

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Faculty of Engineering

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**Area: *Microelectronic Technologies & Devices, and
Communications and Networks***

Host: *Dr Yida Li*

TOPIC	:	A Wireless Multi-Channel Capacitive Sensor System for Efficient Glove-based Gesture Recognition with AI at the Edge
SPEAKER	:	Mr Pan Jieming Graduate student, ECE Dept, NUS
DATE	:	Tuesday, 4 August 2020
TIME	:	11.00AM to 12.00PM
WEBINAR	:	Join Zoom Meeting https://nus-sg.zoom.us/j/97833135888?pwd=RHNqbXJta2FHNY9ZcFVXSHpxV3paQT09 Meeting ID: 978 3313 5888 Password: 992309

ABSTRACT

Hand gesture provides an avenue for individuals to communicate with machines in an interactive manner. Over time, more sophisticated hardware and algorithms have improved the accuracy of the interpretation of such gestures significantly. Smart gloves, enabled by the recent advancements in flexible sensor fabrication and artificial intelligence, allows capturing of subtle changes of hand movements passing on to an appropriate machine learning (ML) model for accurate prediction. In this presentation, I will describe a hardware-software co-optimization solution using a low-cost glove attachment for accurate hand gestures prediction. The sensors, uniformly distributed across a human hand, is captured by a 16-channel CDMA-like capacitance to-digital converter for training/inference at the edge device. Unlike the conventional approach where the capacitive information is recovered before further signal processing, our proposed system approach takes advantage of the capability of the ML algorithms to directly process the code-modulated signals without demodulation. As a result, data efficiency is improved by 20x as compared to using the approach where the capacitive signal is first recovered. This also significantly reduces decision-making latency and lowers the required data throughput for wireless transmission by at least 4x. The highest testing classification accuracy of our system achieved is 99.7%, with a <0.1% difference from the conventional demodulated sensing scheme.

BIOGRAPHY

Pan Jieming is currently a PhD student in Electrical and Computer Engineering Department, National University of Singapore (NUS), advised by Professor Thean Voon-Yew and Associate Professor Tham Chen Khong. His research interest covers capacitive sensing, applied machine learning, hardware-software co-design and co-optimization.

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