Computer-aided Language Learning: applications for bilingual education in early childhood

Helen Meng[1], Pauline Lee[2] and Virginia Yip[3]

[1]Director, Human-Computer Communications Laboratory; Co-Director, MoE-Microsoft Key Laboratory of Human-Centric Computing and Interface Technologies, Department of Systems Engineering and Engineering Management, CUHK
[2] Director, Independent Learning Centre, CUHK
[3] Director, Childhood Bilingualism Research Centre, Department of Linguistics and Modern Languages, CUHK

This paper presents an interdisciplinary project on computer-aided language learning (CALL) and explores its applications for bilingual education in early childhood. The integration of expertise from engineering, linguistics, speech science and second language acquisition enables us to develop an effective tool that complements traditional forms of language learning. The system developed by this project aims to offer a self-paced, private and independent environment for improving English pronunciation.

We present a research prototype system that incorporates automatic speech recognition technologies for computer-assisted pronunciation training. The system, known as CHELSEA, can perform mispronunciation detection and diagnosis of non-target features. The approach involves the development of a pronunciation lexicon that is augmented to include common non-target pronunciations made by CUHK students who are Cantonese learners of English. CHELSEA translates the recognition results into comprehensible feedback by highlighting mispronounced words and providing a phonetic transcription of both the model pronunciation and the learner's own pronunciation. Children who are introduced to suitably designed CALL at the appropriate stage will develop both computer skills and language learning, killing two birds with one stone. Teacher training in early childhood education can also benefit from the applications of CALL.