

B. N. Ashok Baragi, A speech training aid for the deaf, M. Tech. Thesis, Department of Electrical Engineering, Indian Institute of Technology Bombay, 1996.

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**Abstract** –Providing a visual feedback of various speech parameters, can help deaf children in learning to produce intelligible speech. A training aid of this type can also have a provision for comparing the speech parameters of teacher with that of the person being trained.

Earlier efforts at IIT Bombay have resulted in a training aid which estimates and displays vocal tract shape, pitch, and energy in real time. In this project, this aid was tested for accuracy. Various curve fitting algorithms for smoothing the vocal tract area, were examined for their suitability for real-time implementation. After selection of a suitable algorithm, the same was implemented in real-time. The software of the aid was modified to freeze the vocal tract shape during stops to the shape just before the stops period, thereby eliminating the random vocal tract shape during this period.

A PC add-on DSP board based on TMS320C25 is used for acquiring and processing the speech signal. A PC/AT, based on 80286 processor is used for providing the user interface and for displaying the parameters. The fast data transfer between DSP and the PC is through a shared memory space on the DSP board. The system also provide facilities for storing the parameters for 100 frames (equivalent to 1.28 s) and displaying them either in review mode or as an “areagram”, a two-dimensional representation of variation of vocal tract area, (from glottis to lip) with time.

The system was tested for accuracy and for consistency of energy, pitch, and vocal tract shape estimation with both synthetic and natural speech and results were satisfactory.