CSE 573: Artificial Intelligence I

Instructor:

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What is AI?

- Automation of reasoning, problem solving, learning
- Study of mental faculties through computational models
- Making computers do what people currently do better
- Study of heuristic solutions to NP-complete problems

What can you do with AI?

- Beat Kasparov at chess
- Prove new theorems in mathematics
- Do medical diagnosis better than doctors
- Design new drugs
- Query databases in English
- Design a robot that runs errands

What can you do with AI? (contd.)

- Organize the deployment of US troops & equipment in the Gulf
- Solve complex scheduling problems in manufacturing
- Predict the stock market
- Create more realistic characters for computer games
- Design software agents that search the Web for you

Topics for this quarter

- Problem solving and search
- Representation and reasoning
- Uncertainty
- Machine learning
- Planning
- Natural language understanding

Assignments

- **Final** (40% of grade)
- **Two projects** (each 30% of grade)
  Tentatively:
  - Propositional reasoning (satisfiability solvers)
  - Inductive learning (model ensembles)

Assignments (contd.)

Each project is “mini research project”:

- **Implement** two state-of-the-art algorithms
- **Experiment** and compare
- **Interpret** results
- **Improve**: Design & test improved algorithm

Source materials

- **Textbook:**
  Artificial Intelligence: Theory and Practice
  by T. Dean, J. Allen & Y. Aloimonos
  Addison-Wesley
- **Papers**

Ancestors of AI

- Computer science
- Mathematics
- Philosophy
- Probability and statistics
- Decision theory and economics
- Psychology
- Biology
- Control systems
- Operations research

History of AI

- 50's: AI is born; neurons, games, logic
- 60's: Youthful enthusiasm; search, microworlds, the rift
- 70's: Knowledge representation
- 80's: AI becomes an industry; neural nets return
- 90's: AI matures; realistic applications, probability, learning, the Web