

(6)

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- (c) Define the working methodology (mathematical representation for the program 'face detection using python libraries' with the help of pseudo code.

(CO4)

5. (a) Assume A.png and B.png are two images. Write python code to match the pattern of these images with the help of open CV.

(CO5)

- (b) Explain the concept of feedforward and back propagation of neural networks with the help of a diagram.

(CO5)

- (c) How can reinforcement learning be used to improve the control of autonomous vehicles, like self-driving cars or drones ?

(CO5)

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Roll No.

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**B. TECH. (CSE) (FIFTH SEMESTER)
END SEMESTER**

EXAMINATION, Dec., 2023

MACHINE LEARNING

Time : Three Hours

Maximum Marks : 100

- Note :** (i) All questions are compulsory.
(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.
(iii) Total marks in each main question are **twenty**.
(iv) Each sub-question carries 10 marks.

1. (a) There are many machine learning algorithms till now. If given a data set, how can one determine which algorithm to be used for that ?

(CO1)

P. T. O.

(2)

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- (b) Compute, mean, median, mode, range, average deviation, absolute deviation, squared deviation, standard deviation, total sum of squares for the following dataset :

{8, 25, 20, 10, 8, 3} (CO1)

- (c) What do you understand by supervised, unsupervised and reinforcement machine learning ? Explain the real time scenarios with examples where all these types of machine learning can be implemented.

(CO1)

2. (a) Assume s is a collection containing 14 example, $[9+, 5-]$. Of these 14 examples, suppose 6 of the positive and 2 of the negative examples have wind = weak and the remainder have wind = strong. What will be the information gain on attribute wind ?

(CO2)

(3)

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- (b) Predict the class label for a test instance with $X_1 = 3.8$ and $X_2 = 3.2$ using KNN with $K = 3$: (CO2)

Sl. No.	GPA	No. of projects done	Award
1	2.0	3.5	A
2	4.0	1.0	B
3	3.0	2.5	A
4	5.5	2.0	B
5	6.0	3.0	A
6	1.5	4.0	A
7	3.5	5.0	B
8	4.5	4.5	B
9	2.5	2.0	A
10	5.0	5.0	B

- (c) Explain the term decision tree in machine learning. How is it different from random forest. Explain the challenges that occur in the implementation of decision trees, and also give the solution to overcome these challenges. (CO2)

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3. (a) Explain RELU, Sigmoid and Softmax activation function with help of their working suitability and equations. (CO3)
- (b) Apply apriori algorithm on the grocery store example with support threshold $s = 33.34\%$ and confidence threshold $c = 60\%$, where H, B, K, C and P are different items purchased by customers.

(CO3)

- (i) Show all final frequent itemsets
- (ii) Specify the association rule that rare generated
- (iii) Show final association rules sorted by the confidence

Transaction ID items

T1	H, B, K
T2	H, B
T3	H, C, P
T4	P, C
T5	P, K
T6	H, C, P

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- (c) Consider a simple two-dimensional dataset with the following data points : (CO3)

Data points :

- (i) (2, 3)
- (ii) (2, 5)
- (iii) (3, 4)
- (iv) (4, 2)
- (v) (5, 3)
- (vi) (5, 5)
- (vii) (6, 4)
- (viii) (6, 6)

where ϵ (epsilon) = 1.5 and MinPoints = 3

Using DBSCAN form cluster and identify core, Noise, border and outlier (if available).

4. (a) Consider the following set of numbers $S = \{2, 4, 6, 10, 12\}$. Use $k = 2$ and cluster the number of set S into two clusters.

(CO4)

- (b) Difference between YOLO, ALEXNET, VGG-16, VGG-19 and MOBILE NET in terms of CNN layers and working criteria.

(CO4)

P. T. O.