

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
FACULTY OF ENGINEERING

Website: <https://www.eng.nus.edu.sg/ece/>

Area: Integrated Circuits & Embedded Systems

Host: Dr. Viveka Konandur Rajanna

TOPIC	:	Time Domain Accelerator for DNN Workloads
SPEAKER	:	Mr. Animesh Gupta Graduate Student, ECE Dept, NUS
DATE	:	Friday, 5 November 2021
TIME	:	3.00PM to 4.00PM
WEBINAR	:	Join Zoom https://nus-sg.zoom.us/j/83931977633?pwd=ZE1XS0hjTW1lbkl0bVFmNjFnTnVCQT09 Meeting ID: 839 3197 7633 Passcode: 295771

ABSTRACT

Over the past decade, Deep Learning (DL) has enable unprecedented advances in the field of computer vision, audio and speech processing, autonomous driving, neural machine translation and many more. Besides the advancements in the DL algorithms and their increasing computational requirements, continuous efforts have been made to design ASIC accelerators for handling Deep Neural Network (DNN) workloads. This further motivated the community to deploy intelligence at edge devices and change everyday technology. The aim of such intelligent devices is to perform inference with same accuracy as that of software in spite of being in resource constraint environments.

In this seminar, a time domain-based architecture is introduced for DNN acceleration, leveraging on pulse density as data representation to improve the energy and the area efficiency. Digital to time modulation is exploited to perform MAC computations, simplifying multiplications and accumulations. Furthermore, the accuracy of such simplified MAC computations is affected by the inherent error introduced by the approximate time-domain computations. Training of popular DNN models are shown to achieve an accuracy that is equivalent to conventional digital architectures. The proposed technique is evaluated on state-of-the-art benchmark datasets and DNN models.

BIOGRAPHY

Animesh Gupta is a research scholar in the department of Electrical and Computer Engineering, NUS. He has completed his Bachelor's degree in Electronics and Communication Engineering from Indian Institute of Technology Roorkee in 2018. His research area revolves around design techniques for energy-efficient machine learning accelerators.

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