

Online Distributed Optimization via Dual Averaging

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Abstract

This paper presents a regret analysis on the distributed online optimization over a network of agents. The goal is to optimize a global objective function while the agents achieve consensus. The objective function is the summation of convex cost functions associated with each agent. Since the agents face uncertainties in the environment, their cost functions change at each time step. We extend a distributed algorithm based on dual subgradient averaging to the online setting. The proposed algorithm yields a sharp bound on regret as a function of the network topology. The regret of an algorithm is the difference between the cost of the sequence of decisions generated by the algorithm and the performance of the best fixed decision in hindsight. Models for rendezvous in mobile sensors and distributed sensor estimation are proposed and the corresponding simulation results are presented.

Index Terms

Online Optimization, Distributed Algorithms, Distributed Estimation