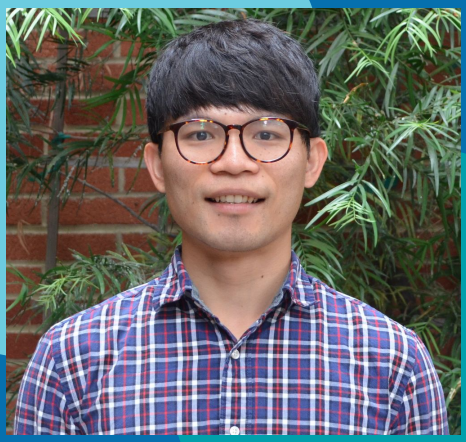
UCCS Mathematics Department

Colloquium:



Efficient Training of Infinite-Depth Neural Networks via Jacobian-Free Backpropagation

Samy Wu Fung

Colorado School of Mines

Thursday, March 31st

12:15-1:30pm

OCSE B138 or via Zoom

Abstract: A promising trend in deep learning replaces fixed depth models by approximations of the limit as network depth approaches infinity. This approach uses a portion of network weights to prescribe behavior by defining a limit condition. This makes network depth implicit, varying based on the provided data and an error tolerance. Moreover, existing implicit models can be implemented and trained with fixed memory costs in exchange for additional computational costs. In particular, backpropagation through implicit networks requires solving a Jacobian-based equation arising from the implicit function theorem. We propose a new Jacobian-free backpropagation (JFB) scheme that circumvents the need to solve Jacobian-based equations while maintaining fixed memory costs. This makes implicit depth models much cheaper to train and easy to implement. Numerical experiments on classification and medical imaging are provided.

For more information or to register to attend via Zoom, scan the QR code with your phone.

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