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Key Findings

Fake news on Online Social Media (OSM) poses a considerable global challenge, primarily due to the swift dissemination of misinformation and its detrimental social, political, and financial consequences. This research offers a thorough examination of Artificial Intelligence (AI) and Machine Learning (ML) methodologies aimed at effective fake news detection.

An extensive review of literature carried out in this research indicates that existing methods for identifying fake news mainly utilized conventional machine learning algorithms and manually crafted linguistic features. While these strategies exhibited early potential, they fell short in extracting deep contextual information and faced challenges with multilingual content. In addition, the structural connections between news items on OSM remain unexplored. The review brings to light significant gaps in research, such as the restricted application of hybrid deep learning, limited cross-language modeling, and lack of use of structural properties. These shortcomings emphasized the need for the creation of more sophisticated and integrated fake news detection methods.

To address these identified limitations, we propose a deep learning architecture named CBiAtFake, which integrates Convolutional Neural Networks (CNN), Bidirectional Long Short-Term Memory (BiLSTM), and Attention mechanism. This hybrid model effectively represents local patterns as well as long-distance dependencies in the news content. Experimental results shows that proposed CBiAtFake model can significantly enhances the accuracy of the classification of fake news.

Moreover, this research work also deals with the structural understanding of the news article networks in fake news detection. Article nodes are connected through the similarity of the content within a network. A set of structural properties including degree, centrality and core nodes measures are extract6ed and integrated with linguistic features. The findings reveal that fake news is likely to exhibit distinct network patterns and clustering characteristics, which can improve the overall detection performance. This indicates that investigating the correlations between news updates on OSM provides interesting information beyond plain text analysis.

Further, this research work also analyzed the growing issue of cross language fake news over the OSM. It introduces a multilingual fake news detection model that utilizes XLM-RoBERTa in conjunction with adversarial learning. This methodology allows the model to acquire cross-lingual representations of news content and maintain resilience against deceptive tactics. The proposed model demonstrates high detection accuracy across several languages, emphasizing the efficacy of transformer-based architectures in addressing global fake news issues.

Furthermore, the research explores fake news detection within the finance sector, where inaccurate information can lead to significant financial loss. In addition to textual features such as sentiment measures, stance and cohesion this work introduces domain-specific features to capture financial context of the fake news. Subsequently, a stacking-based ensemble learning strategy is implemented for classification. The findings indicate that the trained models surpass general-purpose fake news detectors when applied to financial news. This work highlight the necessity of domain-aware learning in specialized and high-risk areas.

In summary, the finding affirm that the integration of insights from existing literature the proposed models including advanced hybrid deep learning, structural network analysis, multilingual transformer frameworks, and domain-specific financial feature engineering contributed significantly to enhance the fake news detection performance. The developed methods establish a robust foundation for the development of scalable and resilient fake news detection systems.