Optimization for Machine Learning 50.579

Instructor: Ioannis Panageas

Research Projects

1 Stochastic Gradient Descent

Project 1. SGD Learns One-Layer Networks in WGANs (Qi Lei et al.)
`https://arxiv.org/abs/1910.07030`

Project 2. Efficient Statistics, in High Dimensions, from Truncated Samples (Daskalakis et al.)
`https://arxiv.org/abs/1809.03986`

2 Non-convex Optimization Problems

Project 3. Matrix Completion has No Spurious Local Minimum (Rong Ge et al.)
`https://arxiv.org/abs/1605.07272`

Project 4. How to Escape Saddle Points Efficiently (Chi Jin et al.)
`https://arxiv.org/abs/1703.00887`

Project 5. Local Maxima in the Likelihood of Gaussian Mixture Models: Structural Results and Algorithmic Consequences (Chi Jin et al.)
`https://arxiv.org/abs/1609.00978`

Project 6. On the Analysis of EM for truncated mixtures of two Gaussians (Nagarajan and Panageas)
`https://arxiv.org/abs/1902.06958`

3 Reinforcement Learning and Game Theory

Project 7. Optimality and Approximation with Policy Gradient Methods in Markov Decision Processes (Alekh Agarwal et al.)
`https://arxiv.org/abs/1908.00261`

Project 8. Multiplicative Weights in Zero-sum and Congestion Games (two papers, Bailey et al., Palaiopanos et al.)
`http://jamespbailey.com/MWUinZeroSum.pdf` and `https://arxiv.org/abs/1703.01138`

4 Generative Adversarial Networks and Last iterate Convergence

Project 9. Training Gans with Optimisim (Daskalakis et al.)
`https://arxiv.org/abs/1711.00141`

Project 10. Interaction Matters: A Note on Non-asymptotic Local Convergence of Generative Adversarial Networks (Liang and Stokes)
`https://arxiv.org/abs/1802.06132`

The report due 19th April (23:59pm).