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"Hogwild for Distributed Machine Learning"

Stochastic Gradient Descent (SGD) is a popular optimization algorithm for solving data-driven machine learning problems such as classification, model selection, sequence labeling, and recommendation. SGD is well suited to processing large amounts of data due to its robustness against noise, rapid convergence rates, and predictable memory footprint. Nevertheless, SGD seems to be impeded by many classical barriers to scalability: (1) SGD appears to be inherently sequential, (2) SGD assumes uniform sampling from the underlying data set resulting in poor locality, and (3) current approaches to parallelize SGD require performance-destroying, fine-grained communication.

This talk will refute the conventional wisdom that SGD inherently suffers from these impediments. Specifically, I will show that SGD can be implemented in parallel with minimal communication, with no locking or synchronization, and with strong spatial locality. I will provide both theoretical and experimental evidence demonstrating the achievement of linear speedups on multicore workstations on several benchmark optimization problems.

Joint work with Feng Niu, Christopher Re, and Stephen Wright.

Bio:
Benjamin Recht is an Assistant Professor in the Department of Electrical Engineering and Computer Sciences and the Department of Statistics at the University of California, Berkeley. Ben was previously an Assistant Professor in the Department of Computer Sciences at the University of Wisconsin-Madison. Ben received his B.S. in Mathematics from the University of Chicago, and received a M.S. and PhD from the MIT Media Laboratory. After completing his doctoral work, he was a postdoctoral fellow in the Center for the Mathematics of Information at Caltech. He is the recipient of an NSF Career Award, an Alfred P. Sloan Research Fellowship, and the 2012 SIAM/MOS Lagrange Prize in Continuous Optimization.