Abstract: Extension of DUET for Blind Separation of Speech Signals in Reverberant Environments

Tae-Jun Lee, Minook Kim, and Hyung-Min Park*
Department of Electronic Engineering, Sogang University, Seoul, 171-742, Republic of Korea
{taejun28, min8328, hpark}@sogang.ac.kr

Abstract

A method for blind separation of speech signals based on degenerate unmixing and estimation technique (DUET) in reverberant environments is described. Because the conventional DUET estimates only a pair of relative attenuation and time-delay parameters over all frequencies for a source by assuming delayed mixing, it may not successfully separate reverberant mixtures when these parameters vary with frequency. In this paper, we propose a method for separating reverberant mixtures by estimating frequency-dependent parameters for each source. In order to estimate accurate parameters, we employ the Linde-Buzo-Gray (LBG) algorithm to initialize the parameters with limited data at each frequency bin, and we derive online update algorithms of the parameters for convolutive mixtures. In addition, the permutation problem is involved because the estimation is performed separately in each frequency bin, so we also introduce a permutation alignment method based on correlations of spectral envelopes. Experimental results verify the effectiveness of the proposed method in reverberant environments.

Acknowledgements

This research was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology of Korea (No. 2010-0025703).