No. of Printed Pages : **2**

Sl. No.

CE1.2-R4 : MACHINE LEARNING

NOTE :
1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time : 3 Hours **Total Marks : 100**

1. (a) What is machine learning and why it is important in current scenarios ?

(b) What basic approach one should follow to design a machine learning system ? Explain in brief.

(c) What is a neural network activation function ? Briefly discuss different types of activation functions in ANN.

(d) Discuss, how K-fold cross validation technique is used for the evaluation of machine learning algorithms ?

(e) discuss different types of learning used in the domain of Machine Learning.

(f) Discuss about few of most trending real-world applications of Machine Learning.

(g) Selecting the right machine-learning model is a challenging task. Discuss the process one should follow for it.

(7x4)

2. (a) Define Concept learning with a suitable example.

(b) What are ensemble methods ? Explain bagging, boosting and stacking ensemble methods.

(9+9)

3. (a) Define version spaces and explain the candidate elimination algorithm with suitable example.

(b) Consider a learned hypothesis, h, for some boolean concept. When h is tested on a set of 100 examples, it classifies 83 correctly. What is the standard deviation and the 95% confidence interval for the true error rate for $Error_D(h)$?

(9+9)

4. (a) Discuss Logistic Regression in Machine Learning with suitable example.

(b) Explain Naïve Bayes Classifier Algorithm with an example.

(9+9)

5. (a) Suppose hypothesis h commits r = 10 errors over a sample of n = 65 independently drawn examples. What is the 90% confidence interval (two-sided) for the true error rate ? What is the 95% one-sided interval (i.e., what is the upper bound U such that $error_D(h) <= U$ with 95% confidence) ? What is the 90% one-sided interval ?

(b) Support Vector Machine (SVM) is one of the popular classification and regression algorithms. Explain it in detail with one of its application example.

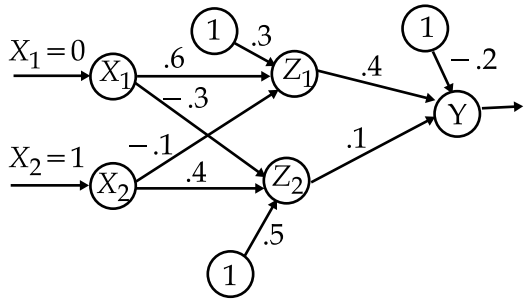
(9+9)

6. (a) Explain Biased Hypothesis Space with a suitable example.

(b) What is Decision Tree Classification Algorithm and why one should use it ? Explain using an example, how rules are formed with the help of a Decision tree.

(9+9)

7. (a) Find the new weights, using back propagation neural network for the network shown below. The network is presented with the input pattern [0, 1] and the target output is 1. Use learning rate 0.25 and binary sigmoidal activation function.



(b) Discuss First-order inductive learner (FOIL) algorithm.

(12+6)

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