



ANDHRA UNIVERSITY

TRANS-DISCIPLINARY RESEARCH HUB

ARTIFICIAL INTELLIGENCE

UNIT-I

Introduction : AI problems, foundation of AI and history of AI intelligent agents:

Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first search, Depth limited search, Iterative deepening depth first search bi-direction search - comparison. Search with partial information (Heuristic search) Greedy best first search, A* search, Memory bounded heuristic search, Heuristic functions.

UNIT-II

Local search Algorithms, Hill climbing, simulated, annealing search, local beam search, genetical algorithms. Constraint satisfaction problems: Backtracking search for CSPs local search for constraint satisfaction problems.

Game Playing: Adversarial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

UNIT-III

Knowledge Representation & Reasoning logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propositional logic, Resolution, Forward & Backward. Chaining.

First order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNIT-IV

Planning – Classical planning problem, Language of planning problems, Expressiveness and extension, planning with state – space search, Forward states space search, Backward states space search, Heuristics for states space search. Planning search, planning with state space search, partial order planning Graphs.

UNIT-V

Learning – Forms of learning, Induction learning, Learning Decision Tree, Statistical learning methods, learning with complex data, learning with Hidden variables – The EM Algorithm, Instance Based learning, Neural Networks.

TEXT BOOKS:

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/Pearson Education.
2. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition,

REFERENCE:

1. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).
2. Artificial Intelligence and Expert Systems – Patterson PHI
3. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson
4. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education.



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Time: 3 Hours

Max.Marks:100

Answer any FIVE questions All questions carry equal marks

- 1.a) What are the task environment natures explain each with examples?
b) Explain A* algorithm with example and write the properties of it. [10+10]
- 2.a) What is reflex agent? Explain different kinds of reflex agents and compare each other.
b) Compare and contrast different types uninformed search techniques. [10+10]
- 3.a) Explain The MIN-CONFLICTS algorithm for solving CSPs by local search with an example.
b) What is constraint propagation in CSP? Explain various local consistencies. [10+10]
- 4.a) Explain the simulated annealing algorithm and how it is differ from Hill climbing algorithm.
b) Describe Backward chaining algorithm that used in logic programming systems and also discuss the problems occurred in this algorithm and give solutions. [10+10]
- 5.a) Explain about the representation of the knowledge.
b) Distinguish between propositional and first order inference.
c) Explain about Resolution. [6+7+7]
- 6.a) Explain partial order Plan with an example.
b) Explain heuristics for planning to solve a problem and illustrate with an example. [10+10]
- 7.a) Explain linear classification with logistic regression.
b) Explain about the classical planning problem. [10+10]
- 8.a) What is decision tree? Write expressiveness of decision tree?
b) Give back propagation algorithm for learning in multilayer neural networks. [10+10]