

Frequency-Based Analysis for the Characterization of the Dysphonic Voices

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Abstract

Since several years, many studies have focused on the objective measurement-analysis for dysphonic voice assessment, proposed as an alternative to the perceptual evaluation [5] that is extensively used by clinicians. In most cases, these studies describe classification systems, based on acoustic, physiological and/or aerodynamic parameters, in order to improve the performance and to help clinicians to make their decision [7][3][6].

A few studies have been dedicated to the analysis of dysphonia effects on the speech signal [4][8]. Indeed, if an expert is able to assess a dysphonic voice according to a quality scale (Hirano's GRBAS scale [2]), it is more difficult for him/her to bring acoustic justification for his/her choice. As dysphonia is essentially related to the vocal source, most of the studies focus on parameters directly linked to this vibrator (FO stability, intensity, harmonics to noise ratio...). Other studies are related on the global timbre of the voice, assuming that the acoustic characteristics of dysphonia are distributed uniformly on the whole spectrum. One of the originality of this paper is to investigate the characteristics of dysphonia in the frequency domain, especially by studying relating phenomena through a subband analysis. The second originality is to rely on an automatic system dedicated to the dysphonic voice classification and derived from the Automatic Speaker Recognition technology [1].

This system should permit to analyse the relevance of frequency subbands for the dysphonic voice characterization. Experiments demonstrate that low frequencies [0-3000]Hz are more relevant for dysphonia discrimination compared with higher frequencies.

1. References

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