

Mitigating the Spread of Fake News with Innovative Detection Methods (NLP)..docx

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1 Research Objectives:

1.1 Textual Analysis:

- Analysis the News content by using the Natural Language Processing
- Focus on identifying the linguistic indicator such as the sentimental language or incitement language

1.2 Image Analysis:

- Leveraging computer vision models to analyze news images
- Detect image manipulation such as deepfakes, photoshopped images, or the use of misleading images.
- Use convolutional neural networks (CNNs) or advanced models (such as Vision Transformers) to detect inconsistencies or the source of images.

1.3 Audio Analysis:

- Examine inconsistencies in speech patterns, such as unnatural pauses, stuttering, or voice manipulation.

- Integrate automatic speech recognition (ASR) models and emotion detection algorithms.

2 Paper Summaries

Paper 1: Ensemble Techniques for Robust Fake News Detection: Integrating Transformers, Natural Language Processing, and Machine Learning

This study presents a comprehensive framework that combines machine learning and deep learning techniques to analyze text and visual data, aiming to improve the accuracy of fake news detection across various media formats. The research is organized as follows: Section 2 reviews the literature on fake news, its causes, and current detection techniques. Section 3 discusses the methodology, including data collection, preprocessing, and machine learning and deep learning applications. Section 4 presents and discusses the results, comparing them with baseline models. Section 5 concludes the paper and explores future research directions.

Paper 2: An image and text-based multimodal model for detecting fake news in OSN's

This study presents a comprehensive and innovative approach to addressing the growing issue of fake news dissemination on online social networks (OSNs). By integrating both text and image-based features, the proposed multimodal model significantly enhances the detection of fake news, overcoming the limitations of traditional text-only methods. The use of deep learning techniques, such as natural language processing (NLP) for text and convolutional neural networks (CNNs) for images, ensures a robust and accurate classification system that effectively captures the complex nature of online misinformation.

Paper 3: Utilizing Ensemble Learning for Detecting Multi-Modal Fake News

The research presented in this paper introduces a novel and effective approach for detecting multi-modal fake news, leveraging ensemble learning and integrating sentiment analysis, textual and visual data processing, and deep learning techniques. The proposed Ensemble Learning-based Detection of Multi-modal Fake News (ELD-FN) system demonstrates substantial performance improvements over existing methods, with notable gains in accuracy, precision, recall, F1-score, and other relevant metrics. By utilizing a diverse set of features, including sentiment analysis and the fusion of text and image embeddings, ELD-FN offers a robust solution to the challenge of identifying fake news in today's digital age.

Paper 4: A Review of Deep Learning Techniques for Multimodal Fake News and Harmful Languages Detection

This review paper highlights the growing challenge of detecting and mitigating the spread of fake news and harmful languages, particularly on social media platforms. As technology evolves, the methods used to deceive and harm through digital content have become increasingly sophisticated. Fake news and harmful languages, which are often spread through multiple data forms like text, images, videos, and memes, have severe societal consequences, including misinformation and attacks on individuals or groups. The paper emphasizes the need for advanced solutions to address this issue, particularly through the application of deep learning techniques, which have shown great promise in the detection of multimodal fake news and harmful languages.

Paper 5: Improving Data Fusion for Fake News Detection: A Hybrid Fusion Approach for Unimodal and Multimodal Data

This study addresses a critical challenge in fake news detection, specifically focusing on the integration of multimodal data—text and images—through a novel Hybrid Fusion Method (HF-TIM). By combining early fusion of multimodal data with late fusion of unimodal features, the proposed approach effectively overcomes the limitations of existing models that either focus on one modality or fail to adequately fuse information across multiple data types. The HF-TIM method capitalizes on the strengths of both early and late fusion techniques, significantly enhancing detection accuracy and model robustness.

Paper 6: Potential Features Fusion Network for Multimodal Fake News Detection

The proposed PFFN (Multimodal Feature Fusion Network) presents a novel and effective approach for fake news detection by incorporating image category features alongside traditional text features. This targeted feature extraction, particularly with the categorization of news images, allows for a more accurate representation of the information contained within both modalities. The use of attention networks and a Mixture of Experts (MoE) structure enhances the fusion of features from text and image, further improving the model's ability to identify fake news. Experimental results across four diverse datasets demonstrate that PFFN outperforms baseline methods, offering promising advancements in multimodal fake news detection. The framework not only highlights the importance of precise feature extraction but also sets a new standard for the integration of multimodal data in fake news detection systems.

3 Critical Analysis:

4 Matrix for Literature Review:

Research Title	Author	Published Date	Key Findings	Weaknesses / Limitations
4 Ensemble Techniques for Robust Fake News Detection: Integrating Transformers, Natural Language Processing, and Machine Learning	Mohammed Al-alshaqi, Danda B. Rawat and Chunmei Liu	19 September 2024	Transformer-based architectures, such as BERT and RoBERTa, are particularly effective in processing and understanding natural language, making them a powerful tool for identifying fake news.	-
6 An image and text-based multimodal model for detecting fake news in OSN's	Santosh Kumar Uppada, Parth Patel & Sivaselvan B.	30 November 2022	The proposed framework extracts features like manipulation probabilities and polarity, using fusion models to build a classifier. By	-

			enhancing BERT with a dense layer, it improves learning, with algorithms like ELA tested for optimal performance. The ensemble model outperforms existing ones in accuracy and effectively detects fake posts with captions.	
2 Utilizing Ensemble Learning for Detecting Multi-Modal Fake News	Muhammad Luqman, Muhammad Faheem, Waheed Yousuf Ramay, Malik Khizar Saeed and Majid Bashir Ahmad	2023		-
7 A Review of Deep Learning Techniques for Multimodal Fake News and Harmful Languages Detection	Eniafe Festus Ayetiran and Özlem Özgöbek	2022		-
4 Improving Data Fusion for Fake News Detection: A Hybrid Fusion Approach for Unimodal and Multimodal Data	Suhaib Kh. Hamed, Mohd Juzaidin Ab Aziz and Mohd Ridzwan Yaakub	2024		-
5 Potential Features Fusion Network for Multimodal Fake News Detection	Feifei Kou, Bingwei Wang, Haisheng Li, Chuangying Zhu, Lei Shi, Jiwei Zhang, Limei Qi	07 March 2025		-

5 References:

[Paper 1](#)

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Mohammed Al-alshaqi, Danda B. Rawat, Chunmei Liu. "Ensemble Techniques for Robust Fake News Detection: Integrating Transformers, Natural Language Processing, and Machine Learning", Sensors, 2024

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Feifei Kou, Bingwei Wang, Haisheng Li, Chuangying Zhu, Lei Shi, Jiwei Zhang, Limei Qi. "Potential Features Fusion Network for Multimodal FakeNewsDetection", ACM Transactions on Multimedia Computing, Communications, and Applications, 2025

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Ashima Yadav, Anika Gupta. "An emotion-driven, transformer-based network for multimodal fake news detection", International Journal of Multimedia Information Retrieval, 2024

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Deepak P, Tanmoy Chakraborty, Cheng Long, Santhosh Kumar G. "Data Science for Fake News", Springer Science and Business Media LLC, 2021

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