Turbomachinery Institute of Technology and Sciences

Indresam, Patancheru, Hyderabad

Question Bank

Year: III-II Branch: C.S.E. Subject: A.I. & N.N. Name of the Faculty: B. Bala Krishna

UNIT I

Unit I: Introduction : AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

1. Define Artificial Intelligence and discuss about underlying assumptions about Physical Symbol system. (June, 2010)

2. Explain briefly about Water jug problem and explain the state Production rules for Water jug problem.

3. What is AI? Explain any four approaches to AI (Nov., 2010)

4. Compare a computer and human brain and also explain how human brain process the information (Nov., 2008)

5. Explain the Neuron and a simulated neuron with a diagram and compare (Nov., 2008)

6. what is an agent? Explain the vacuum cleaner world example? (Nov., 2008)

7. Discuss about utility based agents (August, 2008)

8. Explain simple reflex agents

9. What are simple reflex agents? Explain with a diagram (August, 2008)

10. What are model based reflex-agents? Explain with a diagram

11. What is 8-puzzle problem? By giving an example explain a stupid movie in 8-puzzle problem

UNIT-II

Unit II: Searching : Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search   Game Playing: Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

1. Explain various blind search strategies (Nov.,2008)

2. How breadth first search works? What are the features and applications of breadth first search (Nov., 2008)

3. What is a greedy best first search? Explain with example and diagram (Nov., 2008, Aug., 2008)

4. what is iterative deepening depth first search? Explain with an algorithm and diagram (Nov., 2008)

5. Explain in detail about A* algorithm (June, 2010)

6. Discuss in detail about algorithm for constraint satisfaction by taking some problem.

7. What are various blind search procedures and heuristic search strategies? Explain why they are named so, with your own example. (August, 2008)

8. Define a heuristic function and explain the linear combination with an example. (August, 2008)

9. Explain the hill climbing, local maximum and plateau with diagram

10. When would best-first search be worse than simple breadth first search? Explain with an example and diagram. (Aug,, 2008)

UNIT-III

Unit III: Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic,Resolution patterns in propos ional logic, Resolution, Forward & Backward. Chaining.

1. Explain difference between simple hill climbing and steepest ascent hill climbing. (Nov., 2008)

2. Explain difference between best first search and steepest ascent hill climbing (Nov., 2008)

3. Explain simulated annealing algorithm with an example (Nov., 2008)

4. Explain why it is a good heuristic to choose the variable that is most constrained, but the value that is least constraining in a CSP Search (Nov., 2008)

5. Jones, Smith, and Clark hold the jobs of programmer, knowledge engineer, and manager. Jones owes the programmer $10. The manager's spouse prohibits borrowing money. Smith is not married. Your task is to figure out which person has which job. Solve the problem using propositional logic. (Nov., 2008)

6. Discuss in detail about knowledge based agents (May, 2010)

7. Explain the complexity of propositional inference   (May, 2010)

8. What is a Wumpus world? Explain with an example acting and reasoning on the wumpus world. (May-10)

9. Describe a generic knowledge based agent.   (Nov., 2008)

10. What are the problems with propositional logic? (Nov., 2008)

11. How can a knowledge-based agent be made fully autonomous.   (Nov., 2008, May-10)

12. Explain forward and backward chaining in propositional logic.   (Nov., 2008)

13. Consider the following axioms   (Nov., 2008)

   P

   (P^Q)->R

   (SvT)-> Q

   T

Prove R using resolution in propositional logic.

UNIT – IV

Unit IV: First order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

1. Comment on propositional Vs. First-order inference   (Nov., 2008)

2. How can resolution be used to show that a sentence is   (Nov., 2008)

        i. Valid

       ii. Unsatisfiable

For each of the following pairs of atomic sentences, give the most general unifier if it exists

        i. P(A,B,B), P(X,Y,Z)

       ii. Q(Y,G(A,B)), Q(G(X,X),Y)

3. Consider the following sentences: (May, 2010)

        i. Jack owns a dog

       ii. Every dog owner is an animal lover

      iii. No animal lover kills an animal

      iv. Either Jack or curiosity killed the cat, who is named tuna.

a. Express the original sentences in the first order logic

b. Convert each sentence to implicative normal form

c. State whether curiosity killed the cat, using resolution with refutation.

4. Explain forward chaining algorithm (August, 2008; May, 2010)

5. Explain backward chaining algorithm (August, 2008; May, 2010)

6. What do you mean by semi decidability, What is semi decidability in first order logic? (May, 2010)

7. Comment on Completeness of first order logic. (May, 2010)

8. What do you mean by conjunctive normal form and implicative normal form? (May, 2010)

UNIT V

Unit V: Characteristics of Neural Networks, Historical Development of Neural Networks Principles, Artificial Neural Networks: Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units.

1. How new neural network architectures receive the known facts about working of human brain? Explain with Diagrams (Aug-08)

2. Draw and explain in detail the block diagram of nervous system.

3. Explain the Neurobiological analogy benefits of neural networks.

4. Explain the Uniformity of analysis and design benefits of neural networks.

5. Explain the fault tolerance benefits of neural networks.

6. Explain the VLSI implementability benefits of neural networks.

7. Explain the stochastic model of neuron with an example

8. Explain in detail about signal flow graph with an example

9. Write about nonlinear model of a neuron

10. What are the various structural organization of levels in the brain. Explain each of them.

11. What are the various structural organization of levels in the brain. Explain each of them (Nov-09)

12. Define neural network? What are its characteristics? Discuss in detail different architectures of Artificial Neural Networks.

UNIT VI

Unit VI: Feedforward Neural Networks: Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of pattern storage Networks. Analysis of Pattern Mapping Networks.

1. Give the analysis of pattern storage networks (May-10)

2. Give the analysis of pattern mapping networks (May-10)

3. Give the analysis of pattern classification networks. (May-10)

4. Give the analysis of pattern association networks. (May-10)

5. What are the applications of self organizing map in image processing and pattern recognition

6. It is sometimes said that "the SOM algorithm preserves the topological relationships that exists in the input space". Strictly speaking, this property can be guaranteed only for an input space of equal or lower dimensionality than that of the neural lattice. Discuss the validity of this statement

7. Explain briefly Gauss-Newton's for optimization

8. Write about optimal learning and momentum constants in back propagation

UNIT VII

Unit VII: Feedback Neural Networks:Introduction, Analysis of Linear Autoassociative FF Networks, Analysis of Pattern Storage Networks.

1. Explain Non-linearity capabilities of neural networks (May-10, Set 1)

2. Explain Input-Output mapping capabilities of neural networks (May-10, Set 1)

3. Explain Adaptability capabilities of neural networks (May-10, Set 1)

4. Explain Evidential response capabilities of neural networks (May-10, Set 1)

5. Give the analysis of Auto associate feed forward networks (May-10, Set 2)

6. Give the analysis of pattern storage networks (May-10, Set 3)

7. Write the various benefits of neural networks. Explain them in detail.(May-10, Set 4)

8. Explain the threshold function.(May-10, Set 4)

9. Explain the activation function involved in the computation of back propagation

10. Write distinct properties of Back propagation network

11. Why Back propagation is also called generalized delta rule? Justify

12. Why convergence is not guaranteed in back propagation algorithm? Brie y explain

UNIT VIII

Unit VIII: Competitive Learning Neural Networks & Complex pattern Recognition: Introduction, Analysis of Pattern Clustering Networks, Analysis of Feature Mapping Networks, Associative Memory.

1. Explain about associative memory networks in detail

2. Discuss in detail about pattern clustering network

3. Explain the analysis of feature mapping networks.

4. Explain the analysis of associate memory.

5. Explain two basic feature mapping models and compare them

6. In boltzmann learning rule explain the Energy function

7. In boltzmann learning rule explain the Clamped condition

8. In boltzmann learning rule explain the Free-running condition

9. In boltzmann learning rule explain the Boltzmann Learning rule