INT404:ARTIFICIAL INTELLIGENCE

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

Course Outcomes: Through this course students should be able to

- Describe basic knowledge representation, problem solving, and learning methods of artificial intelligence.
- Analyze the role of problem solving, vision, and language in understanding human intelligence from a computational perspective.
- Apply analytical concepts for solving logical problems using different optimized and heuristics approaches.
- Develop interest about how artificial intelligence methods work under a variety of circumstances
- Discuss and understand the advanced topics of artificial intelligence like NLP, Machine learning and their applications

Unit I

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

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

Unit III

Knowledge Representation : Representations & mappings, Approaches in knowledge representation, Issues in knowledge representation, Predicate logic, Propositional 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 and Strong Slot & Filler Structures : Semantic nets, Frames, Conceptual dependency, Scripts

Unit V

Natural Language Processing : Introduction to NLP and information retrieval, ~~Spell checking, Soundex algorithm~~, NLP phases, Applications of NLP, NLP techniques

Unit VI

Game playing : The min-max search procedure, Alpha-beta cutoffs

Overview of Machine Learning : ~~Definition of Machine Learning, Types of learning, Supervised learning, Unsupervised learning, Reinforcement learning~~

Text Books:

1. ARTIFICIAL INTELLIGENCE by KEVIN KNIGHT, ELAINE RICH, B. SHIVASHANKAR NAIR, MC GRAW HILL

References:

1. ARTIFICIAL INTELLIGENCE: A MODERN APPROACH by STUART RUSSEL, PETER NORVIG, PEARSON

2. ARTIFICIAL INTELLIGENCE AND INTELLIGENT SYSTEM by N. P. PADHY, OXFORD UNIVERSITY PRESS