(3Hrs)

Max Marks: 80

N.B.: (1) Question No. **1 is compulsory**.

(2) Attempt any **three** of remaining **five** questions.

(3) Assume any suitable **data** if necessary and clearly state it.

1 (a) Define well posed learning problem. Hence, define robot driving learning problem. [05]

(b) Explain, in brief, Bayesian Belief networks. [05]

(c) Write short note on Temporal Difference Learning. [05]

(d) Explain procedure to construct decision trees. [05]

2. (a) Explain how support vector machine can be used to find optimal hyperplane to classify linearly separable data. Give suitable example. [10]

(b) Explain procedure to design machine learning system. [10]

3. (a) What is linear regression? Find the best fitted line for following example: [10]

i	x_i	y_i	$\hat{y}_i$
1	63	127	120.1
2	64	121	126.3
3	66	142	138.5
4	69	157	157.0
5	69	162	157.0
6	71	156	169.2
7	71	169	169.2
8	72	165	175.4
9	73	181	181.5
10	75	208	193.8

(b) What is decision tree? How you will choose best attribute for decision tree classifier? Give suitable example. [10]

4 (a) Explain K-mean clustering algorithm giving suitable example. Also, explain how K-mean clustering differs from hierarchical clustering. [10]

(b) What is kernel? How kernel can be used with SVM to classify non-linearly separable data? Also, list standard kernel functions. [10]

5. (a) What is Q-learning? Explain algorithm for learning Q. [10]

(b) Explain following terms with respect to Reinforcement learning: delayed rewards, exploration, and partially observable states. [10]

6 Write short notes on

(a) Soft margin SVM [05]

(b) Radial Basis functions [05]

(c) Independent Component Analysis [05]

(d) Logistic Regression [05]

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