ICA-based Technique in Air and Bone-Conductive Microphones for Speech Enhancement

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Abstract

How to obtain clean speech signal in noisy environments is a crucial issue for improving the appeal of mobile phones. This paper proposes to supplement the existing normal airconductive microphone with a bone-conductive microphone for noise reduction. We propose to apply the ICA (Independent Component Analysis)-based technique to the air and bone-conductive microphone combination for speech enhancement. The speech signal output by the bone-conductive microphone has the advantage of very high SNR, which well supports the generation of a clean speech signal in combination with a normal microphone. We evaluate this method by a Japanese digital recognition system. The results confirm that the proposed method can allow a mobile phone to obtain a clean speech signal even if the background noise is relatively high.