



ARTIFICIAL INTELLIGENCE

Unit 1: Introduction to Artificial Intelligence

- 1.1 Introduction to AI, History of AI
- 1.2 Turing test approach
- 1.3 Multidisciplinary foundation of AI
- 1.4 Intelligent Agents and Task environments
- 1.5 Learning Agents
- 1.6 Rationality and Omniscience
- 1.7 Application Areas for AI- Robotics, Gaming, Machine Learning, Biometrics, Cognitive Science, Medicine, ExpertSystems, etc.
- 1.8 AI present and future

Unit 2: Problem Solving through AI

- 2.1 Problem Solving Agents
- 2.2 Measuring problem-solving performance
- 2.3 Uninformed search strategies- BFS, DFS, DLS, ID-DFS
- 2.4 Searching with partial information- Sensorless and Contingency approach
- 2.5 Heuristic search strategies- Greedy best-first, A*, AO*,
- 2.6 Local Search and optimization- Gradient ascent, Hill Climbing, Simulated annealing, genetic algorithms
- 2.7 Constraint satisfaction problem- backtracking search
- 2.8 Adversarial search- Game playing, Min-Max, alpha-beta pruning

Unit 3: Knowledge and Reasoning

- 3.1 Knowledge based agents
- 3.2 Proposition and first order logic
- 3.3 Forward and backward chaining
- 3.4 Expert systems, example of MYCIN
- 3.5 Inference in first order logic, Inference Resolution
- 3.6 Representation of knowledge and KDD
- 3.7 Dealing with Uncertainty- Bayes' Rule
- 3.8 Probabilistic reasoning over time
- 3.9 Markov process and Markov model (HMM)

Unit 4: Machine Learning

- 4.1 Learning from observations
- 4.2 Learning decision tree
- 4.3 Statistical form of learning
- 4.4 Supervised learning
- 4.5 Maximum likelihood approach
- 4.6 Naïve Bayes' model
- 4.7 Expectation maximization algorithm against missing, noisy or hidden values
- 4.8 Unsupervised learning- learning by exploration

Unit 5: Advanced Machine Learning

- 5.1 Introduction to Classification- Regression



- 5.2 Introduction to Classification- K Nearest Neighbour
- 5.3 Introduction to Clustering- K-Means clustering
- 5.4 Reinforcement Learning
- 5.5 Biological neuron to Artificial neurons
- 5.6 Perceptron model
- 5.7 Introduction to neural networks
- 5.8 Multi-layer perceptron
- 5.9 Introduction to deep learning

Unit 6: Understanding Real World Applications of AI

- 6.1 Natural language Processing
- 6.2 Computer Vision
- 6.3 Robotics
- 6.4 Self-Driven Vehicles
- 6.5 Expert Systems
- 6.6 AI Chatbot
- 6.7 Home Automation Systems

LIST OF EXPERIMENTS:

1. Introduction to Prolog- Installation, Syntax and Semantics
2. Write a program in Prolog to create simple knowledge base and query over it.
3. Write program for expert systems inferences using Prolog
4. Write a program for finding inferential relationship from family tree using Prolog
5. Write program for simple reflex response generation in Prolog
6. Write a program to conduct uninformed and informed search using IDP
7. Write program to conduct game search using Minimax Algorithm approach in IDP
8. Write a program to infer from the Bayesian network
9. Write a program for character recognition using IDP
10. Write program for Image classification using IDP libraries
11. Write program for TIC-TAC-TOE game playing automated system using IDP

PROJECTS BASED ON ABOVE EXPERIMENTS:

1. To develop character recogniser
2. To develop animal image classifier (classify dogs and cats images)
3. To design line follower Robot prototype
4. To develop Robot that detects obstruction on its path and finds alternate path