CSE 257: Search and Optimization (Spring 2021)

Instructor: Sicun Gao

Zoom, Tue/Thu 11am to 12:20pm

Schedule

- Week 1: Overview and Classical Search
  (Heuristic search, adversarial search, backtracking search)

- Week 2: Bandits and Monte Carlo Tree Search
  (Concentration bounds, optimality of upper confidence bound, MCTS)

- Week 3: Reinforcement Learning (I)
  (Convergence of value iteration, Monte Carlo methods, Temporal-Difference methods, Q-learning)

- Week 4: Reinforcement Learning (II)
  (Deep Q-Learning, policy gradient, TRPO, SAC, model-based methods, meta-learning, AlphaGo)

- Week 5: Numerical Optimization (I)
  (Unconstrained: first-order and second-order directions, line search, trust region, various acceleration)

- Week 6: Numerical Optimization (II)
  (Constrained: KKT, Farkas Lemma, interior methods, Lagrange methods, robust optimization)

- Week 7: Combinatorial Search
  (Integer programming, SAT, CDCL, #SAT, SMT)

- Week 8: Global Optimization
  (Interval propagation, branch-and-prune, exists-forall and min-max, some complexity results)

- Week 9 and 10: Presentations

Grading

- Project report 70% (individual projects), extra points for optional presentations.

- Final 30% (take-home exam).