SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: https://cde.nus.edu.sg/ece

Area: Integrated Circuits & Embedded Systems

Host: Prof Heng Chun Huat

TOPIC	:	**An Energy Efficient ECG Ventricular Ectopic Beat Classifier Using Binarized CNN for Edge AI Devices**
SPEAKER	:	**Mr David Wong Liang Tai** **Graduate Student, ECE Dept, NUS**
DATE	:	**Monday, 18 April 2022**
TIME	:	**10.00AM to 11.00AM**
WEBINAR	:	**Join Zoom Meeting** **https://nus-sg.zoom.us/j/4035657856?pwd=bFY0dnJleHJNeUpYd2x6amVvSmpCUT09** **Meeting ID: 403 565 7856** **Passcode: 079445**

ABSTRACT

Cardiovascular diseases (CVD) remain as the leading cause of death according to the World Health Organization. Early detection of CVD via continuous vital signs monitoring and preventive healthcare management could potentially reduce complication and cost. Wearable Artificial Intelligence-of-Things (AIoT) requires edge devices to be resource and energy-efficient. In this paper, we design and implement an efficient binary convolutional neural network (bCNN) algorithm utilizing function-merging and block-reuse techniques to classify between Ventricular and non-Ventricular Ectopic Beat images. We deploy our model into a low-resource low-power field programmable gate array (FPGA) fabric. Our model achieves a classification accuracy of 97.3%, sensitivity of 91.3%, specificity of 98.1%, precision of 86.7%, and F1-score of 88.9%, along with dynamic power dissipation of only 10.5-µW.

BIOGRAPHY

David Wong Liang Tai received the B. Eng. degree with honours in Computer Systems Engineering from Curtin University of Technology in 2007 and the M. Eng. degree in Integrated Circuits and Embedded Systems from National University of Singapore in 2014. He was with Panasonic Corporation as a Research and Development engineer cum technical lead from 2008 to 2011. He is currently working as a researcher at National University of Singapore. His research interests include flexible wearable and wireless biomedical devices, low-power embedded hardware and software co-design, data communications and networking.