APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Scheme for Valuation/Answer Key

Scheme of evaluation (marks in brackets) and answers of problems/key

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CS467

Course Name: MACHINE LEARNING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1	Explanation-2 marks Examples for each(1+1)-2 marks	(4)
2	Definition of Hypothesis space – 1 mark Definition of version space – 1 mark h_m= IF x>=m THEN 1 ELSE 0 Hypothesis space H={ h_m : m is a real number} $VS_{D,H}$={ h_m : 7<m<=11} 1 mark each for finding hypothesis space and version space (1+1=2 marks)	(4)
3	Definition-2 marks (Occam's razor principle states that simpler explanations are more plausible and unnecessary possibility should be shaved off.) Explanation on its necessity – 2 marks	(4)
4	Definition of each term – 1 mark each	(4)
5	k-fold cross validation explanation – 1 mark Method (Leave-one-out) with explanation – 1+2 = 3marks	(4)
6	Correct Equation – 1 mark, Steps to compute the output – 2 marks, Final answer – 1 mark. **(Marks to be awarded for solving the problem using either Sigmoid activation function OR Bipolar sigmoid activation function.)**	(4)
7	Explanation on bagging – 2 marks, Explanation on boosting – 2 marks	(4)
8	Express K(x,y) as product of two functions – step by step procedure – 4 marks	(4)
9	Explanation of EM algorithm – 4 marks	(4)
10	Equation of distance measure – 1 mark, Calculation with correct answer – 3 marks **(Marks to be awarded for solving the problem using any one of the following distance measures; Euclidean /City block /Chessboard.)**	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Step by step procedure – 4 marks	(4)
	b)	Explanation of unsupervised learning – 2 marks Explanation of reinforcement learning – 2 marks Example for each – 1 mark	(5)
12	a)	Any 3 points – 3 marks	(3)
	b)	PCA significance – 1.5marks Explanation of basic procedure of PCA - 4.5 marks	(6)
13	a)	Justification with proof – 6 marks	(6)
	b)	Any 3 applications of Machine learning – (1*3= 3 marks)	(3)

PART C

Answer any two full questions, each carries 9 marks.

14		Step by step procedure – 8 marks Final Prediction – 1 mark	(9)
15		Computation of entropy of entire dataset – 1 mark Finding feature selection value for the four non-class attributes – 4 marks Determining Best Split attribute at the root level – 1 mark Finding the Best Split attributes at next sub-levels – 2 marks Decision tree/Prediction – 1 mark	(9)
16	a)	Benefits (avoid overfitting) with explanation – 1 mark Pre pruning and post pruning techniques – (2+2=4 marks)	(5)
	b)	Step by step procedure – 4 marks	(4)

PART D

Answer any two full questions, each carries 12 marks.

17	a)	Three problems – 2 marks each	(6)
	b)	Explanation with figures – each 3 marks	(6)
18	a)	Steps of 1st iteration-Assigning each point to one of the clusters – 2 marks, Computation of new centroids of each cluster – 1 mark 2nd iteration- computation of final clusters – 2 marks Computation of Final centroid values – 1 mark **(Marks to be awarded for finding <u>two clusters</u> from the two centroids given OR <u>three clusters</u> with assumption on third centroid value, using either Euclidean or City block as distance measure.)**	(6)
	b)	Significance (reduction of computational complexity) with necessary explanation – 3 marks	(6)

Explanation of any 2 kernel functions – 3 marks

19 a) Any one technique with necessary figures(1 mark) and explanation(5 marks) (6)

b) Step by step procedure to find the final set of single cluster – 5 marks (6)

Figure of Dendrogram – 1 mark

(Marks to be awarded if correct dendrogram is constructed using any one of the following algorithms- Single linkage OR Complete linkage OR Average linkage)

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