Listener: a Pronunciation System for Brazilian-accented English

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Abstract

Recent surveys have shown that Brazil is among the countries with the lowest knowledge of the English language. In Education First's *English Proficiency Index* (2012), for instance, Brazil ranked 46th out of 54 countries. In GlobalEnglish (2013), Brazil achieved a similar position, being ranked as 71nd of 77 positions in what concerns to Business English Proficiency. This project aims at developing a tool for improving these indexes. The goal is to build up an ASR-based Pronunciation System for Brazilian Portuguese (BP) speakers English L2 learners. The Pronunciation System proposed herein, called *Listener*, will be able to provide online feedback regarding the pronunciation of the user. Similar tools are available for other languages (Tsubota et al. 2004; Genevalogic, 2006; Strik et al., 2008; Neri et al., 2008; Reis & Hazan, 2011), however, for BP, there is still a gap to be explored. The research hypothesis states that it is possible to build up an efficient Pronunciation System through: (i) an error classification that takes into account phonetic and phonological transfer from L1 to L2, (ii) an acoustic model that contains speech data from both native speakers and English L2 learners, (iii) a pronunciation dictionary which includes the transcription of the mispronunciations that learners are likely to make, and (iv) a language model befitting the syntax of the learner. Ten mispronunciations will be selected and processed by the *Listener*, according recent literature in english pronunciation teaching for native brazilian speakers (Godoy et al., 2006; Zimmer et al., 2009; Cristófaro-Silva, 2012). The General American (GA) will be considered the standard accent. The engine *Julius* (Lee & Kawahara, 2009) is used as the basis of the recognizer. The acoustic model will be built up based on two speech corpora, one containing data of native English speakers: *TIMIT Acoustic-Phonetic Continuous Speech Corpus*[1], and another of English L2 learners: *COBAI - Corpus Oral Brasileiro de Aprendizes de Inglês*[2]. *VoxForge Speech Corpus*' word list[3] will serve as the basis of the pronunciation dictionary. The transcription of the mispronunciations of the learners will be added to the dictionary, manually, by transformational rules and, automatically, by machine learning algorithms, such as *Transformation-Based Learning* (Brill, 1995). The language model will be compiled over 99,508 articles from Simple English Wikipedia. Word Error Rate (WER), Character Error Rate (CER) and confusion matrices will be the measurements used to evaluate the performance of the recognizer. The Listener proposed herein aims at allowing the development of Computer-Assisted Pronunciation Training (CAPT) Systems for English.

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1 Available at: http://www.ldc.upenn.edu/Catalog/CatalogEntry.jsp?catalogId=LDC93S1.
2 To be available at: http://www.uclouvain.be/encecllindsei.html.
3 Available at: http://www.repository.voxforge1.org/downloads/SpeechCorpus/Trunk/Lexicon/.

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