



Deep Learning Program Opening Workshop August 12-16, 2019

SPEAKER TITLES/ABSTRACTS

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“Optimization and Learning with Nonconvex Functional Constraints”

Nonconvex optimization is becoming more and more important in machine learning. In spite of recent progresses, the development of provably efficient algorithms for optimization with nonconvex functional constraints remains open. Such problems have potential applications in risk-averse learning and adversarial learning among others. In this talk, we introduce a new proximal point type method for solving this important class of nonconvex problems by transforming them into a sequence of convex constrained subproblems. We show both the convergence and rate of convergence of our algorithm to a first-order KKT point under different types of constraint qualifications. In particular, we prove that our algorithm will converge to an ϵ -KKT point in $O(1/\epsilon)$ iterations. For practical use, we present inexact variants of this approach, in which approximate solutions of the subproblems are computed by either primal or primal-dual type algorithms, and establish their associated rate of convergence. To the best of our knowledge, this is the first time that proximal point type method is developed for nonlinear programming with nonconvex functional constraints, and all the complexity results seem to be new. Preliminary numerical results will also be presented.

This is a joint work with Digvijay Boob and Qi Deng.