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Application of the Bionic Wavelet Transform and Psycho-Acoustic Model for Speech Compression

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Abstract : In this paper we propose a new speech compression system based on the application of the Bionic Wavelet Transform (BWT) combined with the psychoacoustic model. This compression system is a modified version of the compression system using a MDCT (Modified Discrete Cosine Transform) filter banks of 32 filters each and the psychoacoustic model. This modification consists in replacing the banks of the MDCT filter banks by the bionic wavelet coefficients which are obtained from the application of the BWT to the speech signal to be compressed. These two methods are evaluated and compared with each other by computing bits before and bits after compression. They are tested on different speech signals and the obtained simulation results show that the proposed technique outperforms the second technique and this in term of compressed file size. In term of SNR, PSNR and NRMSE, the outputs speech signals of the proposed compression system are with acceptable quality. In term of PESQ and speech signal intelligibility, the proposed speech compression technique permits to obtain reconstructed speech signals with good quality.

Keywords : speech compression, bionic wavelet transform, filterbanks, psychoacoustic model
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