

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, 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, QBF, #SAT)
- 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), 10% extra for optional presentations.
- Final 30% (take-home exam).