

CMSC 471/671

Artificial Intelligence

Fall 2000

Section 0101

TuTh 5:30 - 6:45pm

MP103

Instructor:

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Office Hour: TuTh 1:30 – 2:30pm or by appointment.

Texts:

Stuart Russell and Peter Norvig, *Artificial Intelligence - A Modern Approach*,
Prentice Hall, 1995.

Supplementary materials (papers, book chapters and web pages) for selected topics.

Course Description:

This course is designed as a broad rather than in-depth introduction to the principles of artificial intelligence, its characteristics, major techniques, and important sub-fields and applications. Although some theoretical issues and mathematical derivations and proofs will be involved, the emphasis will be on understanding basic AI concepts and techniques, important ideas and issues. Students are expected to have basic knowledge of data structures, mathematical logic, and elementary probability theory. Knowledge of algorithm analysis and experience with Lisp programming are helpful.

The lectures will be divided into the following three parts:

Introduction (Chapters 1 & 2)

- Motivations and characteristics of AI

General-purpose AI problem-solving techniques

- Heuristic search (state-space and A* search, AND/OR graphs and AO* search, game-tree and alpha-beta pruning, etc.) (Chapters 3 - 5)
- Knowledge representation and reasoning (first-order-logic and automatic deduction, other representation paradigms such as rule-based systems, semantic nets and frame systems, and neural networks, forward and backward chaining) (Chapters 6, 7, 9, 10)

Advanced topics and Applications

- Uncertainty and probabilistic reasoning (certainty factors in rule-based systems, simple Bayesian systems, Bayesian belief networks, fuzzy set theory, Dempster-Shafer theory) (Chapters 14 & 15)
- Planning (Chapter 11)
- Learning and knowledge acquisition (Chapters 18 & 19)

Grading: Course grading will be based on the following work:

Home works	15%
Project 1	10%
Project 2	15%
Project 3	20%
Exam 1	20%
Exam 2	20%

Note on projects:

- Project 1 is an exercise of Lisp. You may use any programming language for Project 2. It is highly advisable to use Lisp (or Prolog if you know the language) for Project 3.
- For each project, you are required to submit a written report as well as a hard copy of your source code and the output of the code execution.
- You must submit your project by the end of the class time on the due day. Projects submitted after that time will be considered late. A 20-point (out of 100) penalty will be applied to all projects that are late up to one week. No projects later than one week will be accepted.