Improvements for a German Vowel Trainer CAPT Tool

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The research proposes continued improvements to a prototype CAPT tool (Carroll et al., 2015) designed to improve German vowel pronunciation for L2 German learners. The CAPT tool functions as a listening and response exercise where L2 learners hear native German productions of selected vowels, and then record their own vowel productions. The tool incorporates a visual feedback tool which shows users a graphical representation of acoustic and durational information of their vowels alongside target values and examples from native speakers. The aim of the visual feedback is for users to identify how their vowel productions differ from standard pronunciation, and then to adjust their productions until they approximate the correct pronunciation. The previous prototype was a proof of concept, but offered limited functionality, thus in this poster presentation we consider the steps needed to implement a full featured system. Included in the presentation is a discussion of the following open questions: How to select a suitable corpus of training sentences? How to design the visual interface for maximum intelligibility by non phoneticians? And what sort of other feedback, training, or instruction is necessary for the system to achieve it's aim of improving L2 German vowel production?

The problem of selecting suitable training sentences will need to be evaluated from both a technical and pedagogic perspective. The technological challenge stems from the fact that vowels must be automatically recognized and extracted (F1/F2/duration) from the spoken sentences. Therefore carrier words should have the vowel in as neutral context as possible to improve accuracy from the system's algorithms. The pedagogic challenge is to find examples sentences which impress upon L2 learners situations where a mispronounced vowel drastically changes the meaning of a word or phrase (making it linguistically important).

When designing the visual feedback interface, we ask ourselves what kind of graphical representations of formant values and vowel duration are intuitive to the users. The prototype version plotted vowels in a 2-D space similar to the IPA vowel chart, with accompanying bars representing duration. In this presentation we discuss other alternatives such as using geometric shapes and color gradients to depict the vowel information.

The final open question seeks to address whether users can understand and benefit from a CAPT system with just the core functionality described, or if these users require further training and instruction. For example, should a meta-linguistic explanation be given of why vowel length and quality is important in German? And should users first train to perceive differences between similar German vowels, before they try to produce them on their own.

The poster presentation attempts to address these open questions, and show our current thoughts on best practices for continued development on the CAPT system.

References

Carroll, P., Trouvain, J., and Zimmerer, F. (2015). A visual feedback tool for German vowel production. *Proc. Elektronische Sprachsignalverarbeitung,* pages 150-157.