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Tan Lee is currently an Associate Professor at the Department of Electronic Engineering, the Chinese University of Hong Kong (CUHK). He has been working on speech and language related research for over 20 years. His research covers spoken language technologies, speech enhancement and separation, audio and music processing, speech and language rehabilitation, and neurological basis of speech and language. He led the effort on developing Cantonese-focused spoken language technologies that have been widely licensed for industrial applications. His current work is focused on applying signal processing and machine learning methods to atypical speech and language that are related to different kinds of human communication and cognitive disorders. He is an Associate Editor for the IEEE/ACM Transactions on Audio, Speech, and Language Processing and the EURASIP Journal on Advances in Signal Processing. He is the Vice Chair of ISCA Special Interest Group of Chinese Spoken Language Processing, and an Area Chair in the Technical Programme Committees of INTERSPEECH 2014, 2016 and 2018.

Deep Learning Approaches to Automatic Assessment of Speech and Language Impairment

Prof. Tan Lee

Speech is a natural and preferred means of expressing one's thoughts and emotions for communication purpose. Speech and language impairments are negatively impacting the daily life of a large population worldwide. Speech impairments are manifested in the aspects of atypical articulation and phonation, while language impairments could be present across multiple linguistic levels in the use of spoken or written language. Timely and reliable assessment on the type and severity of impairment is crucial to effective treatment and rehabilitation. Conventionally speech assessment is carried out by professional speech and language pathologists (SLPs). In view of the shortage of qualified SLPs with relevant linguistic and cultural background, objective assessment techniques based on acoustical signal analysis and machine learning models are expected to play an increasingly important role in assisting clinical assessment. This presentation will cover a series of our recent studies on applying deep learning models to automatic assessment of different types of speech and language impairments. The types of impairments that we have tackled include voice disorder in adults, phonology and articulation disorder in children, and neurological disorder in elderly people. All of our works are focused on spoken Cantonese. The use of Siamese network and auto-encoder model has been investigated to address the challenges related to the scarcity of training speech and the absence of reliable labels. The findings in attempting the end-to-end approach to speech assessment will also be shared.