

05/04/2023
WEDNESDAY

B.E.(CSE),CEG, AU CHENNAI

MID SEM ---CS6301 Machine Learning

(RUSA R-2018)

Date: 5th APR 2023

Marks: 50

Time: 1 ½ HR

Answer All Questions

Part A (Answer Any 5)

5 X 2 = 10

1. Compare Sequential and Batch Training. CO1, L4
2. What is Machine Learning? How is it different from Traditional Programming? CO1, L2
3. Consider a neuron with 2 inputs, 1 output, and a threshold activation function. If the two weights are $w_1 = 1$ and $w_2 = 1$, and the bias is $b = -1.5$, then what is the output for input (0, 0)? What about for inputs (1, 0), (0, 1), and (1, 1)? Draw the discriminant function for this function, and write down its equation. Does it correspond to any particular logic gate? CO2, L5
4. Differentiate bias and variance. Give its impact in choosing the best model. CO1, L5
5. You want to evaluate the classifier you trained. Your test set (X_{test}, Y_{test}) is such that the first m_1 images are of dogs, and the remaining images are of cats. After shuffling X_{test} and Y_{test} , you evaluate your model on it to obtain a classification accuracy $a_1\%$. You also evaluate your model on X_{test} and Y_{test} without shuffling to obtain accuracy $a_2\%$. What is the relationship between a_1 and a_2 ($>, <, =, \leq, \geq$). Explain. CO2, L5

Part B (Answer any 5)

5 x 8 = 40

1. Explain the various steps in the design of learning system and also discuss the design issues. CO1, L1
2. Compare and Contrast Supervised learning, Unsupervised learning, Semi supervised learning and Reinforcement learning. Give an example for each of learning. CO1, L4
3. Explain the concept behind RBF network. Create a MLP/RBF network that solves the XOR function and also with example explain how it is used for classification applications CO2, L6
4. Consider the following 2D data- (x,y):: (2, 2) (5,7) (2,9) (1, 2) (3,1) (3,7) (2, 6) (1,5). Apply PCA or LDA to reduce the dimensions of the data. CO3, L5

5. Apply the Candidate elimination algorithm for the following sequence of training data. Read the Instances and find S and G after each step. CO2, L3

Example	Size	Color	Shape	Class/Label
1	Big	Red	Circle	No
2	Small	Red	Triangle	No
3	Small	Red	Circle	Yes
4	Big	Blue	Circle	No
5	Small	Blue	Circle	Yes

6. Give the interpretation of Bayes rule. Find the class using Naïve bayes classifier for the following data.

CO3, L3

Example	Colour	Toughness	Fungus	Appearance	Poisonous
1	Green	Hard	N	Smooth	N
2	Green	Hard	Y	Smooth	N
3	Brown	Soft	N	Wrinkled	N
4	Orange	Hard	N	Wrinkled	Y
5	Green	Soft	Y	Smooth	Y
6	Green	Hard	Y	Wrinkled	Y
7	Orange	Hard	N	Wrinkled	Y
8	Green	Soft	Y	Wrinkled	?

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B.E / B.Tech (Full Time) MID- SEMESTER EXAMINATIONS, April / May 2023
DEPT. OF COMPUTER SCIENCE AND ENGINEERING, CEG CAMPUS
ANNA UNIVERSITY, CHENNAI - 25
CS6301 - MACHINE LEARNING TECHNIQUES - (REGULATION 2019)

Duration: 1.30 hrs

Marks: 50

Part-A (5*2=10)

Sl.no	Answer the following	Marks	CO	Bloom
1	What is concept learning? Explain with example.	2	1	2
2	State any 4 applications of reinforcement learning used in day-to-day life.	2	5	1
3	How is KNN different from k-means clustering?	2	4	2
4	Distinguish: Sigmoid & Softmax in Neural Networks	2	2	2
5	State the impact of Learning Bias in ML performance.	2	1	2

Part-B (5*8=40)

Sl.no	Answer the following	Marks	CO	Bloom
6	Distinguish the working of LDA and HDP with examples.	8	1	2
7	Illustrate word embeddings with example.	8	3	3
8	Explain the working of hidden layer in RBF networks.	8	3	1
9	How are mixture models used for dimensionality reduction? Explain.	8	5	4
10	Calculate precision, recall, F1 score and accuracy for the following cases in dataset True positive=30, True negative=20, False positive=10, False negative=15.	8	3	5

09/05/2023

TUESDAY

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BE COMPUTER SCIENCE AND ENGINEERING, AU

5.9.23 Tutorial-1 VI Semester CS6301 Machine learning marks-25

1. Consider the following training set. Apply k-means clustering to this data set for $k=2$. Simulate the k-means algorithm for cluster assignments until convergence.

(1,2), (2,2), (4,3), (5,4), (6,5), (2,4), (6,6) and (7,6)

2. The following dataset will be used to learn a decision tree for predicting whether a person is happy (H) or sad (S) based on the color of their shoes, whether they wear a wig and the number of ears they have.

	Color	Wig	Num. Ears	(Output) Emotion
1	G	Y	2	S
2	G	N	2	S
3	G	N	2	S
4	B	N	2	S
5	B	N	2	H
6	R	N	2	H
7	R	N	2	H
8	R	N	2	H
9	R	Y	3	H

- A. Compute the entropy of the target attribute and the entropy $H(\text{Emotion}/\text{Wig}=Y)$
- B. Construct the decision tree from the above examples using ID3 algorithm. Show the information gain of each attribute at each step in the construction of the tree.
- 3) a) Briefly explain the concept of Bagging and Boosting with example (or)
- b) Explain the working principle of SOM