

Workshop on Sound Change

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Barcelona, Spain: 21-Oct-2010 - 22-Oct-2010

A statistical study of Pronunciation Variation of Schwa in Portuguese

Abstract

This work deals with the realization of the schwa [ɨ] (SAMPA: [ə]) in European Portuguese spoken language, using analysis methods deriving from speech recognition. Our approach is based on a combination of pronunciation variation arising from coarticulation properties, and word-based phonetic sequences [4].

The used data for this study is the Tecnovoz corpus [1], from which we examined 22,627 utterances (about 31.5 hours of speech).

Speech database are analyzed to point out the occurrence of schwa presence vs. schwa deletion (i.e., schwa alternation with zero ([∅])) and of the schwa that alternates with a full vowel as [i] - some examples are shown below. Such analyses generate statistics about the frequency of occurrence of (multi)realizations of schwa (for which we are also proposing the term 'pronunciation variation' of schwa).

By proposing to analyze these (multi)realizations of schwa, we evaluate several immediate issues with respect to schwa characterization, such as the phonological status of [ə] [2], [3], or the empty syllabus nucleus [5].

Taking all these topics into account, we may pose the following questions. Can we have a number of features that may have a potential effect on the propensity to delete schwa? Has the schwa a really orthographic form? What stress environment (stress, pre-stress, post-stress) plays a mayor role in the alternated realization of schwa?

This work has three main purposes: i) to extend the study of the realization of schwa in Portuguese; ii) to present phonetic information on Portuguese spoken language in statistical form, which complements the traditional approach; and iii) to argue that taking account (multi)realizations of the [ə] can further improve automatic speech recognition systems.

This study of schwa in the phonetics sciences provides a challenge to the spoken Portuguese as well as to the speech processing technology.

Some examples of schwa realization:

Schwa alternation types	Phonetic form	Orthographic form
[ə][∅]	m u L E r [ə][∅] S	mulheres (women)
	d [ə][∅]	de combates ferozes (of fierce fight)
	k o ~ b a t [ə][∅] S	
	f [ə][∅] r O z [ə][∅] S	
[ə][i][∅]	[ə][i][∅] S t i m u l a r	estimular (to incite)

References:

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