A machine learning method with extra-gradient step

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Abstract. This paper deals with the minimization of unconstrained objective functions in the form of finite sums. We present an extra-gradient method with line search strategy and algorithm that uses variable sample size and thus makes the process significantly cheaper. The method is non-monotone, and the adaptive step size α_k obtained in the linear search, is a random variable dependent on the sample ξ_k. The inevitable consequence is that the errors do not induce martingales. The algorithm is tested on a couple of examples, including the machine learning problems. [1, 2]

Keywords: finite sum minimization; machine learning; line search extragradient.

References

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Reinforcement learning for graphs and beyond

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Abstract. Adam Zsolt Wagner [1] showed how a particular reinforcement learning technique, the so-called cross entropy method, can be used to construct (counter)examples in graph theory. We have recently provided an improved implementation of this method [2] and in this lecture we will showcase how it can be used to construct counterexamples for a set of older conjectures on the Laplacian spectral radius of graphs [2], edge-colorings of complete graphs that lead to new lower bounds on Ramsey numbers [3], and, with a minor adaptation, also the shape of optimal window overhangs for residential homes [4].

Keywords: Reinforcement learning; Cross-entropy method; Graph theory; Building energy optimization.

References

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