

INT404:ARTIFICIAL INTELLIGENCE

Course Outcomes: Through this course students should be able to

CO1 :: describe basic knowledge representation, problem solving, and learning methods of artificial intelligence.

CO2 :: compare various search techniques used to solve AI problems.

CO3 :: use analytical concepts for solving logical problems using heuristics approaches.

CO4 :: examine the various statistical reasoning techniques to solve AI problems.

CO5 :: justify the performance of different game playing algorithms.

CO6 :: discuss the concepts of machine learning, fuzzy logic, genetic algorithms and NLP.

Unit I

Introduction : What is intelligence?, what is artificial intelligence?,, Foundations of artificial intelligence(AI), History of AI, Basics of AI, Artificial Intelligence Problems, Artificial Intelligence Techniques, applications of AI

Problem Spaces and Search : Defining the problem as a state space search, Production systems, Production system characteristics, Problem characteristics, Issues in designing search problems, Breadth first search (BFS), Depth first search(DFS), Bi-directional Search, Iterative Deepening

Unit II

Informed Search Strategies : Heuristic functions, Generate and Test, Hill Climbing, Simulated Annealing, Best first search, A* algorithm, Constraint satisfaction

Unit III

Knowledge Representation : Representations & mappings, Approaches in knowledge representation, Issues in knowledge representation, Propositional logic, Predicate logic, Procedural versus declarative knowledge, Logic programming, Forward versus backward reasoning

Unit IV

Statistical reasoning : Probability & Bayes' theorem, Bayesian networks, Dempster-Shafer-Theory, Certainty factors & rule-based systems

Weak slot and filler structures : Semantic nets, Frames

Strong slot and filler structures : Conceptual dependency, Scripts

Unit V

Game playing : Minmax Problem, The min-max search procedure, Alpha-beta pruning

Natural Language Processing : Introduction to NLP and information retrieval, NLP phases, Spell checking, Soundex algorithm, construction of parse tree, bag of words model, Applications of NLP

Unit VI

Advanced topics in Artificial Intelligence : introduction to machine learning, Types of Machine Learning, Overview of Neural Networks, activation functions, Overview of Genetic Algorithms, Overview of Fuzzy Logics

Text Books:

1. ARTIFICIAL INTELLIGENCE by RICH, KNIGHT, MCGRAW HILL EDUCATION

References:

1. ARTIFICIAL INTELLIGENCE by KEVIN KNIGHT, ELAINE RICH, B. SHIVASHANKAR NAIR, Tata McGraw Hill, India
2. ARTIFICIAL INTELLIGENCE AND INTELLIGENT SYSTEM by N. P. PADHY, OXFORD UNIVERSITY PRESS