Robust ASR Systems using Auditory Filter in Impulsive Noise Environment

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Abstract

This paper is dedicated to the development of new automatic methods for recognizing of isolated words with impulsive sounds. This article presents a parameterization technique of speech signal with impulsive noise based on auditory filter modeling by the gammachirp filterbank (Gammachirp Filter Banc (GFB). This work includes two parts; the first is devoted to traditional techniques. The second deals with modern methods incorporating a model of auditory filter called gamma chirp. In this section, we will extract the characteristics of a single word with impulsive noise from the TIMIT database using parameterization technique Perceptual Linear Preduction( PLP) with the GFB. The recognition system is implemented on Hidden Markov Model Toolkit HTK platform based on HMM. For evaluation a comparative study was operated with standard PLP and Mel Frequency Cepstral Coefficient (MFCC). We propose a study of the performance of new parameterization technique GFB_PLP and GFB_MFCC proposed in the presence of different impulsive noises. Three types of impulsive noise are used (blast door, glass breaks, and explosion) Tests were carried out at different SNR levels (15dB, 10dB, 5dB, 0 dB and -3 dB) The GFB –PLP technique give the better results in different tests.
References


Index Terms

Computer Science

Signal Processing

Keywords

Mfcc, plp, gfb mfcc, gfb plp