

Real Fake Audio Detection

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Abstract: *The rapid progress of Artificial Intelligence (AI) has enabled the creation of highly realistic synthetic voices, commonly referred to as deepfake audios. These technologies have demonstrated great potential in several creative and assistive fields such as entertainment, speech synthesis for the disabled, and virtual assistants. However, their misuse has raised serious concerns regarding security, privacy, and information authenticity. Malicious individuals can exploit deepfake audio to conduct fraud, impersonate individuals, or spread misinformation, leading to a decline in public trust in digital communications and media.*

Traditional supervised learning models have shown limited capability in addressing this issue effectively. Such models rely heavily on labeled datasets, which makes them inefficient when faced with unseen or newly emerging manipulation techniques. As the sophistication of deepfake generation methods increases, these conventional models struggle to detect subtle anomalies in manipulated audio, resulting in reduced accuracy and adaptability. To overcome these challenges, the proposed system introduces a Generative Adversarial Network (GAN)- based anomaly detection framework. The system works in an unsupervised manner, focusing on learning the intrinsic patterns and natural characteristics of authentic human speech. By capturing and modeling these genuine audio features, the system can identify any deviation or abnormality present in a test audio sample. Such deviations are then classified as potential deepfake or manipulated audio.

The proposed approach significantly enhances robustness, adaptability, and generalization compared to traditional detection systems. Since it learns from real audio rather than depending on pre-labeled fake samples, it becomes capable of detecting both known and novel deepfake audios. Furthermore, the framework's design ensures scalability, making it suitable for real-time audio verification across multiple environments, accents, and languages.

This research thus provides a powerful solution to one of the most critical challenges in today's digital era—ensuring the integrity and authenticity of voice data. The integration of GANs with anomaly detection techniques offers a dynamic and intelligent mechanism for distinguishing between real and fake voices. The system not only strengthens digital communication security but also contributes to safeguarding individuals and organizations from audio-based misinformation, identity theft, and fraudulent activities.

In summary, the proposed GAN-based deepfake audio detection framework serves as an effective and scalable approach for real-time identification of synthetic voices, thereby enhancing trust and reliability in modern communication systems..

Keywords: *Artificial Intelligence*

