

Chapter 6

Analysis of Results

6.1 Comparison of methods used

The speech analysis methods such as spectral, neural network and formant estimation for normal speakers and for hearing impaired speakers developed through several stages of improvements finally give accuracies as shown in Table 6.1.

Vowel	Speaker Type	Method used		
		Spectral Method	Formant Estimation	Neural Method
/a:/	Normal	100	97.50	90
	Hearing Impaired	88.89	75.56	64.44
/æ/	Normal	96.55	89.66	100
	Hearing Impaired	90.91	81.82	84.09
/u:/	Normal	97.37	97.37	94.74
	Hearing Impaired	86.05	76.44	55.81
/o/	Normal	100	93.75	78.13
	Hearing Impaired	88.37	67.44	60.47
/eI/	Normal	97.22	91.67	97.22
	Hearing Impaired	83.72	76.74	86.05

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Table 6.1. Percentages of Accuracies of Test Results

According to Table 6.1 it is evident that the spectral method gives the best percentages of accuracies.

6.2 Comparison of results obtained

For /a:/ sound, spectral method gives the best results for both normal and hearing impaired speakers.

For /æ/ sound, neural method gives the best accuracy for normal speakers and spectral method gives best accuracy for hearing impaired speakers.

For /u:/ sound, both spectral method and formant estimation method give the best results for normal speakers and spectral method shows best results for hearing impaired speakers.

For /o/ sound, spectral method gives the best results for both normal and hearing impaired speakers.

For /eI/ sound, both spectral method and neural method give the best results for normal speakers and neural method shows best results for hearing impaired speakers.

6.3 Method selected for Speech Trainer

According to the comparison of the results of the three methods, spectral method shows the best performance and it is used to develop the speech trainer.

6.4 Possible improvements to Formant Estimation Method

In the coordinate system using f_1 and f_2 , vowels lie in specific regions. The vowel loci correspond to each vowel have different shapes.

Results obtained in formant estimation method can be further improved because the areas defined in the analysis are very loosely selected. Those areas can be minimized to some odd shapes with the use of a large number of speech samples. Then it is required to derive mathematical formulas for those vowel loci.

6.5 Possible improvements to Neural Network Method

Results of the neural method can be improved by considering some more combinations for activation functions. The values of 'a' and 'b' can be changed and it is also possible to use unipolar or bipolar combinations to hidden and output layers.

