Other - Colloquium on Artificial Intelligence Research and Optimization

Algorithmic Bias Control in Deep Learning

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Virtual- REGISTRATION REQUIRED (SEE ABSTRACT) Zoom
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Abstract:
Deep learning relies on Artificial Neural Networks (ANNs) with deep architectures – machine learning models that have reached unparalleled performance in many domains, such as machine translation, autonomous vehicles, computer vision, text generation, and speech understanding. However, this impressive performance typically requires large datasets and massive ANN models. Gathering the data and training the models – all can take long times and have prohibitive costs. Significant research efforts are being invested in improving ANN training efficiency, i.e. the amount of time, data, and resources required to train these models. For example, changing the model (e.g., architecture, numerical precision) or the training algorithm (e.g., parallelization). However, such modifications often cause an unexplained degradation in the generalization performance of the ANN to unseen data. Recent findings suggest that this degradation is caused by changes to the hidden algorithmic bias of the training algorithm and model. This bias determines which solution is selected from all solutions which fit the data. I will discuss how understanding and controlling such algorithmic bias can be the key to unlocking the full potential of deep learning.

REGISTRATION

Speaker's Bio:
Daniel is an associate professor in the Department of Electrical Engineering at the Technion, working in the areas of machine learning and theoretical neuroscience. He did his post-doc (as a Gruss Lipper fellow) working with Prof. Liam Paninski in the Department of Statistics and the Center for Theoretical Neuroscience at Columbia University. He is interested in all aspects of neural networks and deep learning. His recent works focus on quantization, resource efficiency, and implicit bias in neural networks. He is the recipient of the Gruss Lipper fellowship, the Goldberg Award, and Intel's Rising Star Faculty Award.

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