Search

- Problem solving by search: formalization

- Uninformed search: Breadth-First, Uniform-Cost, Depth-First, Depth-Limited, and Iterative- Deepening

- Heuristic search: Greedy best-first, A*

- Properties of search: completeness, optimality, time and space complexity

- Path/cycle checking

- Game tree search: MiniMax, alpha-beta pruning

- CSP: Formalization, backtracking, forward checking, and GAC algorithms

Knowledge representation and reasoning

- First-order logic: syntax and semantics

- Soundness and completeness of proof procedures

- Converting first-order formulas into clausal form

- Unification and MGU

- Resolution proof: forward chaining and refutation

- Answer extraction

Planning

- Closed world assumption

- STRIPS representation of actions

- STRIPS planning

- Relaxed plan heuristics

- Bayesian networks: graphs + tables, inference

- Variable elimination algorithm

- Use D-separation to determine independence

Machine learning

- Decision-tree learning

- Naive Bayes learning

- K-means and EM

- Chain rule for computing partial derivatives

- Linear and logistic regression

- Backpropagation

- Q-learning