Advanced Processing of Microphone Array Data for Engineering Applications

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Microphone arrays are tools for the localisation and quantification of sound sources. The use of the technology is strongly related to the progresses in computer technology. For a long time the application was limited to military or scientific use. The focus of the systems designed for industrial applications lies on fast setup and basic evaluation (e.g. delay-and-sum beamforming). The resulting boundaries are mainly a limited dynamic range and the limitation to free field environments. Although a wide range of algorithms for advanced evaluation has been developed, only few of them are integrated in industrial systems. This is mainly due to the fact that these algorithms require considerably longer computation time, expert knowledge and the integration of additional hardware.

This paper presents techniques for almost real-time processing of microphone array data including multiband beamforming, coherence/incoherence filtering and the integration of measured source characteristics for the application in strongly reverberant environments. By combining the signals of multiple cameras it is possible to detect the distance between the array and a threedimensional source distribution increasing the accuracy of the localisation and quantification.