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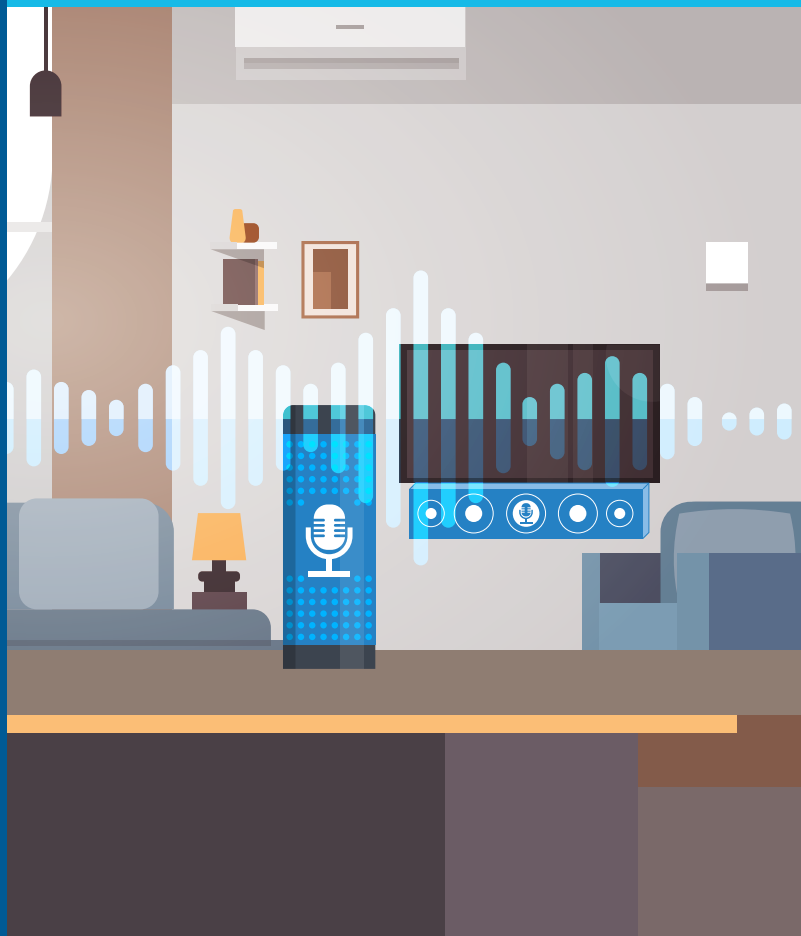
FRAUNHOFER UPHEAR

VOICE QUALITY ENHANCEMENT FOR SMART ASSISTANT DEVICES AND COMMUNICATION



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BE HEARD

Enhanced speech recognition

Fraunhofer upHear Voice Quality Enhancement (VQE) enables far-field voice commands and barge-in for smart assistant devices, ranging from smart speakers to smart soundbars. The software removes interfering sounds captured by a device's microphones, extracts the user's voice and cancels out acoustical echoes that would otherwise make it impossible for the Human Machine Interface (HMI) to understand the user's request.

Suitable for a wide range of devices

Fraunhofer upHear VQE is a fully integrated and flexible solution for all kinds of mobile and smart assistant devices, as well as conferencing solutions. The technology combines advanced multichannel source localization and beamforming techniques with echo and noise reduction algorithms, thus providing outstanding audio quality even under unfavorable acoustic conditions. Advanced multichannel acoustic echo cancellation allows for barge-in functionality in an always-listening operation of the voice-controlled HMI.

Flexible product designs

Fraunhofer upHear VQE can be adapted to the unique housing of the device. It offers flexibility in both the microphone and loudspeaker configuration of the device, ensuring optimal performance, regardless of whether mono, stereo, surround or immersive sound is being played back. Moreover, commonly used array geometries such as linear or circular microphone placements are natively supported. Fraunhofer IIS provides extensive technical support to licensees of the upHear VQE software.

Optimized integration of functionalities

– Multichannel Acoustic Echo Cancellation (AEC) attenuates echoes originating from the device's loudspeakers
– Direction of Arrival (DOA) estimates the direction of the active talker
– Beamforming exploits the spatial diversity offered by an array of microphones to achieve improved directional sound acquisition and extracts the user's voice even in far-field conditions
– Noise Reduction (NR), Dereverberation and Automatic Gain Control (AGC) further enhance the quality of the captured voice

Availability and references

– Available for licensing; the software library can be provided for desktop platforms (Windows, Mac, Linux), mobile apps (iOS, Android), and embedded systems (e. g., ARM Cortex)
– Technology companies Yandex and LG have incorporated Fraunhofer's upHear Voice Quality Enhancement technology into smart assistant speakers