DEPARTMENT OF COMPUTER TECHNOLOGY
MIT Campus, Anna University, Chennai
Internal Assessment I

Sem: 6/8 Programme: B.E. (CSE) Date: 21-4-23

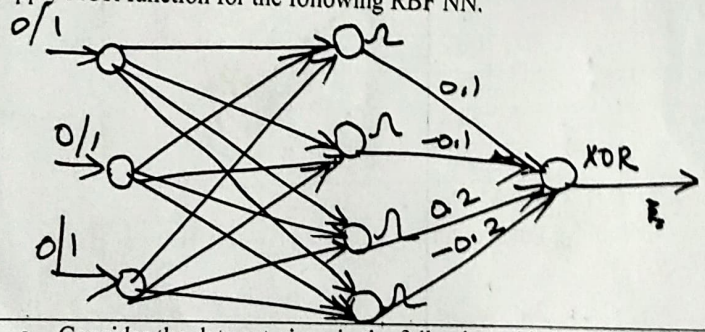
CS6301 – MACHINE LEARNING

Time: 90 Minutes Answer all questions Max. Marks: 50

Objectives:

CO1	To understand the need for machine learning for various types of problem solving
CO2	To know the mathematics involved in various machine learning algorithms
CO3	To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
CO4	To learn about probabilistic models in machine learning
CO5	To have a glimpse of the latest developments in machine learning

BL – Bloom's Taxonomy Levels (L1 – Remembering, L2 – Understanding, L3 – Applying, L4 – Analysing, L5 – Evaluating, L6 – Creating)

Sl. No.	Question	CO	BL
	Part -A (5*2=10)		
1	What is the need of machine learning?	1	L1
2	Define sensitivity and specificity.	2	L2
3	List out genetic operations.	5	L1
4	Find the number of distinct instances, syntactically distinct hypotheses and semantically distinct hypotheses possible for samples given in problem no. (8)	1	L2
5	What is Marcov decision process?	5	L1
	Part-B (8*4=32)		
6	Apply XOR function for the following RBF NN. 	3	L3
7	a. Consider the data set given in the following table to represents the number of hours a student spent for his study for the first 5 weeks. Apply Linear regression to find the he will spend in 7th week.	3	L3

weeks	1	2	3	4	5
Hours spent	12	18	22	28	35

b. Apply K-means clustering algorithm for the following samples, (1,1,1), (1,2,1), (2,1,1), (8,8,8), (8,10,8), (10,8,8) where k=2

8	Consider the training sample given below to describe the symptoms of COVID-19 test results. Apply candidate elimination algorithm to find the version space.	3	L3

Patient's id	fever	cough	Throat pain	Body pain	Covid-19
1	N	Y	Y	Y	positive
2	Mild	Y	Y	Y	positive
3	Y	N	Y	Y	Positive
4	N	Y	N	N	Negative
5	Y	Y	Y	N	Positive
6	Mild	N	N	Y	Negative
7	N	N	N	N	Negative

9	(i) State the ID3 algorithm (use gain ratio). Apply the same to construct a decision tree for the data given below.	3	L3

Attribute	Possible values
Age	old, midlife, new
Competition	no, yes
Type	software, hardware

and the training data is:

Age	Competition	Type	Profit
Old	Yes	swr	Down
Old	No	swr	Down
Old	No	hwr	Down
Mid	Yes	swr	Down
Mid	Yes	hwr	Down
Mid	No	hwr	Up
Mid	No	Swr	Up
New	Yes	Swr	Up
New	No	hwr	Up
New	No	Swr	Up

PART C (1 X 8= 8 Marks)

10	Explain the implementation details of MLP model for the following NN model with initial learning rate of 0.9.	3	L3