

INT404:ARTIFICIAL INTELLIGENCE

L:3 T:1 P:0 Credits:4

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, branches of AI

Problem Spaces and Search : Defining the problem as a state space search, Production systems, Problem characteristics, Production system 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 : Evaluation function, Minmax Problem, The min-max search procedure, Alpha-beta cutoffs, Alpha-beta pruning

Natural Language Processing : introduction to NLP, NLP phases, construction of parse tree, Spell checking, bag of words model, Soundex algorithm, Applications of NLP, Alexa, siri, cortana

Unit VI

Advanced topics in Artificial Intelligence : Definition of Machine Learning, Types of Machine Learning, Supervised Learning, Unsupervised Learning, Reinforcement Learning, Overview of Neural Networks, Overview of Genetic Algorithms, Overview of Fuzzy Logics

Current trends in AI : The augmented workforce, AI in cybersecurity, Explainable AI, AI and the metaverse, autonomous vehicles

Text Books:

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

References:

1. ARTIFICIAL INTELLIGENCE by KEVIN KNIGHT, ELAINE RICH, B. SHIVASHANKAR NAIR, MC GRAW HILL
2. ARTIFICIAL INTELLIGENCE AND INTELLIGENT SYSTEM by N. P. PADHY, OXFORD UNIVERSITY PRESS

