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Bettear

Deep Audio Processing (DAP): An AI-Driven Audio Personalization Technology for Improved Speech Intelligibility and Listening Experience

Speech intelligibility in complex acoustic environments remains a major limitation for hard-of-hearing individuals, even with advanced hearing devices. Conventional approaches, including amplification, noise reduction, and AI-based denoising, are often insufficient in dynamic, multi-source listening conditions.

This lecture presents Deep Audio Processing (DAP), an AI-driven audio personalization technology designed for content-aware and listener-specific adaptation. DAP integrates audio scene analysis, source separation, and perceptually guided rebalancing of speech, music, and background components. A key component of the framework is phoneme-aware non-uniform time-scale modification (NU-TSM), enabling selective temporal adaptation of speech to enhance perceptually relevant cues without introducing global distortion.

The system is designed for real-time operation under low-latency constraints.

Psychoacoustic evaluations indicate improved speech intelligibility, reduced listening effort, and enhanced overall listening experience.

DAP represents a shift toward perceptually driven audio processing, offering a scalable approach to auditory accessibility.