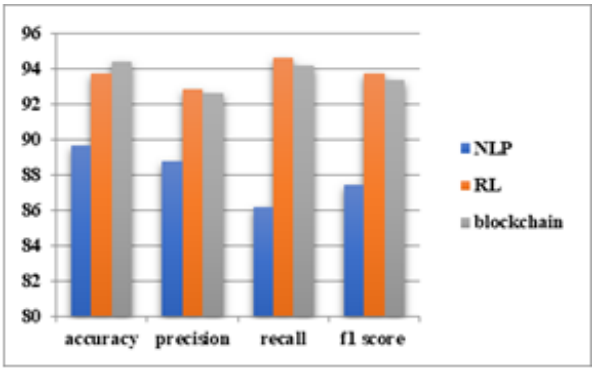


**Figure 2. Comparison graph**

The proposed system's performance can be evaluated by comparing its predictions to a labelled dataset of news articles that are true and false. The framework's expectations can then be dissected to decide the accuracy, review, and F1 score of the framework. In addition, the system's efficiency can be evaluated by comparing it to other cutting-edge false news detection methods.

The quality of the dataset, the performance of the NLP techniques used to preprocess the data, the design of the RL agent, and the accuracy of the block chain technology used to safeguard the data all affect the proposed system's overall effectiveness in detecting false news. In order to evaluate the system's efficacy and identify areas for improvement, extensive testing and analysis are required

## VII. CONCLUSION

To summarize, the identification of false news is a crucial undertaking in the present era, where the dissemination of misinformation can yield severe repercussions. The suggested approach to detect false news involves the utilization of Natural Language Processing, Reinforcement Learning, and blockchain technology, which presents a promising resolution to this issue. By employing NLP techniques to pre-process and extract features from news articles, an RL agent can be trained to discern patterns that differentiate between true and false news. Additionally, the implementation of blockchain technology guarantees the integrity and authenticity of the analysed data, rendering it arduous for anyone to manipulate the data without detection. In essence, this proposed system holds the potential to play a pivotal role in curbing the propagation of false news and fostering the dissemination of accurate information.

## VIII. FUTURE WORK

Further enhancements to the proposed system in the realm of false news detection could be pursued in future research. The feature extraction process presents an opportunity for potential improvement, as additional features could be investigated to bolster the RL agent's capacity to differentiate between true and false news. Additionally, the utilization of advanced NLP techniques, including deep learning models, holds promise for enhancing the system's overall performance.

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