VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD
Accredited by NAAC with A++ Grade
B.E. (E.C.E.) VIII-Semester Main & Backlog Examinations, May-2023
Image and Video Processing using Machine Learning (PE-V)

Time: **3 hours**

Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO	PSO
1.	What is the difference between traditional programming and Machine Learning?	2	2	1	1	3
2.	Discus about Logistic Regression?	2	1	1	1	3
3.	What is Bayesian Network?	2	1	2	1	3
4.	What are the advantages of Decision trees?	2	1	2	1	3
5.	What is support vector in machine learning?	2	1	2	1	3
6.	What are the disadvantages of K-means clustering algorithm?	2	1	2	1	3
7.	What are the advantages of LSTM?	2	1	2	1	3
8.	You are performing a binary classification task. Which activation function is suitable for your model? Justify.	2	2	3	2	3
9.	Write the applications of image retrieval system?	2	1	5	3	3
10.	What are the challenges in face recognition?	2	1	5	2	3

Part-B (5 × 8 = 40 Marks)

		M	L	CO	PO	PSO
11. a)	$J(w) = w_1^2 + w_2^2 + 4$. Learning rate is 0.1. Initial weights are [3 4]. Update weights using gradient descent algorithm at first and second iterations.	4	3	1	2	3
b)	Discuss Practical machine learning applications.	4	2	1	1	3

12. a)	Explain C4.5 algorithm.		4	2	3	3	3
b)	Probabilities are given as below:		4	3	3	3	3
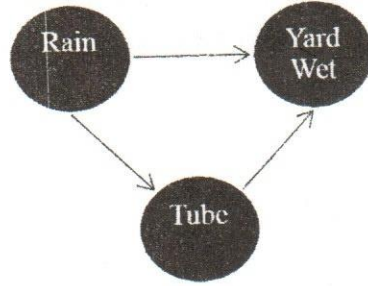
Yard			
Tube	Rain	True	False
False	False	0.0	1.0
False	True	0.8	0.2
True	False	0.9	0.1
True	True	0.99	0.01

Tube		
Value of Rain Node	True	False
False	0.4	0.6
True	0.01	0.99

Rain	
True	False
0.2	0.8

Given the Yard is wet, what is the probability that it is raining?
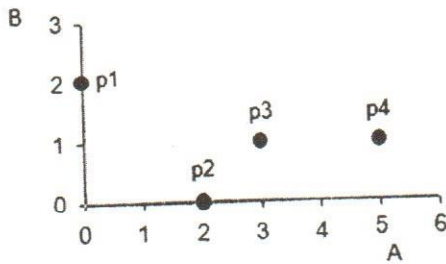
|			2	3	3	2	3
13. a)							

Calculate the distance matrix using Euclidean Distance for the above mentioned data.

b)	Plot a dendrogram using single linkage (Agglomerative Clustering) for the following data elements. Use Euclidean distance measure.		6	3	3	2	3

Point	a	b
P1	0.07	0.83
P2	0.85	0.14
P3	0.66	0.89
P4	0.49	0.64
P5	0.8	0.46

Q. No.		Question	M	L	CO	PO	
14.	a)	With a neat diagram explain RNN.					
	b)	Use the initial weights and bias as zeros. Calculate the final weights during the training phase for the following perceptron by considering the given input vectors.	4	2	5	1	3
			4	3	5	1	3

Input   Perceptron Neuron

$Y = \text{hardlim}(Wx+b)$
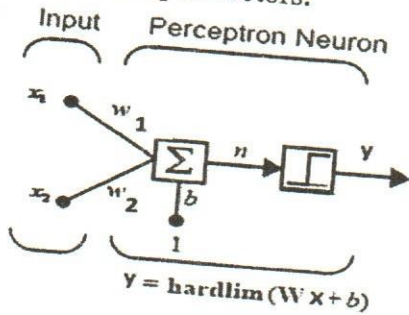
$$\left\{x_1 = \begin{bmatrix}2\\2\end{bmatrix}, T_1 = 0\right\} \left\{x_2 = \begin{bmatrix}1\\-2\end{bmatrix}, T_2 = 1\right\} \left\{x_3 = \begin{bmatrix}-2\\2\end{bmatrix}, T_3 = 0\right\} \left\{x_4 = \begin{bmatrix}-1\\1\end{bmatrix}, T_4 = 1\right\}$$

Q. No.		Question	M	L	CO	PO	
15.	a)	Design the diagram for Satellite Image classification (Water, Building, Vegetation) using Decision Tree (Consider NDVI as feature-assume values)?	4	3	5	1	3
	b)	What are the different metrics used for asses the performance of the neural networks? Explain with an example.	4	2	4	2	3
16.	a)	Explain Data inconstancies with an example.	4	2	1	1	3
	b)	Planning a picnic today-but the morning is cloudy.	4	3	2	2	3

16. b)
1. 50% of all rainy days start off cloudy!
2. But cloudy mornings are common (about 40% of days start cloudy)
3. This is usually a dry month (only 3 of 30 days tend to be rainy)

By considering the above observations Calculate the percentage chance of the rain today.

17. Answer any *two* of the following:

a) Segment the given image of size 2 x 3 into two clusters using K-Means.

$$\begin{bmatrix} 1 & 200 & 3 \\ 4 & 500 & 6 \end{bmatrix}$$

b) Explain Back propagation operation in neural networks.

c) With an example explain the operation of Convolutional Neural Network containing two convolution layers (output should be 3 classes).

Q. No.		M	L	CO	PO	
17. a)		4	3	3	2	3
17. c)		4	2	5	2	3
		4	2	5	2	3

M : Marks;   L: Bloom's Taxonomy Level;   CO; Course Outcome;   PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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