Distinctive Feature Analysis of Bengali Consonants

Sourav Mukhopadhyay
Student, A.I.I.S.H., Mysore.

Language is a composite set of words, words of sounds or phoneme and phonemes of features which are distinctive from each other. An explicit simple sound is thus composed of several parameters which can be seen in the form of features which descrive it. These featres which provide us the information about the various distinction between these speech sounds are called distinctive features. In essence the distinctive features can be thus referred to as the 'building blocks of the phoneme'.

Distinctive features are now considered to be the psychologicla and physical realities of a phoneme (Singh, 1976). This definition thus clearly brings to light two aspects of the features, the perceptual and the acoustic.

The establishment of a distinctive features system has been achieved by various methodologies, such as perceptual method, articulatory method, acoustic method and by using computer.

The present study aimed at establishing a distinctive features system of Bengali consonants. 339 word pairs were prepared such that there was at least one feature difference between the two consonants of the word pair. Perceptual and acoustic analysis were carried out to establish the features.

Perceptual analysis was carried out in two stages, Part I & Part II;

Part I: The word pairs were presented to a group of 30 subjects (individually) who were native speakers of Bengali. Subjects had to speak out what they heard andthese responses were recorded for further analysis.

Part II : The same stimuli were presented to a group of 30 Non-Bengali speakers (Tmil Speakers) and their responses were recorded.

The perceptual data was anayzed using confusion matrices an by calculating the information content of each feature.

32 words were analyzed spectrographically to observe the acoustic characteristics of each feature.

The following conclusions were drawn from the study :-

1. It is possible to propose a distinctive features system in Bengali based on phonetic description of Bengali language.
2. Consonants in Bengali are made up of te following features a) voicing b) nasality c) continuant d) anterior e) coroal f) stridency g) aspeiration.
3. Information carried by each feature differs.
4. Each feature has distinctive acoustic characteristics.
5. Significant difference were found betwen the listening performance of Bengali and Non-Bengali speakers when the word pairs were presented in a quite situation.

Implications :

1. The distinctive features system thus established gives an indepth analysis into the phonology of Bengali.

2. The distinctive features system can be used to study the phonological acquisition of Bengali in children, to assess articulation disorders and in planning articulation theapy.

3. Distinctive feature discrimination tests can be developed for audiological testing (speech discrimination).

4. An articulation drill book in Bengali can be prepared based on this.

5. It can be used to improve the telecommunication system for transmission in Bengali.

6. It can be used in the development of speech synthesizer.

7. It can be used to study the perception of individuals who are both normal and hard of hearing.

8. It can be used in studying automated speech recognition.

Recommendations :

As evidence accumulated to support the distinctive feature approach in general, one need to bear in mind that there are still significant issues that remain unresolved.

1. Is there an universal set of distinctive features?

2. Is there an universal feature hierarchy?

3. Areall features binary?

4. Which is the optimal level(s) for specifying the features (articulatory, acoustic, perceptual)?

These and other important questions are still open to debate. So further studies should be done to give answer for whese unresolved questions and make it a powerful tool in clinical work.

Further study can be done on :

1. Substitution analysis, that is which of the features are substituted by te other features.

2. An articulation test in Bengali can be developed on the basis of the established distinctive feature system.

3. Distinctive feature system for vowels in Bengali.

4. Distinctive features can be established using different methodology.