Automatic Speech Recognition and Feedback in Computer Assisted Pronunciation Training

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From the appearance of the first dictation applications, Automatic Speech Recognition (ASR) technology has been seen as a powerful instrument for processing speech and providing feedback on pronunciation. Over the years, this has generated an impressive amount of research aimed at evaluating ASR technology and its potential for language learning, at improving algorithms to realize more appropriate systems and provide better feedback, and at developing a whole range of research applications and commercial products.

In this presentation, I will focus on the use of ASR-based algorithms as a basis for providing feedback in the context of Computer Assisted Pronunciation Training (CAPT). First, some basic concepts will be defined, which are related to ASR, CAPT and feedback strategies in second language acquisition (SLA) research. Important ingredients for conducting research in this field and developing useful applications will be described.

I will then go on to consider how ASR technology has been employed in developing CAPT systems that provide automatic feedback on pronunciation. This review will cover both research systems and commercial products. Most research and development on this topic has been conducted by speech technologists, while the systems and applications developed are intended for language learning purposes. It is therefore interesting to examine the various approaches not only from the point of view of speech technology, but also from the angles of SLA research and language teaching. In reviewing systems and applications attention will be paid to the conceptualization of pronunciation adhered to, the level of accuracy attained in pronunciation error detection, and the advantages and disadvantages viewed from the different perspectives mentioned above. In this context relevant research conducted at our lab will be presented, focusing particularly on the potential of ASR-based CAPT systems as instruments for conducting innovative research on the role of feedback in pronunciation acquisition research.

Finally, still existing challenges to the use of ASR-based CAPT for providing effective feedback on pronunciation will be discussed, as well as current obstacles to its large-scale adoption. I will conclude by pointing out some interesting avenues of future research.