Notice of the Final Oral Examination
for the Degree of Master of Applied Science

of

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BSc (Arab Open University, Amman, 2017)

“Articulation Modelling of Vowels in Dysarthric and Non-Dysarthric Speech”

Department of Electrical and Computer Engineering

Monday, May 11, 2020
1:00 P.M.
Remote Defence

Supervisory Committee:
Dr. Nigel Livingston, School of Public Health and Social Policy, University of Victoria (Co-Supervisor)
Dr. Mihai Sima, Department of Electrical and Computer Engineering, UVic (Co-Supervisor)

External Examiner:
Dr. Daniela Constantinescu, Department of Mechanical Engineering, UVic

Chair of Oral Examination:
Dr. Leslie Saxon, Department of Linguistics, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

People with motor function disorders that cause dysarthric speech find difficulty using state-of-the-art automatic speech recognition (ASR) systems. These systems are developed based on non-dysarthric speech models, which explains the poor performance when used by individuals with dysarthria. Thus, a solution is needed to compensate for the poor performance of these systems. This thesis examines the possibility of quantifying vowels of dysarthric and non-dysarthric speech into code words regardless of inter-speaker variability and possible to be implemented on limited processing-capability machines. I show that it is possible to recognize all possible vowels and vowel-like sounds that a North American speaker can produce if the frequencies of the first and second formants are used to encode these sounds. The proposed solution is aligned with the use of neural networks and hidden Markov models to build an acoustic model in conventional ASR systems. A secondary finding of this study includes the feasibility of reducing the set of ten most common vowels in North American English to eight vowels only.