Model Answer

AU 6285

Department of CSIT

MSc (CS): Semester III Year: 2014 Paper Title: Artificial Intelligence and Expert Systems Max Marks: 60

Note: The model answers to few questions are provided in http://www.ggu.ac.in/CSIT_LectureNotes14-15.html and written LN in the following answers. Remember these are model answers only to provide guidelines. The classroom exercises also to be recalled.

Section A: **(All 10 questions are compulsory)** **10X2=20**

Very Short Answer Questions: Write very short answers to following questions.

- How will you define the term Artificial Intelligence?

  AI is the science of making a machine think and act like an intelligent person. Or take Any definition/meaning from P5-8 of LN.

- What are intelligent agents?

  Intelligent agents can b software with some required hardware to assist humans to achieve goals requiring intelligence. (can also write from P14 of LN)

- Name any two uninformed and informed search techniques each.

  Uninformed: Breadth First BFS and Depth First DFS; Informed: Best first, Greedy, A* Search

- What is the meaning of the term local search, write any one example?

  When the search is in a limited area or region (locally) e.g. generate and test/hill climbing

- Unify (i) P(a,a) and P(a,c) (ii) Q(m,n) and Q(p,p)

  - Use c/a to get P(c,c) and P(c,c)

  - Use p/m and then p/n to get Q(p,p) and q(p,p) or any similar operation

- Convert into clause form (i) (a b) (ii) A B

  - aVb (DeMorgan's law) (ii) AVB

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- Define feature, class and pattern with an example.

  See P80-82 in LN for example, pattern can be like a record/instance, class is the label given to any pattern, feature is an attribute of a pattern

- What is the role of k in k-nn and k-means, write with some example.

  In k-nn, k is the number of nearest neighbors to test pattern; in k-means, k is the number of clusters defined by a user

- What is an expert system?

  See P92 of LN, An expert system is a complex AI program which is used to solve problems which are solved by human expert. E.g. what an expert physician doctor does, same purpose must be achieved by an expert system.

- Write in brief about any two advantages of an expert system.

- Availability (ii) knowledge update at any time, see P93 of LN.

Section B: **(Attempt any 4 questions out of 7 questions)**   **4X10=40**

Descriptive Questions:

- State a water jug problem. Write all productions rules required to solve it and write the solution.

  See P20-22 of LN, write solution and rules both.

- Explain the meaning of proposition and hence propositional logic. What are simple and compound propositions, write with examples.

  See P50-53 (can also talk of resolution with some part from P66-67 of LN)

- Write short notes with examples on (a) Use of unification algorithm (b) Skolem function.

  - See P64-65 of LN for basic definition, why to use unification to unify literals in proposition and predicate logic while resolution, take any example like P(a,b) and P(c,c)

- See P63 of LN. Use Skolem to remove existential quantifier

- Explain semantic nets and partitioned semantic nets. Draw partitioned semantic nets for the sentences (a) Every dog has bitten a postman (b) Every dog has bitten every postman.

  See P74-78 of LN

- Describe k-means clustering technique with example.

  See P89-90 and take any example of a small database as practiced in classroom, write some introduction to k-means and unsupervised classification.

- Describe k-nn technique with example for classification.

  See P84-86 and take any example of a small database as practiced in classroom with training and testing parts, write some introduction to k-nn and supervised classification.

- Explain the roles of a knowledge engineer, domain expert and an end user in an expert system.

  See Unit 5 of LN. Knowledge Engineer is one who processes the knowledge collected from domain expert. The knowledge engineer may not be a subject expert but he/ she must be familiar with the domain to work upon. The domain expert is the one who has the real expertise in the subject which is going to be designed by a knowledge engineer. The end user is the user of the expert system. He will report all feedback, problems, and suggestions to the knowledge engineer who in turn will discuss with domain expert to solve provided the product is free from other technical flaws.