

Good morning,
You are invited to attend our weekly ECE Graduate Seminar.

Old Dominion University
College of Engineering and Technology
Department of Electrical and Computer Engineering

All lectures to be held at 3:00pm on Fridays online at [ODU DL: ECE 731 831 Grad Seminar](#)

For more information, contact Dr. Chung Hao Chen at (757) 683-3475 or email cxchen@odu.edu.

Friday, November 12, 2021 Seminar Topic:

CONVOLUTIONAL NEURAL NETWORK FOR ECG-BASED VIRTUAL PATHOLOGY STETHOSCOPE TRACKING IN PATIENT HEART AUSCULTATION by Haben Yhdego, Ph.D. Candidate in the Department of Computational Modeling and Simulation Engineering at Old Dominion University

Abstract:

Cardiac auscultation (CA) is the auditory detection of heart sounds to diagnose abnormalities, a crucial skill that is both efficient and cost-effective in medical practice. However, due to the increased prevalence and usage of expensive cardiac technologies, many new physicians and trainees have difficulty performing essential cardiac examinations on their patients, particularly diagnosing abnormalities through auscultation using a stethoscope. A virtual pathology stethoscope is a simulation-based solution that trains students to perform cardiac examinations by listening to abnormal heart sounds in otherwise healthy standardized patients (SPs). This study reports the accuracy of an electrocardiogram (ECG)-based stethoscope tracking method for placing virtual symptoms in correct auscultation regions. A modified stethoscope head with two electrodes was used to pick up ECG signals at the four primary auscultation sites. A one-dimensional convolutional neural network (CNN) is then modeled to classify the location of the stethoscope by taking advantage of subtle differences in the ECG signals. A 91% accuracy was obtained, showing promising performance gain over previous methods. This finding would significantly extend the simulation capabilities of SPs by allowing trainees to perform realistic CA and hear CA in a clinical environment.



Bio:

Haben Yhdego is a Ph.D. candidate in the Computational Modeling and Simulation Engineering (CMSE) Department at Old Dominion University. He received MSc in Image processing and computer vision from Jean-Monet University, Saint-Etienne, France. His research interests include applying machine learning methods for wearable sensor signals, image analysis, and computer vision. He publishes some papers in IEEE and SpringSim-related to the application of machine learning methods to sensor signal datasets. His email address is hyhde001@odu.edu.