

FRAUNHOFER UPHEAR

VOICE QUALITY ENHANCEMENT
FOR SMART DEVICES



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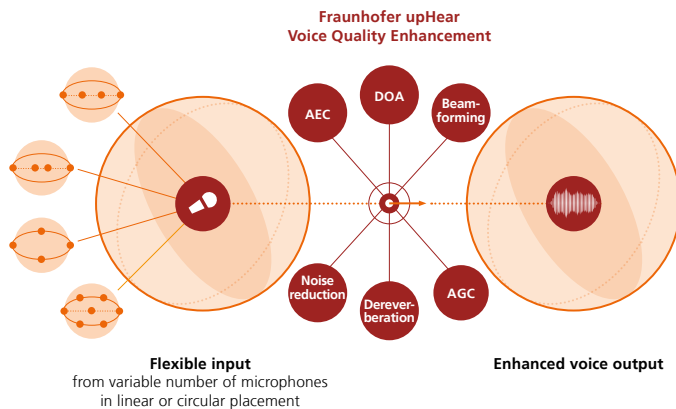
BE HEARD

Enhanced Speech Recognition in Smart Devices

Fraunhofer upHear Voice Quality Enhancement 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.

Flexibility, Functionality and Quality

Fraunhofer upHear Voice Quality Enhancement is a fully integrated and flexible solution combining advanced multichannel source localization and beamforming techniques with echo and noise reduction algorithms. It provides outstanding audio quality even under unfavorable acoustic conditions. Advanced acoustic echo cancellation allows for barge-in functionality in an always-listening operation of the voice-controlled HMI.



Fraunhofer upHear Voice Quality Enhancement can be adapted to the unique body and microphone configuration of the device. This enables flexibility in the product design, and ensures optimal performance. Commonly used array geometries such as linear or circular microphone placements are natively supported.

Features

Fraunhofer upHear Voice Quality Enhancement improves voice quality by an optimized integration of the following functionalities:

- 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

- 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)
- Russian technology company Yandex has incorporated Fraunhofer's upHear Voice Quality Enhancement technology into its first smart speaker, available since July 2018