

MODULE: ARTIFICIAL INTELLIGENCE

Aims and Objectives:

- Have a thorough understanding of classical and modern AI applications;
- Be able to implement a wide range of AI concepts using Prolog;
- Understand non-classical AI approaches such as genetic algorithms and neural networks;
- Be able to assess the potential of AI in research and real-world environments;

Assessment Methods:

- Written Exam 70%
- Course Work 30%

Reading List :

Title	Author	Publisher
Artificial Intelligence	S. Russell, P. Norvig	Prentice Hall
Artificial Intelligence	E.Rich, K. Knight	McGraw Hill
Neural Networks	Phil Picton	Palgrave
Algorithms for Image processing & Computer Vision	J.R. Parker	Wiley
Speech Processing	C. Rowden	McGraw Hill
Artificial Intelligence	S. Russell, P. Norvig	Prentice Hall

SYLLABUS – Artificial Intelligence

1. Logic & Theorem Proving

- Review propositional & predicate Calculus
- Resolution

2. Production Rules

- Procedural versus declarative knowledge
- Forward versus backward reasoning
- Matching
- Control Knowledge

3. Statistical Reasoning

- Classical logic versus nonmonotonic logic
- Default logic
- Circumscription
- Fuzzy Logic
- Typicality
- Levels of confidence
- Baye's Theorem
- Dempster-Shafer theory of evidence

4. Slot & Filler Structures

- Semantic nets
- Frames
- Scripts

5. Learning

- Rote Learning
- Learning by taking advice
- Explanation based learning
- Discovery
- Analogy

6. Computer Vision

- Defining the problem
- Overview of solution: Marr's Theory
- Early processing: Gray level primal sketch
- Primal sketch to 2.5D sketch
- Late processing: 2.5D sketch to 3D sketch

7. Natural Language Processing

- Defining the problem
- Overview of solution
- Syntactic Analysis: Context-free grammars
- Transformational grammars
- Parsing: Top down, bottom up & chart parsing
- Semantics: Thematic roles, Aktionsart, Coercion, Cospecification, Extended reasoning with KB
- Discourse & Pragmatic Processing: Modelling

8. Connectionism

- Biological basis of connectionism
- Historical background to connectionism
- McCulloch & Pits formal neuron, Hebb's learning rule, Rosenblatts perception
- Associations
- Hopfield Networks
- Backpropagation
- Connectionist representations & representational adequacy