138

Roll No. 2 0 1 6 0 2 4 1 2 3

MCA

Year 3rd / Semester: 5th

Major Examination: Session 2018-2019

ARTIFICIAL INTELLIGENCE: ~~PRINCIPAL'S& TECHNIQUE~~ Principles & Technique.

Time: 3 Hrs

Max Marks: 50

Note: Answer all questions.

Q1. *Attempt any five of the following questions.* (5x2=10)

(a). What are the facts that are to be represented in knowledge? Explain with example.

(b). What are heuristics and what is their importance? Describe their types, with this help of examples.

(c). What is a state-space graph? Explain in details the uninformed and informed search techniques?

(d). What is a Proposition? Explain it. Explain Forward Chaining and Backward chaining considering the following example.

p1: the sky is not cloudy

p2: it will not rain

p3: p1→ p2

(e). Explain the concept of searching. Explain A* algorithm .

(f). What is an intelligent agent? Describe the communication among agents with suitable examples?

(g). Trace the constraint satisfaction procedure for solving the following cryptarithemetic problem:

```
  CROSS
+ROADS
-------
DANGER
-------
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Q2. *Attempt any two of the following questions.* (2X5=10)

(a). Differentiate tree based breadth-first, depth-first and iterative-deepening search strategies based on completeness, time and space complexities.

(b). Show how means-end analysis could be used to solve the problem of getting from one place to another Place. Assume the available operators are walk, drive, take the bus, take a cab, and fly.

(c). What is fuzzy set and membership function? What is the difference between a crisp set and fuzzy set explain with example? Explain features of the membership function.

Q3. ***Attempt any two of the following questions.*** **(2X5=10)**

(a). Explain the Bayesian theorem. A Box contains 10 screws out of which 3 are defective. Two screws are drawn at random .Find the probability that none of the two screws are defective using

1) Sampling with replacement and
2) Sampling without replacement

(b). Design a system whose input is the membership value of a person being young, and output is the membership value of the person being a fast-runner.

PR1: IF X-is Young THEN X-is-a Fast-Runner.

Suppose the membership distribution of subset Young is given in the following form:

Young = {10 / 0.1, 20 / 0.6, 30 / 0.8, 40 / 0.6},

Fast-Runner = {5 / 0.1, 8 / 0.2, 10 / 0.4, 12 / 0.9}.

(c). Explain Knowledge Representation from learning system with Examples

Q4 ***Attempt any two of the following questions.*** **(2X5=10)**

(a). Explain the Dempster Shafer theory for uncertainty management with example.

(b). What do you understand by "training the neural network "Differentiate between the supervised and unsupervised learning.

(c). What are the main steps in developing a frame based expert system?

Q5 ***Attempt any two of the following questions.*** **(2X5=10)**

(a). How are objects related in a frame based system? Is the 'Is-a' relationship the only one or not explain it

(b). How the Decision Tree evaluate the best hypothesis to design the learning system? Explain with example.

(c). Explain the concept of Pattern Recognition using neural network with example.

TEST -1 (2017-18)

MCA. 3rd year (V Semester) YEAR

COMPUTER SC&ENGG DETT

Artificial Intelligence Paper Code: MCS-138

Time: - 2 hrs *Maximum Marks: 30*

Note: Attempt ALL questions. Each question carries equal Marks

Q.1 Attempt any three of the following. Q.1 (a) is compulsory.

a. What are the important characteristics of a control strategy? How does the control strategy lead to combinational explosion? What is the way out to solve the problem in such a case?

b. What are heuristics and what is their importance? Describe their types, with this help of examples.

c. Prove Breadth-first search is a special case of uniform-cost search with example

d. What is AI. What are the application area of AI .Explain it

Q.2 Attempt any three of the following. Q.2 (a) is compulsory.

(a) Explain the type of production rules and its application. Given 2water jugs 4 liters and 3 liters neither has any marks on it .There are a pump that can be used to fill the jugs . Write the rule sets to obtain how you can get exactly 2 liters of water in 3L jug.

(b) Draw the search tree for four puzzle problem along with rule set and explain it.

(c) What are the facts that are to be represented in knowledge? Explain with example.

(d) Explain the type of production rules and its application.

Q.3 Attempt any three of the following. Q.3 (a) is compulsory.

(a) Explain the concept of searching. Explain A* algorithm and how A* algorithm is the best?

(b) Write the heuristics function of water jug problem and using A* find the path to get 3L jug contain 2L water.

COMPUTER SC &ENGG DEPTT

MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY, GORAKHPUR

ODD SEMESTER 2018-19

ROLL NO | 2 | 0 | 1 | 6 | 0 | 2 | 4 | 1 | 2 | 3 |

Test

ARTIFICIAL INTELLIGENCE PRINCIPLES & TECHNIQES

Paper code: MCA 138

Maximum Marks: 30

Time: 2 hrs.

Q1. *Attempt any three of the following Q.1 (a) is compulsory.*

a. Explain the type of production rules and its application. Given 2water jugs 4 liters and 3 liters neither has any marks on it .There is a pump that can be used to fill the jugs .If possible how can you get exactly 2 liters of water in 3liter jugs. Write the rule sets also (4)

b. What are the facts that are to be represented in knowledge? Explain with example (3)

c. What are the important characteristics of a control strategy? How does the control strategy lead to combinational explosion? What is the way out to solve the problem in such a case? (3)

d. Define intelligence. What are the intelligent behaviors of a machine? (3)

Q2. *Attempt any three of the following Q.2 (a) is compulsory.*

a. Explain the concept of searching. How A* algorithm is the best? Explain with the help of water jug problem. (4)

b. List problems for which the forward chaining inference technique is appropriate. Why backward chaining used for diagnostic problem (3)

c. List advantages of rule based expert system. What are their disadvantages? (3)

d. Explain the AO* algorithm. Explain with example (3)

Q3. *Attempt any three of the following Q.3 (a) is compulsory.*

a. (a) Explain the Wang's algorithm and prove the following (4)

$$\neg q \cdot p \rightarrow q \Rightarrow \neg p$$

b. Prove the following in Propositional Logic (3)

1. $p, p \rightarrow q, q \rightarrow r \Rightarrow r$
2. $p \wedge (q \vee \neg q) \Leftrightarrow p$
3. $p \leftrightarrow q \Leftrightarrow (p \wedge q) \vee (\neg q \wedge \neg p)$

c. Represent the following sentences using symbolic logic: (3)

i) Students like good teachers.

ii) All that glitters is not gold.

iii) God help those who help themselves.

d. Prove that if a heuristic is consistent, it must be admissible. (3)

MCS138

ROLL NO | | | | | | | 1 | 0 | 3 |

MCA-final year
ODD SEMESTER
MINOR TEST 2019-2020

Subject Name: Artificial Intelligence : Principle and Techniques

Times: 2 Hrs. **Max Marks: 30**

Note: Answer all questions.

Q.1	**Attempts any Three parts of the following. Q.1 (a) is compulsory**	**Mark**
(a)	Explain Intelligent Agents . Explain different types of Agent Architecture in details	4
(b)	What are heuristics and what is their importance? Describe their types, with this help of examples.	3
(c)	Give an instance of the Travelling Sales Person problem for which the nearest neighbour's strategy fails to find an optimal path. Suggest another heuristic for this problem.	3
(d)	Solve the water jug problem with the capacity of the two jugs as 3 and 4, litres, and design the rule set to draw the state space diagram to find 2 litre water in 3 litre jug.	3
Q2	**Attempts any three parts of the following. Q.2 (a) is compulsory**	
(a)	Solve the water jug problem using A* Algorithm with the capacity of the two jugs as 3 and 4, litres, writing all the salient operators. Draw the complete state space diagram to find 2 litre water in 4 litre jug. Using heuristics function	4

h' (x) = 2, when 0 < X < 4 AND 0 < Y < 3,
h' (x) = 4, when 0 < X < 4 OR 0 < Y < 3,
h' (x) =10, when i) X = 0 AND Y = 0
OR ii) X = 4 AND Y = 3
h' (x) = 8, when i) X = 0 AND Y = 3
OR ii) X =4 AND Y = 0

(b)	How the Semantic Net representation is useful in Knowledge Representation in expressiveness explain it .Represent the following in partitioned semantic networks 1 Every player kicked the ball. 2 All players like the referee.	3
(c)	Write the algorithm to solve the 8-puzzle and draw the state space diagram. and design the rule set	3
(d)	What are the facts which represented in Knowledge to get some needful information for system development?	3

Q3 **Attempts any three parts of the following. Q.3 (a) is compulsory**

(a) Explain The MINIMAX Algorithm with example. 4

(b) What are the ways of Searching ?Explain Blind Search Depth first search and Breadth-first search with example 3

(c) Draw the state-space graph for the hypothetical problem .Let us Consider the following knowledge base, the starting state and the goal state for a hypothetical problem. The "," in the left-hand side of the production rules PR 1 through PR 4 denotes joint occurrence of them. 3

PR 1: p, q → s
PR 2: s, t →u
PR 3: p, q, r → w
PR 4: w→ v
PR 5 : v, t → u
Starting state: p and q
Goal state: u.
Other facts: t

(d) Explain α-β cut-off algorithm. Show the computation for the first 3 ply moves in a tac-tac-toe game using the α-β cut-off algorithm 3

MCA 136

Roll No. 2 0 1 7 0 2 4 1 0 3

M.C.A.
V SEMESTER
MAJOR EXAMINATION 2019 - 2020

Subject Name: Introduction to Wireless & Mobile Computing

Time: 3 Hrs. **Max. Marks: 50**

Note: Attempt all questions. Each question carries equal marks.

1. **Attempt any five parts of the following:** **(5× 2 = 10)**

(a) Discuss the advantage and disadvantage of cellular system with small cells.

(b) What is spread spectrum technique? Discuss direct sequence spread spectrum and their advantages and disadvantages.

(c) Write different steps that take place for a mobile terminal call by fixed station to mobile station in GSM network.

(d) Explain GPRS architecture in detail with a neat diagram. Explain in what ways is GPRS better than GSM.

(e) Briefly explain architecture of an infrastructure –based IEEE 802.11 and architecture of IEEE 802.11 ad-hoc wireless LANs.

(f) What is a GEO? Compare GEO, MEO and LEO satellite types.

(g) Compare SDMA, TDMA, FDMA and CDMA techniques.

2. **Attempt any two parts of the following:** **(2× 5 = 10)**

(a) Illustrate AODVroute discovery and route maintenance processes in detail and compare with DSR.

(b) Classify the MANET routing algorithms. Describe what are the problems does dynamic topology causes in the design of routing protocol? How are these problems addressed in a popular MANET routing protocol?

(c) Describe the following terms associated with mobile IP in detail: i) Corresponding Node ii) Mobile Node iii) Agent Discovery v) Care of Address vi) Tunnelling and Encapsulation.

3. **Attempt any two parts of the following:** **(2× 5 = 10)**

(a) Explain indirect TCP model with a neat diagram. What are the factors affecting TCP performance of wireless media?

(b) Differentiate between Traditional IP and Mobile IP? Briefly describe and compare the following mobility solutions:

i) IPv4
ii) IPv6
iii) Host identity payload (HIP)
iv) Migrate Approach

(c) Explain route request and route reply process in DSDV protocol. Write advantage and disadvantage of DSDV protocol.

4. Attempt any two parts of the following: **$(2\times 5 = 10)$**

(a) Describe logical model of WAP application environment with the help of suitable diagram.

(b) Explain WTLS Internet Architecture with the suitable diagram.

(c) Explain and differentiate between WML and HTML? Why are these solutions especially needed in wireless mobile environments?

5. Attempt any two parts of the following: **$(2\times 5 = 10)$**

(a) Explain the WTA voice mails communication with the help of suitable diagram. How MMS different from Short Message Service and Extended message Service?

(b) What are the enhancements of WAE to the classic client/server model of the web? What are the functions of this enhancement?

(c) Describe the WAP protocol stack while enumerating the functions of different layers.

138

Roll No. 2 0 1 7 0 2 4 1 6 3

MCA
Year 3rd / Semester: 5th
Major Examination: Session 2019-20

ARTIFICIAL INTELLIGENCE PRINCIPLES &TECHNIQES

Time: 3 Hrs **Max Marks: 50**

Note: Answer all questions.

Q1. ***Attempt any five of the following questions.*** **(5x2=10)**

(a). What are the facts that are to be represented in knowledge? Explain with example.

(b). Prove that if a heuristics is consistent it must be admissible. Construct an admissible heuristics that is not consistent

(c). Which of the following production systems is more stable? Explain it

(1) Knowledge base
If A&B then C

If C then D

If D then E

Initial WM= {A, B} and Goal {E}

(2) Knowledge base
If A then C

If C then E

If A&C then F

If A then F

Initial WM= {A, C} and goal {F}

(d). What is a Proposition explain it? Expl in Forward Chaining and Backward chaining considering the following example.

p1: the sky is not cloudy

p2: it will not rain

p3: p1→ p2

(e). Explain the concept of searching. Explain the AO* algorithm with example

(f). Explain how Case based learning represent Knowledge? Explain with Examples

(g). Prove Breadth first search is a special case of uniform- cost search with example.

(2X5=10)

Q2. ***Attempt any two of the following questions.***

(a). Explain the Bayesian theorem. A Box contains 10 screws out of which 3 are defective. Two screws are drawn at random .Find the probability that none of the two screws are defective using

1) Sampling with replacement and

2) Sampling without replacement

(b). **Explain the Demster Shafer theory for uncertainty management with example.**

(c). Explain the Wang's algorithm and prove the following

$\neg q , p \rightarrow q \Rightarrow \neg p$

Q3. ***Attempt any two of the following questions.*** **(2X5=10)**

(a). Write the algorithm to solve the 8-puzzle and draw the state space diagram, and design the rule set

(b). Explain the concept of Fuzziness. Design a system whose input is the membership value of a person being young, and output is the membership value of the person being a fast-runner.
PR1: IF X-is Young THEN X-is-a Fast-Runner.
Suppose the membership distribution of subset Young is given in the following form:
Young = {10 / 0.1, 20 / 0.6, 30 / 0.8, 40 / 0.6},
Fast-Runner = {5 / 0.1, 8 / 0.2, 10 / 0.4, 12 / 0.9}.

(c). Explain the Resolution Algorithm in propositional Logic and prove the following
$p, p \rightarrow q, q \rightarrow r \Rightarrow r$

Q4 ***Attempt any two of the following questions.*** **(2X5=10)**

(a). Prove the following in Propositional Logic
1. $p, p \rightarrow q, q \rightarrow r \Rightarrow r$
2. $p \wedge (q \vee \neg q) \Leftrightarrow p$
3. $p \leftrightarrow q \Leftrightarrow (p \wedge q) \vee (\neg q \wedge \neg p)$

(b). What do you understand by "training system"? Differentiate between supervised and unsupervised learning.

(c). How the Semantic Net representation is useful in Knowledge Representation. Explain it? Represent the following in partitioned semantic networks
1 Every player kicked the ball.
2 All players like the referee.

Q5 ***Attempt any two of the following questions.***
(2X5=10)

(a). Explain Fuzzy-IF -THEN rules. How the rules are designed for mobile system having two parameter as Energy and Load using fuzzy logic?

(b). Represent the following sentences using symbolic logic:

i) Students like good teachers.

ii) All that glitters are not gold.

iii) God help those who help themselves.

iv) A drunker is enemy of himself

v) John love Marry

(c). What is decision tree? How they are used for learning system design? Discuss its application.