CSE 257: Search and Optimization (Fall 2021)

Instructor: Sicun Gao

Schedule

- Week 1: Numerical Optimization (I)
(first-order and second-order directions, various acceleration, line search, trust region)
- Week 2: Stochastic Search
(Simulated annealing, cross-entropy methods, natural evolution strategy)
- Week 3: Classical Search
(Heuristic search, adversarial search, expectiminimax)
- Week 4: Reinforcement Learning (I)
(MDP, convergence of value iteration, Monte Carlo and Temporal-Difference, Q-learning)
- Week 5: Reinforcement Learning (II)
(Deep Q-learning, policy gradient, model-based methods)
- Week 6: Bandits and Monte Carlo Tree Search
(Concentration bounds, upper confidence bound, MCTS, AlphaGo)
- Week 7: Numerical Optimization (II)
(Lagrange duality, KKT, saddle-point interpretation)
- Week 8: Combinatorial Search (I)
(constraint solving, SAT, conflict-driven backtracking search)
- Week 9: Combinatorial Search (II)
(Integer programming, cutting planes, branch-and-bound)
- Week 10: Presentations

Grading

- Assignments: 70%
- Final: 30%
- Extra credits for presentations: up to 10%