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Modeling Liaison in French for Pronunciation Teaching Applications

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Abstract

Being able to verbally communicate well in a second language is a desirable skill for living in the globalized world of the Twenty-First Century. However, developing such skill for a foreign language like French is normally a difficult learning process. One of the main difficulties is due to its pronunciation, since the written and the spoken French are not the same. Isolated graphic words not only have a “weak” correspondence with their phonetic transcriptions, but depending on their context, some words may have their ordinary lexical pronunciations affected by the insertion of a consonant sound at the end. This phenomenon is technically known as *liaison in French*, or simply *liaison*.

Liaisons are classified according to their context into obligatory, forbidden or optional. Obligatory liaisons stand for contexts where a consonant of liaison is expected to be pronounced, while forbidden contexts are those where a final graphic consonant should not be pronounced. Additionally, optional contexts of liaison are those where the pronunciation or not of such consonants are both acceptable.

Learning these French pronunciation difficulties could be facilitated by the use of a pronunciation teaching system specialized in phonetics of French language. Naturally, the more progress is observed in automatic text-to-speech synthesis systems, the more useful this technology may become for second language education.

Nevertheless, the phonological complexities of French language are still a challenge for automatic grapheme-to-phoneme converters. Particularly, liaison is identified as one of main causes of these phonetic conversion errors. Automatic converters use manually generated rule-based approaches for modeling liaison, whose sets of rules are large in number, complex and difficult to give maintenance. As a consequence, their outputs still have a considerable number of liaison errors, making them inadequate to appropriately meet the high level of requirements necessary for a phonetic teaching application.

For this reason, aiming to produce more reliable grapheme-to-phoneme conversions for the basis of a French phonetic teaching system, we propose a new approach for modeling liaisons. Basically, we investigate how efficiently liaisons and other rule-based word final consonant pronunciation variabilities can be modeled using C4.5 decision trees, since we contemplate that most of these linguistic phenomena can be identified by categorical attributes and values for each context. These features are then used for populating a liaison database necessary for training and inducing decision trees.

The technical efficiency of our method was investigated regarding two aspects: 1) classification of liaison contexts and 2) consonant prediction in obligatory contexts. The results show that our method reduced 52% of the obligatory context classification errors in comparison with a commercial speech synthesizer. On top of that, an error reduction of 53% regarding consonant prediction in obligatory contexts was also observed. Our method shows that the use of decision trees for predicting the linguistic phenomena of liaison in automatic grapheme-to-phoneme converters can achieve better results than the previous method, enabling and opening horizons to the development of pronunciation teaching applications.