

Notice and Invitation

Oral Defense of Doctoral Dissertation
The Volgenau School of Engineering, George Mason University

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Bachelor of Science, Tianjin University of Science and Technology, 2014
Master of Science, Oregon State University, 2016

Interpretable Deep Learning for Efficient Mobile Computing

Thursday, August 6, 2020, 10:00 AM-11:00 AM

Via Zoom Meeting:

<https://gmu.zoom.us/j/97522143463>

All are invited to attend.

Committee

Dr. Xiang Chen, Chair
Dr. Kun Sun
Dr. Zhi Tian
Dr. Brian L. Mark

Abstract

Promoted by the evolution of artificial intelligence and deep learning, more and more intelligent applications have emerged on mobile devices. As one of the most representative deep learning technologies, deep neural networks (DNNs) have been considered as a primary tool in computer vision fields. However, the heavy computation, memory, and energy demands of the DNN model restrict their deployment on resource-constrained mobile devices. In this dissertation, I focus on research solutions that enable efficient processing of DNNs by qualitatively interpreting their inside working mechanism (i.e., neuron functionality). I proposed a set of computation optimization approaches for DNN execution on mobile devices through better model interpretability. I first proposed a functionality-oriented convolutional filter pruning method to optimize the DNN algorithm for fast inference. To further adapt the DNN to diverse mobile applications, I proposed a class-adaptive DNN reconfiguration framework for mobile applications. Finally, I proposed a collective edge learning system to enable training DNN on mobile system. As a result, this dissertation provides a novel mobile DNN optimization approach by examining the close combination of the neural network interpretation and the mobile system features for more performance escalation.