Quantization of Fully Convolutional Networks for Accurate Biomedical Image Segmentation

Dr Yiyu Shi
Associate Professor
Department of Computer Science and Engineering
University of Notre Dame
USA

Date : 17 May 2018 (Thursday)
Time : 11:00 a.m. – 12:00 noon
Venue : Room PQ703, 7/Floor, PQ Core, Mong Man Wai Building,
The Hong Kong Polytechnic University

Abstract
Biomedical image segmentation plays a central role in quantitative analysis, clinical diagnosis, and medical intervention. Since manual annotation suffers from limited reproducibility, arduous efforts, and excessive time, automatic segmentation is desired to process increasingly larger scale histopathological data. Towards this, deep neural networks (DNNs), particularly fully convolutional networks (FCNs), have been widely adopted. At the same time, quantization of DNNs has become an active research topic, which aims to represent weights with less memory (precision) to considerably reduce memory and computation requirements of DNNs with certain accuracy loss. In this talk, we will show that interestingl, quantization can be used as a method to reduce over-fitting in FCNs for better biomedical image segmentation accuracy. Extensive experiments on the MICCAI Gland dataset show that our method exceeds the current state-of-the-art performance by up to 1%.

About the Speaker
Dr Yiyu Shi is currently an Associate Professor in the Department of Computer Science and Engineering at the University of Notre Dame, and the director of the Sustainable Computing Lab (SCL). He received his B.S. degree (with honor) in Electronic Engineering from Tsinghua University, Beijing, China in 2005, the M.S and Ph.D. degree in Electrical Engineering from the University of California, Los Angeles in 2007 and 2009 respectively. His current research interests include hardware intelligence and three-dimensional integration. In recognition of his research, many of his papers have been nominated for the Best Paper Awards in top conferences. He was also the recipient of IBM Invention Achievement Award, Japan Society for the Promotion of Science (JSPS) Faculty Invitation Fellowship, Humboldt Research Fellowship, IEEE St. Louis Section Outstanding Educator Award, Academy of Science (St. Louis) Innovation Award, Missouri S&T Faculty Excellence Award, NSF CAREER Award, IEEE Region 5 Outstanding Individual Achievement Award, and the Air Force Summer Faculty Fellowship. He has served on the technical program committee of many international conferences including DAC, ICCAD, DATE, ISPD, ASPDAC and ICCD. He is a member of IEEE CEDA Publicity Committee and IEEE Smart Grid R&D Committee, deputy editor-in-chief of IEEE VLSI CAS Newsletter, and an associate editor of IEEE TCAD, ACM JETC, VLSI Integration, IEEE TCCCP Newsletter and ACM SIGDA Newsletter. He is also the chair of 2018 DAC System Design Contest on Machine Learning on Embedded Platforms.

All are welcome!

Enquiries:
Professor George Baciu
Email: csggeorge@comp.polyu.edu.hk
Tel : 2766 7295 / 2766 7272