

Evaluation of Features Extraction Algorithms for a Real-Time Isolated Word Recognition System

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Abstract : This paper presents a comparative evaluation of features extraction algorithm for a real-time isolated word recognition system based on FPGA. The Mel-frequency cepstral, linear frequency cepstral, linear predictive and their cepstral coefficients were implemented in hardware/software design. The proposed system was investigated in the speaker-dependent mode for 100 different Lithuanian words. The robustness of features extraction algorithms was tested recognizing the speech records at different signals to noise rates. The experiments on clean records show highest accuracy for Mel-frequency cepstral and linear frequency cepstral coefficients. For records with 15 dB signal to noise rate the linear predictive cepstral coefficients give best result. The hard and soft part of the system is clocked on 50 MHz and 100 MHz accordingly. For the classification purpose, the pipelined dynamic time warping core was implemented. The proposed word recognition system satisfies the real-time requirements and is suitable for applications in embedded systems.

Keywords : isolated word recognition, features extraction, MFCC, LFCC, LPCC, LPC, FPGA, DTW

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