Bhaskara Rao Budiredla, Real-time implementation of spectral subtraction for enhancement of electrolaryngeal speech, M. Tech. Thesis, Department of Electrical Engineering, Indian Institute of Technology Bombay, 2005.

Supervisor(s): P. C. Pandey

Abstract **-** Laryngeal cancers often necessitates complete surgical removal of the larynx, and thus it results in loss of the natural voicing source for speech production. The transcervical electro larynx is a prosthesis meant to provide vibrations for alaryngeal speech production. The main problem with this device is background noise generated by the device itself. Earlier work on the suppression of the background noise has shown that pitch synchronous application of spectral subtraction with quantile based noise estimation gives best results. The objective of this project is to implement a real time system in which the noisy sound is picked up by a microphone, processed for the removal of the background noise, and output through a speaker. Implementation has been done using a DSP board based on a 32-bit processor TMS320C6211. Offline processing has shown that at least 55 frames should be used in quantile based spectral subtraction for effective suppression of noise. Because of processing speed constraints, number of frames for dynamic estimation of noise is limited to 8, and phase spectrum during re-synthesis has been taken as zero. Real-time implementation provided a significant reduction without much noticeable speech degradation. However, optimization in program code and use of a faster processor may help in enhancing the noise reduction.