AI and Expert System

MCA II Sem

Unit-1

- **UNIT-1**
- General Issues and overview of AI:
- The AI problems; what is an AI technique;
- characteristics of AI applications
- Problem Solving,
  - Search and Control strategies
  - General Problem solving;
  - Production systems;
- Control strategies:
  - forward and backward chaining
  - Exhaustive searches: Depth first Breadth first search

Unit - 2

- **UNIT-2**
- Heuristic Search techniques:
  - Hill climbing;
  - Branch and Bound technique;
  - Best first search and A* algorithm;
  - AND/OR Graphs;
  - Problem reduction and AO* algorithm;
  - Constraint Satisfaction problems
  - Game Playing Minmax search procedure;
  - Alpha-Betacutoffs; Additional Refinements

Unit-3

- **UNIT-3**
- Knowledge Representation
  - First Order Predicate Calculus;
    - Skolemnisation;
    - Resolution Principle and Unification;
    - Inference Mechanisms Horn's Clauses;
  - Semantic Networks;
  - Frame Systems and Value Inheritance;
  - Scripts;
  - Conceptual Dependency
  - AI Programming Languages
  - Introduction to LISP, Syntax and Numeric Functions;
  - List manipulation functions;
  - Iteration and Recursion; Property list and Arrays,
  - Introduction to PROLOG.

Unit-4

- **UNIT-4**
- Natural Language Processing and Parsing Techniques;
  - Context - free Grammar;
  - Recursive Transition Nets (RTN);
  - Augmented Transition Nets (ATN);
  - Semantic Analysis,
  - Case and Logic Grammars;
- Planning Overview - An Example Domain:
  - The Blocks Word;
  - Component of Planning Systems;
  - Goal Stack Planning (linear planning);
  - Non-linear Planning using constraint posting ;
- Probabilistic Reasoning and Uncertainty; Probability theory; Bayes theorem

Unit-5

- **UNIT-5**
- Expert Systems:
- Introduction to Expert Systems,
- Architecture of Expert Systems;
- Expert System Shells;
- Knowledge Acquisition; Case Studies: MYCIN,
- Learning,
  - Rote Learning;
  - Learning by Induction;
  - Explanation based learning.

Books

- **Text Book**
- Elaine Rich and Kevin Knight: Artificial Intelligence- Tata McGraw Hill.
- Dan W.Patterson, Introduction to Artificial Intelligence and Expert system, Pearson Education
- **Reference Book**
- Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
- Artificial Intelligence : A Modern Approach, Stuart Rusell, Peter Norvig, Pearson Education, 2nd Edition
- 3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education
- 4. Artificial Intelligence by Gopal Krishna , Janakiraman

Course Outcome

- To develop algorithm for searching a solution for a problem
- To design a knowledge representation of a complex problem and implement inference algorithm
- To implement probabilistic model in case of uncertain situations
- To implement planning system at small scale