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"AI-based Fake News Detection"

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***Abstract*-- Fake news on social media platforms is increasing rapidly, so many people are becoming victims of this news without their interference. It is a big challenge for us to detect who is spreading fake news. Fake news spreads faster nowadays than in the past due to the widespread use of the internet. This research paper is a study of techniques based on artificial intelligence, such as neural networks, natural language processing, and machine learning algorithms that work together. The learning models surveyed are Convolutional Neural Network (CNN), Long Short-Term Memory (LSTM), and Bidirectional Recurrent Neural Network (RNN) methods. Natural language processing methods contain the tokenization model, and machine learning includes Term Frequency-Inverse Document Frequency (TFIDF) and unsupervised algorithms. The algorithms are compared and their effectiveness in detecting fake news is investigated, along with the advantages and disadvantages of the respective techniques.**

***Keyword*-- Convolutional neural network, long short-term memory, recurrent neural network, term frequency-inverse document frequency**

I. INTRODUCTION

Fake news is the deliberate spread of misinformation and its false and misleading information published as news. It is also called junk news. To detect fake news, various methods and algorithms are used to determine if the news is real or fake. Fake news main aim is to focus on a selected person or organization's economic loss [1]. The Facebook feed and web programmers like Google increase the amount of fake news drastically. Falsified detection could be an important and demanding subject in the field of Natural Language Processing (NLP). False news has gained traction as a result of social media's uprise because of the simplicity with which it can now be shared [2]. As a result, the impact of fake news has grown, sometimes reaching offline realms and posing a danger to people. Fake news, whether created by humans or algorithms, has a significant influence on people and the political system **[3] .** In today's society, the media plays a huge influence in shaping public opinion. Right now, the field of studying how to spot fake news is a hive of activity. Automated approaches to detect inaccuracies in news items are being created with the help of NLP and macne learning **[4]**. Machine learning has played an important role in the classification of knowledge, although with some limitations. For this model, CNN and LSTM models are used for designing the sequence prediction problems with spatial inputs like images, text, and videos **[5]**. The widespread use of fake news has significantly impacted our lives in politics and economics.

Supervised computing algorithms are used for extracting fake news; they can transform the info set into a structured format with text mining methods **[6]**.

II. LITERATURE REVIEW

The rapid growth of social media platforms has significantly increased the spread of fake news, making it a global issue affecting political, economic, and social systems. Researchers highlight that fake news spreads faster than real news due to its sensational nature and high engagement rate, which creates the need for automated AI-based detection systems**[1]**.Research Gate Early research in fake news detection primarily relied on machine learning (ML) techniques such as Naïve Bayes, Support Vector Machines (SVM), and Logistic Regression, which focused on text classification using linguistic and statistical features. These models were effective but limited in handling complex semantics and contextual understanding**[2]**. With advancements in artificial intelligence, deep learning (DL) models such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) have been widely adopted for fake news detection. These models automatically extract features from large datasets and improve accuracy compared to traditional ML approaches**[3]**. Transformer-based models like BERT (Bidirectional Encoder Representations from Transformers) have significantly improved fake news detection by capturing contextual relationships in text. Studies show that BERT-based models outperform traditional ML and some deep learning models in classification tasks**[4]**. Recent research has explored the use of Large Language Models (LLMs) for fake news detection, demonstrating robustness against noisy or manipulated text. However, studies indicate that while LLMs are powerful, they may still underperform compared to fine-tuned encoder-based models in certain classification tasks**[5]**.

III. PROBLEM STATEMENT

The rapid growth of social media and online news platforms has made it easier for information to spread quickly across the world. However, this has also led to a significant increase in the spread of fake news, which can mislead people, influence public opinion, and create social and political instability **[1]**. Fake news is often designed to look like real news, making it difficult for users to identify whether the information is true or false. As a result, many people unknowingly share misleading or incorrect information on digital platforms **[2]**.

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Traditional methods of detecting fake news, such as manual fact-checking, are time-consuming and cannot keep up with the large volume of content generated every day. Moreover, fake news creators continuously evolve their techniques, making detection even more challenging. Therefore, there is a need for automated and intelligent systems that can efficiently analyze and identify fake news in real time **[3]**.

IV. OBJECTIVE

AI-based systems are widely used for detecting and analyzing fake news on digital platforms. However, different techniques show variations in performance, such as accuracy, processing speed, scalability, and ability to handle complex or misleading content **[1]**. Users and organizations often face difficulty in identifying reliable detection systems, especially when large volumes of data and diverse news sources are involved. Therefore, the objective of this research is to evaluate and compare different AI-based fake news detection models to identify the most efficient approach under similar conditions **[2]**. To analyze system performance based on key metrics such as accuracy, precision, recall, and F1-score **[3]**. To examine the impact of different datasets, feature extraction techniques, and data quality on detection results **[4]**. To study challenges such as bias, overfitting, and lack of generalization in AI models and to improve the overall efficiency, reliability, and effectiveness of automated fake news detection systems for better information credibility. **[5]**

V. RESEARCH OBJECTIVES

AI-based approaches are increasingly used to address the growing issue of fake news detection on online platforms. However, there is a need to systematically study how these models perform in real-world scenarios with diverse and dynamic data **[1]**. To design and develop an effective AI-based framework that can accurately classify news as real or fake by utilizing advanced machine learning and deep learning techniques **[2]**. To investigate the role of feature engineering, including textual, semantic, and contextual features, in improving the performance of fake news detection systems **[3]**. To conduct experimental analysis on different benchmark datasets in order to validate the proposed model and compare its results with existing approaches **[4]**. To identify limitations in current systems and propose improvements that enhance model robustness, adaptability, and real-time detection capability **[5]**.

VI. METHODOLOGY

1. Data Collection and Preprocessing

Data is collected from different datasets like LIAR, FakeNewsNet, ISOT, and COVID-19 news.

After collecting, the data is cleaned by removing unwanted words, duplicates, and errors so that the model gets good quality data for training.

2. Feature Extraction

Important features are taken from the data such as text patterns (words, sentences), grammar, source of news, and social media activity like shares and likes. These features help the system understand whether news is fake or real.

3. Data Augmentation

To improve the model performance, extra data is created using techniques like text modification and duplication. This helps the system learn better and work well on different types of news.

4. Traditional Machine Learning Models

Basic models like Support Vector Machine (SVM), Random Forest, Logistic Regression, and Naive Bayes are used. These models are simple, fast, and useful for basic fake news classification tasks.

5. Deep Learning Models

Advanced models like LSTM, Bi-LSTM, and CNN are used to understand complex patterns in news content. These models can capture the meaning and sequence of words better than traditional models.

6. Transformer-Based Models and Evaluation

Modern models like BERT and RoBERTa are used for better understanding of context in text. Finally, all models are tested using metrics like accuracy, precision, and recall to check which model performs best.

Fig.1 Overview of Research Methodology

VII. BENEFITS OF "AL-BASED FAKE NEWS DETECTION"

AI-based fake news detection systems provide several advantages in managing and controlling the spread of misinformation on digital platforms. However, the increasing volume of online content makes it difficult to manually verify the authenticity of news, which highlights the importance of automated solutions **[1]**.

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These systems help in identifying and reducing the spread of fake news by quickly analyzing large amounts of data and flagging misleading content **[2]**. They improve the credibility and reliability of information available to users by ensuring that only verified and trustworthy news is promoted **[3]**. They support social media platforms and news organizations in content moderation by filtering out false information efficiently **[4]**. They help in protecting public opinion and preventing the manipulation of information in areas such as politics, health, and education **[5]**.

Fig.2 Benefits of AI based Fake News Detection

VIII. CHALLENGES

AI-based fake news detection systems face several challenges due to the complex and evolving nature of misinformation on digital platforms. However, the increasing volume and diversity of online content make it difficult for models to maintain consistent performance across different domains and formats **[1]**. One major challenge is the presence of biased, incomplete, or imbalanced datasets, which can affect the accuracy and fairness of the detection models **[2]**. Another challenge is the difficulty in understanding context, sarcasm, and misleading writing styles that closely resemble real news content **[3]**. Models also struggle with generalization, as systems trained on one dataset may not perform well on unseen or real-time data from different sources **[4]**. The rapid evolution of fake news techniques, including deepfakes and manipulated multimedia content, further complicates detection **[5]**.

IX. ANALYSIS AND DISCUSSION

AI-based fake news detection systems have shown significant improvements in identifying misleading content, but their performance varies depending on the models, datasets, and features used. However, experimental results indicate that no single model performs best in all situations, highlighting the need for comparative analysis and hybrid approaches **[1]**. The analysis shows that deep learning and transformer-based models generally achieve higher accuracy compared to traditional machine learning methods due to their ability to understand context and complex patterns in text **[2]**.

While feature engineering and quality of datasets play a crucial role in improving model performance and reducing errors **[3]**. It is also observed that combining content-based and context-based features leads to better detection results compared to using a single type of feature **[4]**. despite these advancements, challenges such as overfitting, bias, and difficulty in handling real-time data still affect the reliability of the models **[5]**.

X. CONCLUSION

AI-based fake news detection has become an essential solution for addressing the growing problem of misinformation on digital platforms. However, the effectiveness of these systems depends on the choice of models, quality of data, and ability to handle complex and evolving fake news patterns **[1]**. The study concludes that advanced techniques such as deep learning and transformer-based models provide better accuracy and performance compared to traditional methods **[2]**. while proper data preprocessing and feature extraction significantly improve the reliability of detection results **[3]**. It is also observed that combining multiple approaches and using high-quality datasets enhances the overall efficiency of the system **[4]**. Despite these improvements, challenges such as bias, lack of generalization, and high computational cost still need to be addressed **[5]**.

XI. FUTURE SCOPE

AI-based fake news detection has significant potential for future development as technology continues to evolve and the volume of online information increases **[1]**. Future research can focus on developing more advanced hybrid models that combine machine learning, deep learning, and transformer-based techniques for better accuracy and efficiency **[2]**. There is a need to create large, diverse, and unbiased datasets covering multiple languages and domains to improve model generalization **[3]**. Integrating multimodal analysis by combining text, images, videos, and social media context can enhance detection capabilities **[4]**. Improving explainable AI methods will make detection systems more transparent and trustworthy for users and organizations **[5]**. Developing real-time detection systems will help in identifying and controlling the spread of fake news more effectively **[6]**. Research can also focus on reducing computational cost and improving scalability for handling large-scale data **[7]**. Future systems can be integrated with social media platforms and news applications to provide automatic and instant fake news alerts to users **[8]**.

REFERENCES

[1] W. Y. Wang, "Liar, Liar Pants on Fire: A New Benchmark Dataset for Fake News Detection," arXiv, 2017.

[2] K. Shu, D. Mahudeswaran, S. Wang, D. Lee and H. Liu, "FakeNewsNet: A Data Repository with News Content, Social Context and Spatial-temporal Information," arXiv, 2018. https://arxiv.org/abs/1809.01286

[3] K. Nath, A. Ahuja and P. Soni, "Study of Fake News Detection using Machine Learning and Deep Learning Classification Methods," IEEE, 2021. https://www.researchgate.net/publication/356438992_C2021_IEEE_Study_of_Fake_News_Detection_using_Machine_Learning_and_Deep_Learning_Classification_Methods

[4] T. Jiang, J. P. Li, A. U. Haq, A. Saboor and A. Ali, "A Novel Stacking Approach for Accurate Detection of Fake News," IEEE Access, vol. 9, pp. 22626–22639, 2021. https://doi.org/10.1109/ACCESS.2021.3056079

[5] F. Sadeghi, A. J. Bidgoly and H. Amirkhani, "Fake News Detection on Social Media using a Natural Language Inference Approach," Multimedia Tools and Applications, 2022. https://doi.org/10.1007/s11042-022-12428-8

[6] J. Kathiriya and S. Degadwala, "A Review on Fake News Detection using Deep Learning Methods," IJRCSIT, vol. 10, no. 3, pp. 450–460, 2024. https://ijsrcseit.com/index.php/home/article/view/CSEIT24103126

[7] M. Z. Ansari and M. Ahmed, "A Hybrid Approach for Fake News Detection using Convolution and Multilayer Perceptron," International Journal of Computer Sciences and Engineering, 2019. https://doi.org/10.26438/ijcse/v7i4.11811187

[8] "Fake News Detection Algorithms – A Systematic Literature Review," Data & Knowledge Engineering, 2025. https://www.sciencedirect.com/science/article/pii/S0169023X25000369