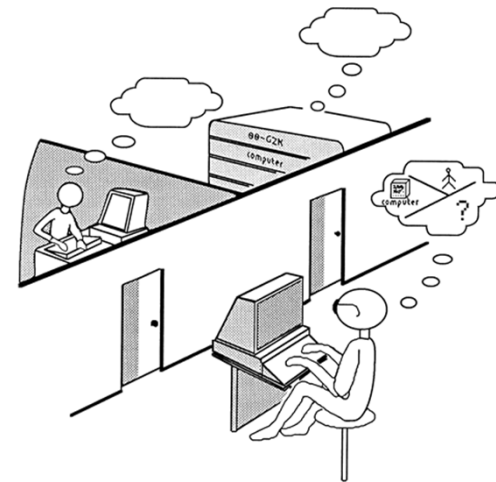




Intro to AI Exam Review

Introduction (1.1-1.3)

- ◆ What is AI? Thinking/Acting like Humans/Rationally
- ◆ Turing Test
- ◆ Rational Behavior
- ◆ Fields that influenced AI
- ◆ Kinds of early AI systems



Intelligent Agents (2.1-2.4)

- ◆ What is an Agent?
- ◆ Percept, Percept Sequence
- ◆ Agent Function, Agent Program
- ◆ Rational Agent
- ◆ Task Environment Specification and Properties
- ◆ General Structure of Agents

Search Problems (3.1-3.2)

- ◆ Formulating a search problem
 - State space, initial state, successor function, goal test, path cost
 - Validity and usefulness
- ◆ State space vs. search tree
- ◆ Assumptions in basic search
- ◆ Important parameters

Blind Search (3.3-3.4)

- ◆ Data structure of a search node
- ◆ Expanding a node
- ◆ The frontier of a search tree
- ◆ Search algorithm #1 and #2
- ◆ The search strategy
 - Breadth-First, Depth-First, Depth-Limited, Iterative Deepening, Uniform Cost
- ◆ Performance measures

Heuristic Search (3.5-3.6+4.1)

- ◆ Evaluation function and Best-First search
- ◆ Heuristic function
 - Admissible, consistent, accuracy
 - Finding an admissible heuristic
 - Some examples for 8-puzzle and robot navigation
- ◆ A* Search Algorithm
- ◆ (Local Search)

Adversarial Search (5.1-5.3)

- ◆ The specific setting for adversarial search or “game playing”
- ◆ Constructing an evaluation function
- ◆ Minimax Game Tree and Algorithm
- ◆ Alpha-beta Pruning and Algorithm

Propositional Logic (7.1-7.4 ~7.5)

- ◆ Representing the world, possible worlds
- ◆ PL Symbols, Syntax and Semantics
- ◆ Models, Knowledge Bases, Satisfiability, Entailment and Equivalence
- ◆ Inference, Modus Ponens, Modus Tolens
- ◆ Soundness and Completeness

First-Order Logic (8.1-8.3, ~8.4)

- ◆ Why FOL?
- ◆ Objects, Relations and Functions → Constants, Predicates and Functions
- ◆ Atomic and Complex sentences
- ◆ Truth in FOL. Models and Interpretation
- ◆ Universal and Existential quantification
- ◆ Building a KB. Axioms vs. Theorems

Planning (10.1-11.3)

◆ PDDL / STRIPS

- Closed and Open world assumptions

◆ Goal, State and Action. Action schema

◆ Forward planning

- Applicable action

◆ Backward planning

- Relevant action, regression of a goal

◆ Planning graph for heuristic estimates

Uncertainty (13.1-13.5)

- ◆ Sources of uncertainty
- ◆ Belief State
- ◆ Random Variables, Domains
- ◆ Events and propositions
- ◆ Prior probability, probability distribution, full joint probability distribution
- ◆ Conditional / Posterior probability
- ◆ Bayes Rule

Bayesian Networks (14.1 ~ 14.2)

- ◆ Probabilistic Belief State
- ◆ Probabilistic Inference
- ◆ Conditional Probability
- ◆ Issues with inference using full joint probability distribution tables
- ◆ Independence and Bayesian networks
- ◆ Conditional Probability Tables (CPTs)

Machine Learning (slides)

◆ Supervised Learning

- Approaches

- ◆ Classification (e.g. decision trees), Regression

- Hypothesis, Overfitting / Underfitting

◆ Unsupervised Learning

- Clustering (K-Means)

◆ Reinforcement Learning

- Delayed reward