

A COMPUTER-AIDED PHONETIC INSTRUCTION SYSTEM FOR SOUTH-ASIAN LANGUAGES

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ABSTRACT

A set of Hypercard stacks for Macintosh that explains and illustrates the sound system of South Asian languages is described. Some of the specific phonetic features of these languages are presented. This is followed by an illustration of the system. The system is built using Hypercard 2.2 using all the standard features like buttons, fields, sound resources etc. The system is expected to be useful in understanding the sound pattern of these languages as well as in teaching of pronunciation of South Asian languages.

INTRODUCTION

Languages belonging to four major families are spoken in South Asia. The families are Indo-Aryan, Dravidian, Tibeto-Burman and Austro-Asiatic. In addition there are a couple of unaffiliated languages also spoken in this area. Though the languages across the linguistic families differ in their genetic affiliation, they share several features in their phonetics, phonology, grammar and semantics. The purpose of the system described in this paper is to provide a facility for accessing information about the phonetic features of the languages in the area and for teaching and learning of pronunciation of the sounds of these languages. This paper is divided into two parts: the first part describes the salient features of the phonetic system of these languages and the second part presents the details of the Computer-Aided Instruction system developed for phonetic instruction of these languages.

PHONETIC FEATURES OF SOUTH-ASIAN LANGUAGES

1. Places of Articulation: Following are some of the distinctive places of articulation that require some discussion among these languages.

Retroflexion: Retroflex sounds are used prominently in these languages. Though retroflex sounds are available in some non-South Asian languages, the use of retroflex sounds is predominant in South Asian languages. Furthermore, various manners of articulation are used in producing retroflex sounds. In all the Dravidian languages we get voiced and voiceless retroflex stops, voiced retroflex nasal, voiceless retroflex fricative, voiced retroflex lateral. In addition, in Tamil and Malayalam we get a voiced retroflex approximant – these are the only two languages that possess this sound in this area. However, following the general phonological pattern of their own, in Tamil and Malayalam the voiced and voiceless retroflex stops are mostly allophonic. In all these languages, in intervocalic position, a voiced retroflex stop is allophonically a flap. Some speakers of Hindi and Urdu maintain a contrast between a flap and a stop in intervocalic position [1].

Among the Indo-Aryan languages too we find retroflex sounds are available with various manners of articulation. However, Assamese is the only exception which does not use retroflex sounds. Typically, in Indo-Aryan languages we get retroflexed voiceless unaspirated stops, voiceless aspirated stops, voiced stops, murmured stops, voiced nasal, and voiceless fricative. However, a voiceless retroflex fricative is found only in allophonic variation (before a retroflex stop or nasal) in Oriya. A retroflex voiced lateral is found in Sinhalese, Gujarati,

Marathi and Oriya. Though all these sounds can be grouped under retroflexes, some differences are found in the amount of retroflexion and extent of the upper articulator among these languages [2]. Hindi uses the area just behind the alveolar ridge whereas in Malayalam the tongue is curled so that the underside of the apex touches the hard palate.

Dental-to-Palato-Alveolar Area: The typical range of places of articulation generally found in a majority of the languages of the sub-continent is from labial to velar. Thus we find labial, dental, retroflex, palatal, velar distinction in most of the Indo-Aryan languages and Dravidian languages. However, as pointed out earlier, Assamese does not use the retroflex place of articulation. Urdu uses an extra place of articulation viz., Uvular. Malayalam and Toda show maximal range of places of articulation. Ignoring Labial and Velar places of articulation, we find Malayalam using 4 places (dental, alveolar, retroflex, palato-alveolar) and Toda using 5 places (Dental, Denti-Alveolar, Alveolar, Retroflex, Palato-Alveolar) [3].

2. Manners of Articulation: The most commonly found manners of articulation in South Asian languages are: stops, affricates, fricatives, trills, approximants, laterals, nasals. Among fricatives, it is mostly the voiceless varieties that are encountered in these languages -- however, Urdu has voiceless and voiced sets of fricatives contrasting at two places of articulation (/s/ and /z/; /x/ and /ɣ/). Most of these languages have a trill sound which allophonically varies with a tap in intervocalic position. Malayalam, however, has two trills, one more advanced than the other. As mentioned earlier, retroflex voiced sounds are flapped when they are intervocalic -- usually we find a stop, a nasal and a lateral possessing this kind of allophones.

3. Airstream and Phonation: Pulmonic egressive airstream is the major airstream used in most of these languages. However, Sindhi has a series of voiced plosives produced by glottalic ingressive airstream. A majority of Indo-Aryan languages have contrasts involving voiceless unaspirated, voiceless aspirated, voiced unaspirated and murmured (conventionally known as voiced aspirate) plosives. Panjabi has the first three categories. Gujarati also shows contrasts between

murmured and plain-voiced vowels. Tibeto-Burman languages also generally have plosives of the first three categories. Among Dravidian languages, Tamil and Malayalam do not possess aspirated stops. In both these languages, voiced stops do not contrast with voiceless ones -- they are available at allophonic level. Some of the Tibeto-Burman languages (e.g., Angami) show a distinction between voiced and voiceless nasals, trills, and laterals. Consonantal length is also phonemic in several of South-Asian languages.

4. Vowels and Accent: Among Dravidian languages all vowels contrast for length. In Indo-Aryan languages length contrast is found only in the high vowels. In addition, their long-short vowels also possess some qualitative differences. Nasalized vowels are found in some of the Indo-Aryan languages. Among non-Tibeto-Burman languages, Panjabi has contrastive pitch accent. Other Indo-Aryan languages as well as Dravidian and Austro-Asiatic languages do not contain tonal contrasts. Tones are predominantly used in Tibeto-Burman languages -- ranging from minimal distinction in Manipuri to extensive differentiation in Mizo etc. Shina exhibits a contrast for stress accent [4].

THE CAI SYSTEM

UCLA "Sounds of the World's Languages" Hypercard stacks are built to cater to the world's languages in general [5]. The aim of the present system is to take into account the phonetic features of South Asian languages in more detail.

This Computer-Aided Instruction (CAI) system is built using Hypercard version 2.2. The two main components of the system are: cards and sound stacks. The cards are used for explaining various aspects of phonetics of the languages and the sound stacks contain illustrative sound samples. The system is built using the standard features of Hypercard viz., buttons, fields, backgrounds etc. A button that contains a word is also a clickable sound button -- by clicking on it, the respective word is played. The system gives access to the following types of information: description of general phonetic features of the languages; details of a particular phonetic feature across languages; phonetic features of a particular language. Sound samples are recorded in good recording conditions from the speech of native speakers of respective languages.

As an illustration of the first type, we can take the feature of Retroflexion among South-Asian languages. By recalling this feature the users get a general description of the nature of retroflex

sounds in these languages. The user can locate further references to works on a feature. Fig. 1 shows a card that illustrates this feature.

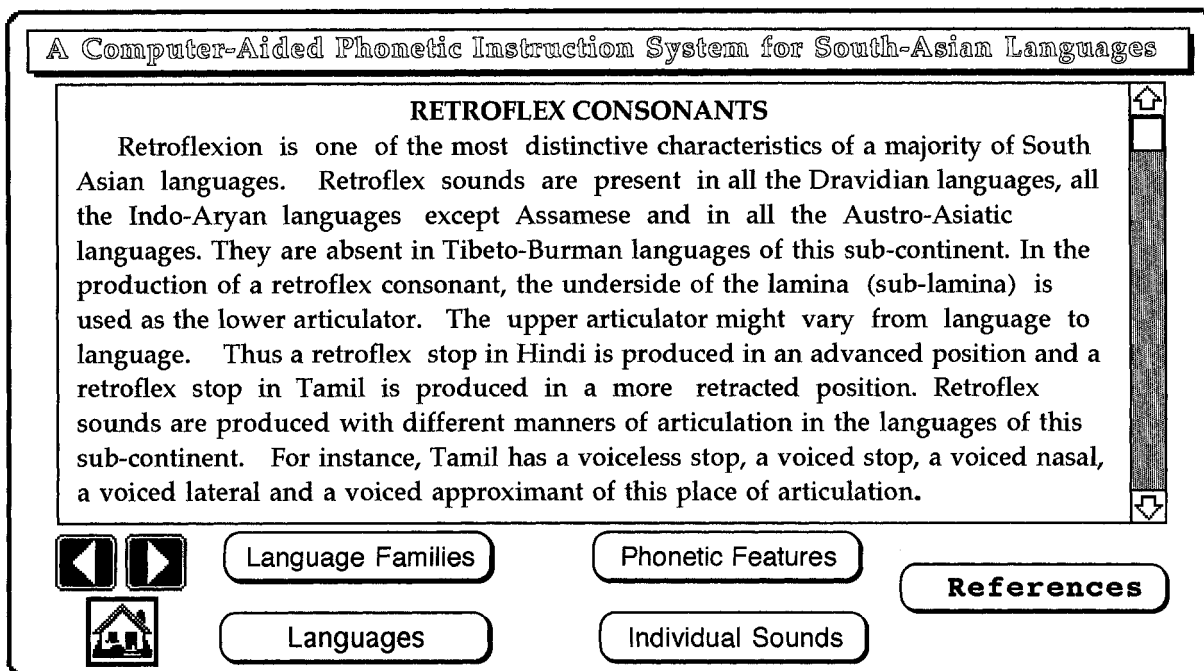


Fig. 1: A Sample Card of Description of Phonetic Features

Users can choose to listen to sample words containing a particular feature from across these

languages. Fig.2 gives an example of such a card.

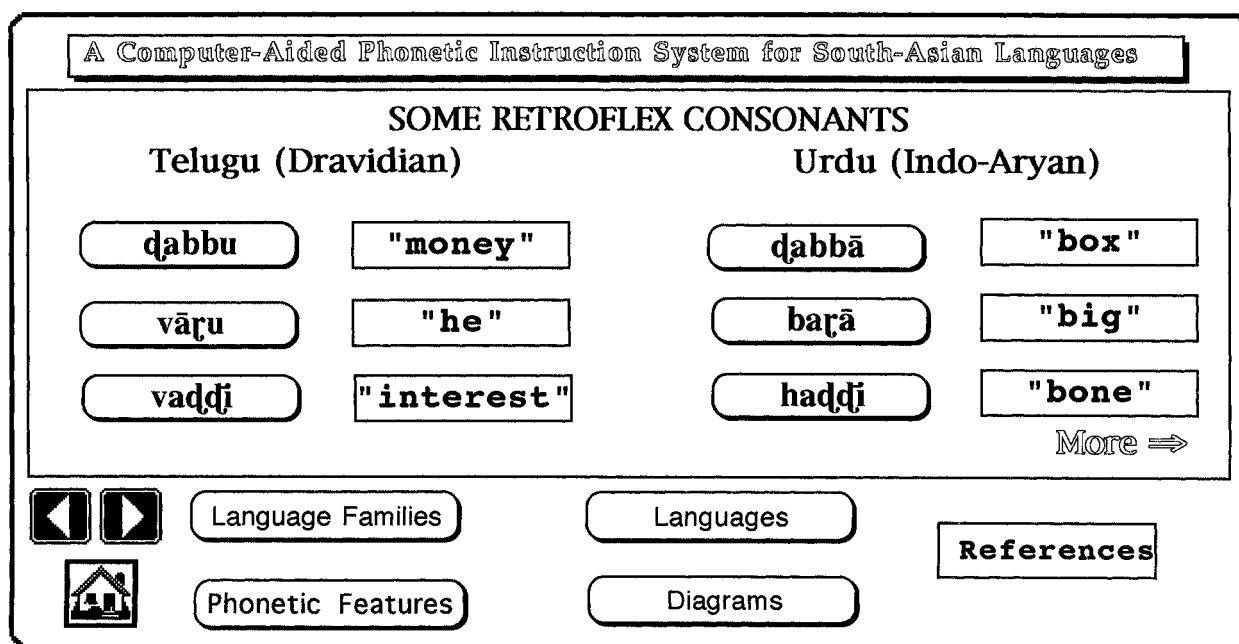


Fig. 2: A Sample Card of Sound Demonstrations

Fig.3 illustrates a card that gives the description of specific phonetic features of a particular language.

A Computer-Aided Phonetic Instruction System for South-Asian Languages

TODA CONSONANTS

	Labial	Dental	Denti-Alv.	Alv.	Retro-flex	Palato-Alv.	Velar
Vless. Stop	p	t̪	ts	t̪	ʈ	tʃ	k
Vd. Stop	b	d̪	dz	d̪	ɖ	dʒ	g
Fricative	f	θ	s̪	s̪	ʂ z̪	ʃ ʒ	x (ɣ)
Approximant						j	w
Lateral				l̪ l	ɭ ʎ		
Nasal	m			n̪	ɳ		
Trill			r̪	r̪	ɽ		

For Individual series of Consonants go to Next Card ⇒

Language Families

Phonetic Features

Toda Vowels

Languages

Individual Sounds

References

Fig. 3: A Sample Card of Phonetic Description of Individual Languages

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