CAP378:ARTIFICIAL INTELLIGENCE

L:3 T:0 P:0 Credits:3

Course Outcomes: Through this course students should be able to

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.

Unit I

Introduction and problem solving : 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

Heuristic search and game playing : 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 alpha-beta pruning, perfect decision game and imperfect decision game

Unit III

Knowledge representation : types of knowledge in AI, issues in knowledge representation, logic representation, propositional logic, predicate logic, forward chaining and backward chaining

Unit IV

Uncertainty and planning in AI : 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 : 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

Foundations of machine learning : 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

Text Books:

1. ARTIFICIAL INTELLIGENCE A MODERN APPROACH by STUART RUSSELL AND PETER NORVIG, PEARSON

References:

1. ARTIFICIAL INTELLIGENCE by RICH ,KNIGHT, Tata McGraw Hill, India