Warped Discrete Cosine Transform-Based Noisy Speech Enhancement

Abstract

In this paper, a warped discrete cosine transform (WDCT)-based approach to enhance the degraded speech under background noise environments is proposed. For developing an effective expression of the frequency characteristics of the input speech, the variable frequency warping filter is applied to the conventional discrete cosine transform (DCT). The frequency warping control parameter is adjusted according to the analysis of spectral distribution in each frame. For a more accurate analysis of spectral characteristics, the split-band approach in which the global soft decision for speech presence is performed in each band separately is employed. A number of subjective and objective tests show that the WDCT-based enhancement method yields better performance than the conventional DCT-based algorithm.

**Index Terms**—Discrete cosine transform (DCT), frequency warping control parameter, Laguerre filter, speech enhancement, split-band global soft decision, warped DCT (WDCT).