

Research paper on Fake News Identification through Artificial Intelligence

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Abstract—The exponential growth of digital media platforms and social networking sites has resulted in the rapid dissemination of fake news and misinformation. Fake news poses serious threats to society by influencing public opinion, spreading panic, and undermining trust in legitimate information sources. Traditional manual verification techniques are inefficient due to the massive volume and velocity of online content. This research paper presents an Artificial Intelligence-based approach for detecting fake news using machine learning and deep learning techniques. Natural Language Processing methods are employed for text preprocessing and feature extraction, followed by classification using Naïve Bayes, Support Vector Machine, and BERT models. Experimental results obtained from benchmark datasets demonstrate that deep learning models outperform traditional machine learning approaches in terms of accuracy and reliability. The proposed framework provides an effective and scalable solution for automated fake news detection and can be deployed in real-time digital environments.

Index Terms—Fake News Detection, Artificial Intelligence, Machine Learning, Deep Learning, Natural Language Processing, IJIRT

I. INTRODUCTION

In the digital age, information is shared instantaneously through online news portals, blogs, and social media platforms. While this accessibility has improved information dissemination, it has also enabled the widespread circulation of fake news. Fake news refers to deliberately fabricated or misleading information presented as authentic news. The impact of fake news can be observed in political manipulation, financial fraud, social unrest, and public health misinformation.

Traditional fact-checking methods rely heavily on human intervention and are not scalable. Artificial

Intelligence (AI) offers automated, efficient, and scalable solutions for detecting fake news. This paper focuses on developing an AI-based fake news detection system that analyzes textual content using machine learning and deep learning algorithms.

II. LITERATURE REVIEW

Several researchers have explored fake news detection using computational techniques. Early studies applied traditional machine learning algorithms such as Naïve Bayes, Decision Trees, and Support Vector Machines with handcrafted features. Later research incorporated Natural Language Processing techniques including TF-IDF, n-grams, and sentiment analysis to improve classification performance.

Recent advancements emphasize deep learning approaches such as Convolutional Neural Networks, Recurrent Neural Networks, and transformer-based models like BERT. These models capture semantic and contextual relationships within text more effectively, resulting in higher detection accuracy. The literature indicates that deep learning models consistently outperform traditional machine learning approaches for fake news detection.

III. METHODOLOGY

The proposed methodology follows a structured workflow consisting of the following steps:

3.1 Dataset Description

Experiments are conducted using publicly available datasets such as the Kaggle Fake News Dataset and the LIAR dataset. These datasets contain labelled news articles categorized as real or fake.

3.2 Data Preprocessing

Text preprocessing includes tokenization, removal of stop words, punctuation elimination, stemming, and lemmatization to reduce noise and dimensionality.

3.3 Feature Extraction

TF-IDF is used for feature extraction in traditional machine learning models, while contextual embeddings are generated for deep learning models.

3.4 Classification Algorithms

Naïve Bayes: Probabilistic classifier based on Bayes' theorem

Support Vector Machine: Margin-based classifier for high-dimensional data

BERT: Transformer-based deep learning model for contextual understanding

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IV. RESULTS AND DISCUSSION

The performance of the proposed models is evaluated using accuracy, precision, recall, and F1-score. Experimental results show that Naïve Bayes and SVM achieve moderate accuracy, while the BERT model achieves the highest accuracy of approximately 94%. The results demonstrate that deep learning models are more effective in capturing contextual information and handling complex linguistic patterns. These findings confirm the superiority of transformer-based models for fake news detection tasks.

V. CONCLUSION

This research presents a comprehensive AI-based framework for fake news detection using machine learning and deep learning techniques. The experimental analysis highlights that BERT-based models outperform traditional classifiers in terms of accuracy and robustness. The proposed system can be effectively deployed for real-time fake news detection. Future work may focus on multilingual fake news detection, multimodal misinformation analysis, and large-scale deployment on social media platforms.

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