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Evaluation of TI TMS320C6748 Kit for Pitch Detection in Speech Therapy.

ABSTRACT - Masterthesis

Voice is one of the fundamental means through which gender is expressed. The vibration frequency of the ligaments when pronouncing voiced sounds, called Pitch or Fundamental frequency F0, which varies quite largely between people (male and female) and also, from one person to the other. Todays speech therapy is demanding support to optimize compliance of their patients, eg: transgender patients, in whom there is a discrepancy in the voice they possess and the gender they experience, which leads to low self-esteem in individuals and also, invites societal stigma. To overcome this, trans individuals adopt various surgical and hormonal voice modification strategies. These strategies must be followed by voice training through trained SLPs, who assist them to adopt their voice to the desired pitch. Pitch trackers play an important role in voice training and also, helps an individual to monitor the pitch on their own after the training sessions. They act as a supporting companion to notify them, when their fundamental voice frequency falls back to origin.

But, detecting pitch or fundamental frequency is a complex task from the technological point of view, because of the quasi-periodic nature of the speech signal. Although, number of algorithms have been developed in the recent past, development of an accurate, reliable and dedicated pitch tracker is still an active topic of research.

The main objective of this thesis is, an attempt to evaluate a robust and efficient algorithm for pitch detection, called YAAPT (Yet Another Algorithm for Pitch Detection) on TI's DSP TMS320C6748 LCDK, as a companion for transgender patients.

YAAPT uses hybrid approach, based on NCCF (Normalized cross-correlation function) of Temporal and SHC of Spectral domain. The significant advances involve: Voice recording, Pre-processing of the recorded voice signal by creating two different versions of the signal, Voiced/Unvoiced decision, Estimating F0 candidates from the signals in time domain and frequency domain, Dynamic programming to decide the best pitch track.