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When context is missing: Why good hearing is more than just understanding speech

Communication is based not only on speech, but on its integration into a multimodal context. Background noise, spatial and spectrotemporal information, are crucial for differentiated hearing. Furthermore, the brain utilises semantic-pragmatic patterns that are shaped by situational context – the awareness of where and how communication takes place.

When acoustic context is missing, confusion and misunderstanding occurs. Intonation, for example, determines the meaning of ‘Oh great’, whilst surrounding sounds determine the urgency of ‘Watch out’. Hearing aids that prioritise speech and do not take the listening environment into account reduce context-relevant information.

A key step in the development of modern hearing aids is that AI not only processes speech but also actively analyses the acoustic context. 360° listening environments can thus be captured using spatial, acoustic and sensory information to support communication holistically and contextually.

The presentation highlights a new context-adaptive signal processing approach using AI and its influence on dynamic balancing of speech and the listening environment, with the aim of improving speech understanding, listening effort, situational awareness and user interaction.