Dissertation Defense

Amy Nesky

Efficiency in Machine Learning with Focus on Deep Learning and Recommender Systems

Thursday, August 6, 2020
10:00 am – 12:00 pm
bluejeans.com/294261802

ABSTRACT: Machine learning algorithms have opened up countless doors for scientists tackling problems that had previously been inaccessible, and the applications of these algorithms are far from exhausted. However, as the complexity of the learning problem grows, so does the computational and memory cost of the appropriate learning algorithm. As a result, the training process for computationally heavy algorithms can take weeks or even months to reach a good result, which can be prohibitively expensive. The general inefficiencies of machine learning algorithms is a significant bottleneck slowing the progress in application sciences. This thesis introduces three new methods of improving the efficiency of machine learning algorithms focusing on expensive algorithms such as neural networks and recommender systems. The first method discussed makes structured reductions of fully connected layers in neural networks, which causes speedup during training and decreases the amount of storage required. The second method presented is an accelerated gradient descent method called Predictor-Corrector Gradient Descent (PCGD) that combines predictor-corrector techniques with stochastic gradient descent. The final technique introduced generates Artificial Core Users (ACUs) from the Core Users of a recommendation dataset. Artificial Core Users improve the recommendation accuracy of Core Users and mimic real user data.

Chairs: Prof. Quentin Stout