

CAP 378

ARTIFICIAL INTELLIGENCE

Tanzeela Javid Kaloo (32638)

Assistant Professor

System And Architecture

Lovely Professional University

Course Outcome

CO1 :: define the approaches and the types of artificial intelligence used for problem solving

CO2 :: understand knowledge representation, heuristic search algorithms, and different methods of game playing

CO3 :: apply analytical concepts to deal with uncertainty and fuzzification

CO4 :: discuss the use of different AI language and tools and apply basic principles of AI in solutions that require inference, knowledge representation and logical reasoning.



Text Books and References

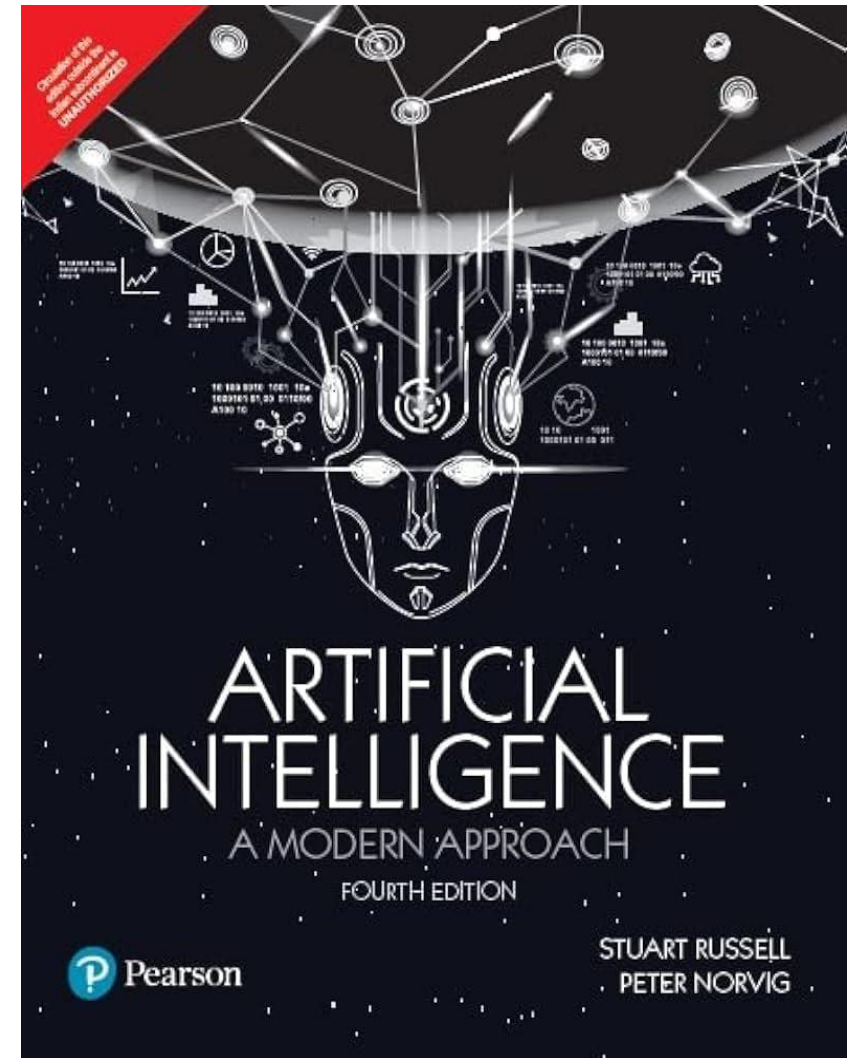
- **TEXT BOOK:**
Artificial Intelligence, A Modern Approach
by Stuart Russel, Peter Norvig
- **REFERENCES:**
Artificial Intelligence by Rich, Knight
- Journals articles as Compulsary reading
(specific articles, complete reference)
<https://courses.cs.vt.edu/~csonline/AI/Lessons/>



Text Book: Artificial Intelligence A Modern Approach

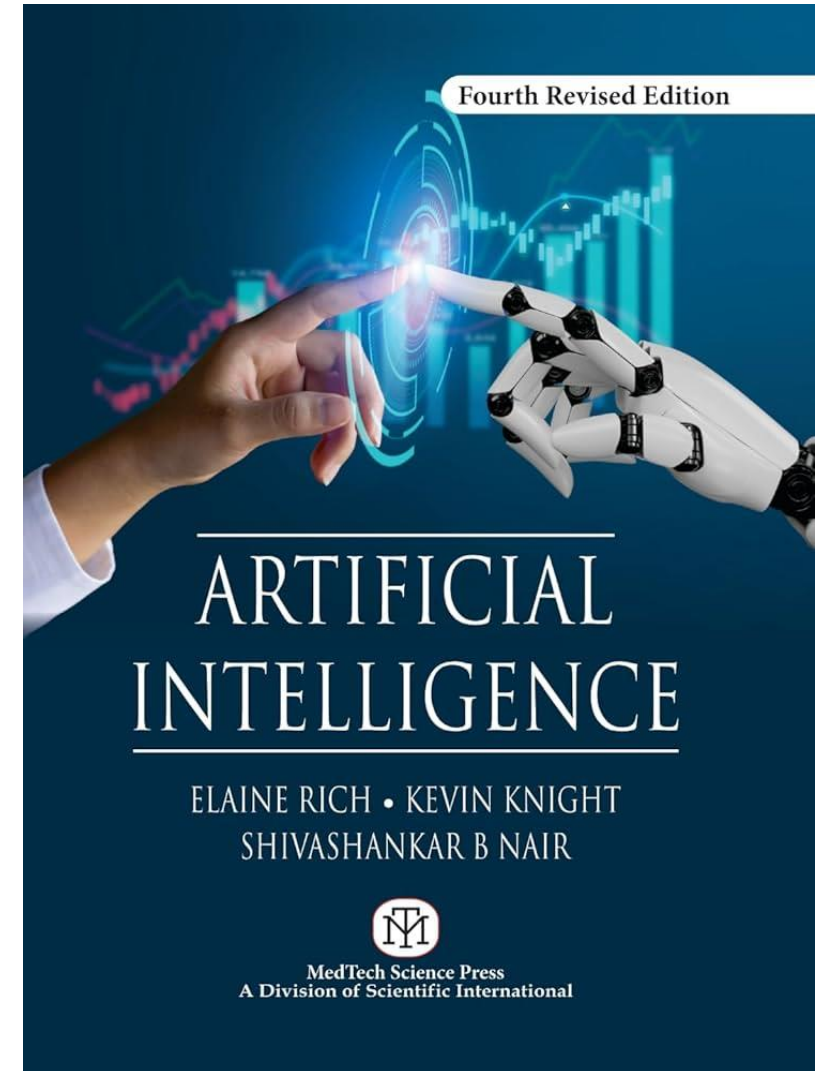
Author: Stuart Russel, Peter Norvig

Download: <https://dpvipracollege.in/wp-content/uploads/2023/01/Russell-S.-Norvig-P.-Artificial-intelligence-a-modern-approach-2edPH2003T1112s.pdf>



Reference Book: Artificial Intelligence

Author: Rich, Knight



Relevant Websites

S. No	Web Address	Salient Features
1	https://www.cs.utexas.edu/~novak/cs381kcontents.html	Searching techniques
2	http://lecturesppt.blogspot.com/2010/03/artificial-intelligence-pdf.html	Planning, Uncertainty and Learning
3	https://www.elementsofai.com/	Introduction to Artificial Intelligence
4	https://www.coursera.org/learn/machine-learning	Machine learning introduction
5	http://www.stats.ox.ac.uk/~ripley/Expert/Expert.pdf	Expert system notes

Relevant Websites

S. No	Web Address	Salient Features
6	https://www.cl.cam.ac.uk/teaching/2002/NatLangProc/nlp1-4.pdf	NLP introduction
7	https://www.geeksforgeeks.org/fuzzy-logic-introduction/	Fuzzy Logic
8	https://www.edureka.co/blog/what-is-machine-learning/	Machine Learning
9	https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_natural_language_processing/	Natural Language Processing

Audio Visual Aids (AV)

S. No	Web Address	Salient Features
1	https://www.coursera.org/learn/introduction-to-ai	MOOCS
2	https://nptel.ac.in/courses/106106126/	NPTEL

Virtual Labs (VL)

S. No	Web Address	Salient Features
1	https://www.swi-prolog.org/	Prolog

Syllabus / Course Outline



UNIT I:
Introduction And
Problem Solving



UNIT II: Heuristic
Search And Game
Playing



UNIT III:
Knowledge
Representation



UNIT IV:
Uncertainty And
Planning In AI



UNIT V: Fuzzy
Logic



**UNIT
VI:** Foundations Of
Machine Learning

UNIT I

- Introduction To Artificial Intelligence,
- Types Of Intelligence,
- General Vs Narrow AI,
- Strong Vs Weak AI,
- Difference Between Human And Machine Intelligence,
- Applications Of AI,
- Approaches Of Artificial Intelligence,
- Intelligent Agent,
- Types Of Agent Programs,
- Formulating Problems -
 - Water Jug Problem,
 - 8 Puzzle Problem,
 - Missionaries And Cannibals Problem

UNIT II

- Introduction To Heuristic And Blind Search,
- Heuristic Search Strategies -
 - Best First Search,
 - A* Algorithm,
 - Iterative Deepening A*(IDA),
 - Small Memory A*(SMA),
- Heuristic Techniques:
 - Generate And Test,
 - Hill Climbing,
 - State Space Search,
 - Constraint Satisfaction Problem,
- Introduction To Game Playing,
- Applications Of Game Playing,
- Minimax Algorithm And Alphabeta Pruning,
- Perfect Decision Game And Imperfect Decision Game

UNIT III

- Types Of Knowledge In AI,
- Issues In Knowledge Representation,
- Logic Representation,
- Propositional Logic,
- Predicate Logic,
- Forward Chaining And Backward Chaining

UNIT IV

- Introduction To Uncertainty And Probability,
- Prior Probability And Posterior Probability,
- Bayes Rule,
- Belief Network,
- Introduction To Perception And Planning In AI,
- Representation Of Planning,
- Blocks-world Planning Problem,
- Components Of Planning System

UNIT V

- Fuzzy Logic,
- Advantage Of Fuzzy Logic Based Systems,
- Introduction To Fuzzy Sets,
- Fuzzy Logic,
- Block Diagram a Fuzzy Logic Based System
 - Fuzzification Modules,
 - Inference Engine,
 - Knowledge Base and Defuzzification Module of a Fuzzy System
- Illustration of the Working of a Fuzzy Logic Based System with an Example,
- Applications Areas: Expert Systems, Finance, Business, Management, Software Engineering, Medicine And Industry

UNIT VI

- Introduction To Learning,
- Various Forms Of Learning,
- Need Of Machine Learning,
- Types Of Machine Learning,
- Limits Of Machine Learning,
- Introduction To Neural Network,
- Artificial Neural Network And Expert System,
- How Neurons Activate,
- Components Of Expert System,
- Characteristics Of Expert Systems,
- Benefits Of Expert System,
- Natural Language Processing,
- Components Of NLP,
- Difficulties In NLU,
- Phases Of NLP

Grading policy

- Attendance – 5%
 - CA - (02)– 25%
 - Mid Term – 20%
 - End Term Test – 50%
-
- CA Category : A0202 (Total 2 / Best of 2)

GitHub Classroom

- All assignments and study materials will be available in the GitHub repository.
- To access the repository, you must have a GitHub account.
- An invitation will be sent to the email linked to your GitHub account.
- Simply accept the invitation to gain access to:
 - All lecture materials
 - All lab materials