Artificial Intelligence

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Course Description

Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously. Although AI has been studied for more than half a century, we still cannot make a computer that is as intelligent as a human in all aspects. However, we do have many successful applications. In some cases, the computer equipped with AI technology can be even more intelligent than us. The Deep Blue system which defeated the world chess champion is a well-know example.

The main research topics in AI include: problem solving, reasoning, planning, natural language understanding, computer vision, automatic programming, machine learning, and so on. Of course, these topics are closely related with each other. For example, the knowledge acquired through learning can be used both for problem solving and for reasoning. In fact, the skill for problem solving itself should be acquired through learning. Also, methods for problem solving are useful both for reasoning and planning. Further, both natural language understanding and computer vision can be solved using methods developed in the field of pattern recognition.

In this course, we will study the most fundamental knowledge for understanding AI. We will introduce some basic search algorithms for problem solving; knowledge representation and reasoning; pattern recognition; fuzzy logic; and neural networks.

Tentative Course Plan

Week	Lect. #	Topic	Chapter
5	1	Introduction to AI	1
6	2	Introduction to Python	-
7	3	Agents	2
8	4	Intro to Search / Uninformed Search	3.1 - 3.4
9	5	Informed Search	3.5 - 3.6
10	6	Local Search	4
11	7	Adversarial Search	5
12	8	Constraint Satisfaction Problems	6
15	9	Probability	13
16	10	Bayesian Networks	14
17	11	Hidden Markov Models	15.3 + Extra Materials
18	12	Review/ Intro to Machine Learning	18

Textbook

Artificial Intelligence: A Modern Approach, 3e
by Peter Norvig and Stuart J. Russell

Other recommended books

Artificial Intelligence: Foundations of Computational Agents
(http://artint.info)