

ABSTRACT

Title: Voice Biometric Based Security Authentication System

Abstract:

In recent years, the rise of deepfake technologies and AI-generated voices has posed serious challenges to traditional voice authentication systems. To address this emerging threat, this project proposes a Voice Biometrics Authentication System with Deepfake Detection, combining robust speaker verification and spoof detection techniques.

The system utilizes ECAPA-TDNN to extract unique speaker embeddings for identity verification and AASIST to detect synthetic or spoofed voice inputs. During registration, users record voice samples that are processed into secure voiceprints. During authentication, the user's live voice is compared with the stored voiceprints and simultaneously verified for authenticity, ensuring both identity and genuineness.

The complete implementation enables real-time voice capture, processing, and feedback without requiring

By integrating biometric authentication with deepfake resilience, the system offers a highly secure and scalable solution applicable to domains such as banking, smart devices, healthcare, and government services.

Overall, this project demonstrates that voice, when combined with modern deep learning techniques, can serve as a powerful, secure, and future-ready biometric for real-world authentication.

Keywords:

Voice Biometrics, Speaker verification, Audio spoofing, Speaker Embeddings