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Rhotics display a large amount of phonetic variation and consequently lend themselves to becoming sociolinguistic variables in many language varieties. However, even for trained phoneticians, the systematic distinction of the wide range of variants of /r/ remains a methodological challenge. Can AI replace the human transcriber and provide fast and accurate phonetic transcriptions? The data set used for training and testing are selected from a study of variation and change in the pronunciation of /r/ in Flanders, the Dutch speaking part of Belgium (Tops 2009, Van de Velde et al. 2013). The 1904 speakers are stratified for age (2), gender (2) and locality (89). Each speaker pronounced 12 items containing the target variable and 8 distractors. 12 different variants of /r/ were distinguished.A first version of the RrecogniserR – our AI-based tool for the automatic classification of r-variants – was developed using machine learning techniques. In this pilot study we selected a pretrained multilingual wav2vec2 model (Facebook) on a 200ms fragment centered on /r/ as detected by forced alignment as the best performing method. We achieved nearly 70% accuracy in classifying 11 variants and 98% accuracy in determining place of articulation (front vs. back). Building upon these promising results, this follow-up research aims to improve classification accuracy through an extensive multifeature approach. We specifically investigate whether integrating four additional features leads to higher overall accuracy:Position in the word (onset vs. coda)Presence of a preceding or following /t/Manner of articulation of the variantPlace of articulation of the variantThe study will consist of two phases: first, we test whether the multifeature approach indeed results in increased classification accuracy across all variants. Subsequently, we analyze whether this method specifically improves the recognition of previously problematic variants.In our presentation we will also focus on the best-performing technique(s) and discuss issues such as data augmentation for low-frequency variants, optimal size and selection of training sets, different models, and the optimal extraction technique. We will also evaluate the performance of the improved RrecogniserR on other (i.e., not in the training set) words, speakers and localities/varieties.The results of this research will contribute to the further development of accurate transcription tools for the study of rhotics and may have broader implications for automatic speech recognition. Moreover, this study will provide insight into the relative contribution of various linguistic features to the automatic

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Title

A multifeature approach for the classification of rhotic variants using AI