

Artificial Intelligence

—An Introduction Course—

Instructor
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Instructor's Information

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Outline

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Course's Objectives

- ❖ Introduce the development of Artificial Intelligence
 - ✍ <Time, Research Interests, Results>
- ❖ Train the students with general techniques, principals, and strategies for solving problems
- ❖ Side-effect:
 - ✍ Analyze, design, code, and debug a given problem

References

Artificial Intelligence: A Modern Approach

(Third edition) by [Stuart Russell](#) and [Peter Norvig](#)

The [leading textbook](#) in Artificial Intelligence.

Used in over **1300** universities in over **110** countries.

The [22nd most cited](#) computer science publication on Citeseer (and 4th most cited publication of this century).

What's New

- **Free Online AI course**, Berkeley's CS 188, offered [through edX](#).

Comments and Discussion

- [Comments from readers](#)
- [Errata list](#) (errors in the book)
- [AIMA-talk](#) discussion list, open to all

AI Resources on the Web

- [AI Resources](#) in many categories
- [AI courses that are using AIMA](#) (1300 schools)

Online Code Repository

- Pseudo-code algorithms from the book in [pdf](#).
- [Online code](#) at [aimacode](#) project on Github.
- [Online demos](#) (Java applets and Javascript)
- [The OpenNERO 3D multiagent simulator](#)

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Part II Problem Solving

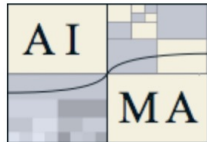
- 3 Solving Problems by Searching
- 4 Beyond Classical Search
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AIMA Home

Code

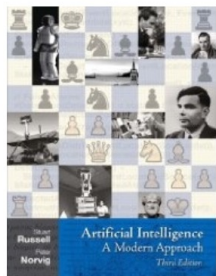
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References

- [1] Stuart Russell & Peter Norvig (2003). **Artificial Intelligence - A Modern Approach**, Prentice Hall, 2nd edition.

Web resources: <http://aima.cs.berkeley.edu/>

- [2] Elaine Rich & Kevin Knight (1991), **Artificial Intelligence**, McGraw-Hill, 2nd edition.
- [3] George Klir & Bo Yuan (1995), **Fuzzy Sets and Fuzzy Logic: Theory and Applications**. Prentice Hall
- [4] Tom Mitchell (1997), **Machine Learning**, McGraw-Hill.
- [5] Ivan Bratko (1990), **Prolog Programming for Artificial Intelligence**, Addison-Wesley.

Course's Outcomes

STT	Chuẩn đầu ra môn học
L.O.1	Biểu diễn được bài toán cần giải quyết trong một không gian trạng thái và thiết kế được một giải thuật tìm kiếm heuristic thích hợp để giải nó.
	<p>L.O.1.1 – Xây dựng được một không gian trạng thái để biểu diễn bài toán cần giải quyết.</p> <p>L.O.1.2 – Thiết kế được một giải thuật tìm kiếm heuristic thích hợp để giải bài toán đặt ra.</p>
L.O.2	Sử dụng được logic, mạng Bayes, để biểu diễn và suy luận tri thức.
	<p>L.O.2.1 – Sử dụng được logic để biểu diễn và suy luận tri thức cơ bản.</p> <p>L.O.2.2 – Sử dụng được mạng Bayes để biểu diễn và suy luận tri thức không chắc chắn.</p>
L.O.3	Hiểu biết được một số khái niệm, nguyên lý, và giải thuật cơ bản về việc làm cho máy tính tự học.
	<p>L.O.3.1 – Hiểu biết được một số khái niệm và nguyên lý cơ bản về việc làm cho máy tính tự học.</p> <p>L.O.3.2 – Hiểu biết được một số giải thuật cơ bản về việc làm cho máy tính tự học.</p>
L.O.4	Hiện thực được một số hệ thống thông minh đơn giản.

Course's Outline

❖ Chapter 1: Introduction

- ✎ Artificial Intelligence (AI): What, Why, and How?
- ✎ History and The State of The Art
- ✎ Typical Problems
- ✎ Tools and Programming Languages for AI

❖ Self-Reading: Intelligent Agent

- ✎ Agent and Behavior
- ✎ Environment
- ✎ The Structure of Agents

Course's Outline

❖ Chapter 2: Uninformed Search

- ✎ Modeling State Spaces
- ✎ Searching for Solutions
- ✎ Uninformed Search Strategies
- ✎ Problem Characteristics

❖ Chapter 3: Informed Search

- ✎ Heuristic Functions
- ✎ Best first and A*

Course's Outline

❖ Chapter 4: Game Playing

- ✍ Minimax Procedure
- ✍ Alpha-beta Cutoffs
- ✍ Additional Refinements

❖ Chapter 5: Other search techniques

- ✍ Backtracking Search
- ✍ Hill-climbing
- ✍ Simulated Annealing
- ✍ Genetic algorithms

Course's Outline

❖ Chapter 6: Knowledge Representation and Reasoning

- ✍ Propositional logic
- ✍ First-order logic
- ✍ Rule-based systems

❖ Chapter 7: Probability

- ✍ Basic concepts
- ✍ Independence
- ✍ Conditional independence

Course's Outline

❖ Chapter 8: Bayesian Networks

- ✍ Concepts
- ✍ Reasoning with Bayesian networks

❖ Chapter 9: Naïve Bayes

- ✍ Introduction to Machine Learning
- ✍ Introduction to Naïve Bayes
- ✍ Applications with Naïve Bayes

Course's Outline

❖ Chapter 10: Decision Trees

- ✍ Concepts
- ✍ Algorithms in decision trees
- ✍ Applications with decision trees

❖ Chapter 11: Artificial Neural Networks

- ✍ Introduction to Artificial Neural Networks (ANN)
- ✍ Learning algorithms
- ✍ Applications with ANN

Grading Policy

❖ Assignments: **30%**

- ~~✗~~ Assignment-1: State Space Search
- ~~✗~~ Assignment-1: Probabilistic Reasoning
- ~~✗~~ Assignment-3: Data analytics (machine learning)

❖ Programming tasks: **10%** (for midterm-exam)

- ~~✗~~ Coding some algorithms with Python in Google Colab

❖ Final examination: **60%**

Preparation

❖ Before next lecture:

- ✍ Check BKeL for slides, guidelines, and forum
- ✍ Book (Artificial Intelligence – A modern approach, abbreviated as **AIMA**)
- ✍ Tool:
 - Python
 - Google Colab: login with your account
 - ✓ Each student: will be shared a writable folder
 - ✓ Code: ipynb format
 - ✓ Code submission: upload to the shared folder
 - AI-framework: provided by the instructor

Office time

❖ Office:

- ❖ DSCILAB – 6th floor, C6 block, HCMUT's campus-1
- ❖ Time: Wednesday (daytime)