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SPRING END SEMESTER EXAMINATION-2019

2nd Semester M.Tech

MACHINE LEARNING

CS6134

(For 2018 Admitted Batch)

Time: 3 Hours | Full Marks: 50

Answer any SIX questions.
Question paper consists of four sections-A, B, C, D.
Section A is compulsory.
Attempt minimum one question each from Sections B, C, D.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

SECTION-A

1. Answer the following questions. [1 × 10]

(a) What is an Artificial Neural Network?

(b) Distinguish between classification and regression.

(c) What is overfitting? How does it affect the performance of the model?

(d) Mention the applications of a Radial Basis Function Network.

(e) If a data set is imbalanced then find out a technique to balance it.

(f) Can a Support Vector Machine be used for regression? Justify.

(g) How kernel trick is useful in higher dimension space?

(h) What will be Euclidean Distance between the two data points A(1,3) and B(2,3)?

(i) Differentiate between linear regression and logistic regression.

(j) Define active learning.

SECTION-B

2. (a) What is a perceptron? Specify the perceptron learning rule. What is its purpose? [4]

   (b) Illustrate Naïve Bayes Classifier with an example. [4]

3. (a) Explain different model selection procedures. [4]

   (b) Explain back-propagation for a multi-layer feed forward network. [4]

SECTION-C

4. (a) Explain linear regression with an example. Compare the measures for accuracy in linear regression. [4]

   (b) Examine the purpose of the expectation-maximization algorithm. List the steps. [4]

5. (a) Analyze the principle of the gradient descent algorithm with a diagram. [4]

   (b) Analyze expectation maximization algorithm. [4]

6. (a) Compare various parameters for evaluating classification models along with their applicability. [4]

   (b) What is clustering? Apply k-means clustering on the given data for k=3. Use C1(2), C2(16) and C3(38) as initial cluster centres. [4]

   Data : 2,4,6,3,31,12,15,16,38,35,14,21,23,25,30

SECTION-D

7. (a) Elaborate the different feature selection methods and their applicability. [4]

   (b) Interpret the bias-variance tradeoff problem. [4]

8. Discuss any two - [4×2]

   (a) Regularization

   (b) Reinforcement learning

   (c) Hidden Markov Model

   (d) Kernel methods

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