

# A Hybrid Multimodal Machine Learning Framework for Fake News Detection

Suraj Pal<sup>1</sup> and Dr. Devender Kumar<sup>2</sup>

Research Scholar, Department of Computer Science & Application<sup>1</sup>

Associate Professor, Department of Computer Science & Application<sup>2</sup>

BMU, Asthal Bohar, Rohtak

**Abstract:** Fake News Detection (FND) has emerged as a critical challenge due to the rapid dissemination of deceptive information across social media and online platforms. The increasing use of multimedia content, particularly the combination of textual narratives with misleading visuals, has further complicated the detection process. This chapter addresses the FND problem by proposing a robust multimodal approach that jointly analyzes textual and visual information to improve detection accuracy. The study utilizes three widely adopted multimodal benchmark datasets Fakeddit, TwitterMediaEval2015, and the FakenewsNet repository to ensure comprehensive evaluation and generalizability of the proposed framework. The proposed multimodal architecture is designed to identify deceptive patterns by capturing superficial and semantic dependencies between text and images. Transformer-based techniques are employed to enhance word sequence modeling and internal feature representations, enabling effective cross-modal interaction and contextual understanding. By integrating visual and textual cues, the framework overcomes the limitations of unimodal approaches that rely solely on either text or images. Experimental results demonstrate the effectiveness of the proposed method. The multimodal model achieves an accuracy of 91.35% on the PolitiFact dataset and 98.59% on the Gossip Cop dataset, significantly outperforming traditional unimodal and baseline multimodal models. Furthermore, a comparative evaluation with an established multimodal framework, FakeRevealer, shows an accuracy of 80.00%, surpassing the state-of-the-art performance on the TwitterMediaEval2015 dataset by 2.23%. These findings highlight the superiority of multimodal learning in detecting fake news by leveraging complementary information from multiple data sources. Overall, the results confirm that multimodal approaches provide more reliable and accurate solutions for fake news detection in modern social media environments..

**Keywords:** Fake News Detection, Fakeddi , TwitterMediaEval2015, Accuracy

