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Question Paper Code: U9271

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Open Elective

Computer Science Engineering

21UCS971-ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FUNDAMENTALS

(Common To All Branches)

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1. Define the term "agent" in the context of Artificial intelligence. How does it interact with its environment? CO1-U
2. Define a tree and their types with examples. CO1-U
3. Define open list and closed list in searching. CO1-U
4. How does a heuristic function contribute to the efficiency of a search algorithm? CO2-App
5. Give formula for conditional probability. CO1-U
6. Define Baye's Theorem. CO1-U
7. Define learning algorithms. Give their types. CO1-U
8. Under what learning algorithm does decision tree, SVM, linear regression and logistic regression come? CO1-U
9. What are the advantages of K means algorithm? CO1-U
- 10 Define fuzzy C means clustering. CO1-U

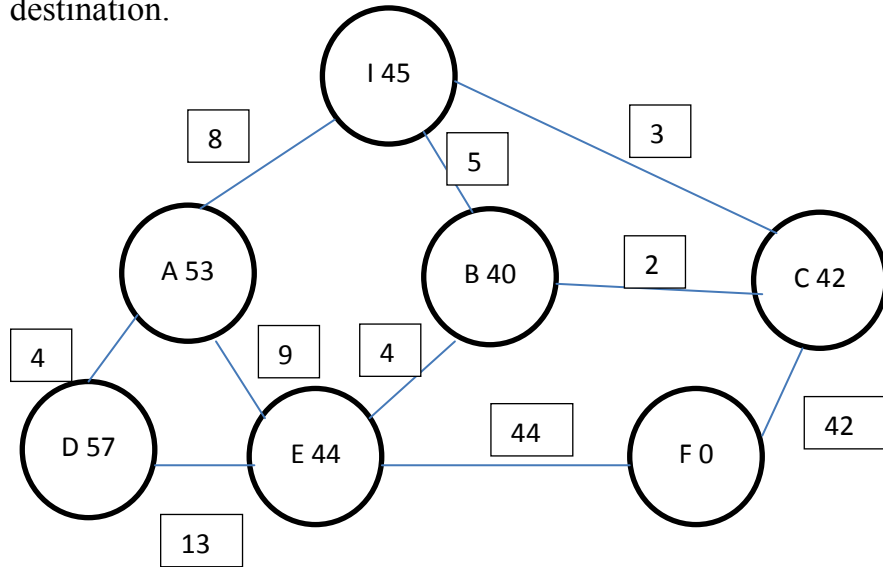
PART – B (5 x 16= 80Marks)

- 11 (a) Explain about the foundations of AI. CO2-App (16)
Or
(b) Give the complete state space when three coins are tossed and two dies are rolled. CO2-App (16)

- 12 (a) There are two water jugs of 4 L and 3 L and an infinite capacity water tank. One has to bring 2 liters of water in any one of the jugs. Use BFS to solve this problem. CO2-App (16)

Or

- (b) Apply A* algorithm to the following graph taking I as initial node and F as destination. CO2-App (16)



- 13 (a) (i) There are three machines in a manufacturing unit and 25% of the products are manufacture in machine A, 35% from B and 40% from C. The defective probability in each machine is 5%, 4%, and 2% respectively. A product is chosen in random and what is the probability of it being a defective one. CO2-App (8+8)
- (ii) Two cards are drawn from a deck with replacements. Find the probability of getting the second card as a king.)

Or

- (b) Create a Bayesian Networks CO2-App (16)
- You have a new burglar alarm installed. It is reliable about detecting burglary, but responds to minor earthquakes. Two neighbors (John, Mary) promise to call you at work when they hear the alarm. John always calls when hears alarm, but confuses alarm with phone ringing (and calls then also). Mary likes loud music and sometimes misses alarm! Given evidence about who has and hasn't called, estimate the probability of a burglary $P(\text{Burglary} = \text{true} \mid \text{JohnCalls} = \text{true}, \text{MaryCalls} = \text{true})$.

Give reasonable conditional probability tables for all the nodes.

How many independent values are contained in the joint probability distribution for eight Boolean nodes, assuming that no conditional independence relations are known to hold among them?

How many independent probability values do your network tables contain?

- 14 (a) The relation between distance and ticket fare the travel was taken to develop a regression model. Develop the model. CO2-App (16)

Int	15	23	18	23	24	22	22	19	19	16	24	11	24	16	23
Ex t	49	63	58	60	58	61	60	63	60	52	62	30	59	49	68

Or

- (b) Construct a decision tree classification model for the given table. CO2-App (16)

Age	Income	student	credit rating	buys_computer
<=30	high	no	fair	no
<=30	high	no	excellent	no
31..40	high	no	fair	yes
>40	medium	no	fair	yes
>40	low	yes	fair	yes
>40	low	yes	excellent	no
31..40	low	yes	excellent	yes
<=30	medium	no	fair	no
<=30	low	yes	fair	yes
>40	medium	yes	fair	yes
<=30	medium	yes	excellent	yes
31..40	medium	no	excellent	yes
31..40	high	yes	fair	yes
>40	medium	no	excellent	no

Classify X=(age=youth, income=medium, student=yes, credit_rating=fair).

- 15 (a) Explain k-means clustering in detail. CO1-U (16)

Or

- (b) Explain fuzzy C means algorithm in detail. CO1-U (16)

