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TCS–834

B. TECH (CSE) (EIGHTH SEMESTER)
END SEMESTER
EXAMINATION, May, 2022

MACHINE LEARNING

Time :Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Explain the concept of Learning Systems in detail. How the usage of Machine Learning methodology helps in the development of various learning systems ? Explain with the help of an example.

(CO1)

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(b) "machine Learning is an integral part of Artificial Intelligence." Comment on the above statement. Explain various applications of Machine Learning. (CO1)

(c) "Outlier needs to be handled very carefully in the implementation of Machine Learning approach." Justify the above statement. Explain how outlier can affect the performance of any machine learning model. (CO1)

2. (a) With respect to splitting of data explain Information Gain and Entropy by giving the formula to calculate them. Using Entropy find out the attribute according to which the data can be divided in the below example : (CO2)

Day	Company_ perf	exchange_ rate	gold _price	Action
1	High	Increase	Stable	Sale
2	Medium	Increase	Unstable	Purchase
3	High	Increase	Unstable	Purchase
4	Medium	Decrease	Stable	Purchase
5	Low	Decrease	Unstable	Purchase

6	Medium	Increase	Stable	Sale
7	High	Decrease	Stable	Purchase
8	Medium	Increase	Stable	Sale
9	High	Increase	Stable	Sale
10	Medium	Decrease	Unstable	Purchase
11	High	Decrease	Stable	Purchase
12	Medium	Increase	Stable	Sale
13	Medium	Decrease	Unstable	Purchase
14	Low	Increase	Stable	Purchase
15	Low	Increase	Stable	Purchase

(b) "In Supervised Machine Learning Approach Regression plays an important role." Justify the above statement. Explain the difference between Linear Regression and Logistic Regression. (CO2)

(c) Explain the term Decision Tree in Machine Learning. How is it different from Random Forest ? Explain the challenges that occur in the implementation of Decision Trees. Also give the solution to overcome these changes. (CO2)

3. (a) What do you mean by Perceptron ? Explain all components of Perceptron in detail with the help of an example. (CO3)

   (b) Write short notes on the following : (CO3)

   (i) Naive Bayes

   (ii) Backpropagation

   (c) Explain the working of K-Nearest Neighbor in Machine Learning. Also give the algorithm of K-Nearest Neighbor. (CO3)

4. (a) What is the use of Demographic Parity in Machine Learning ? Explain Impossibility theorem in detail with the help of an example. (CO4)

   (b) "In Unsupervised Machine Learning, Clustering techniques and algorithm are used to enhance the performance of machine learning model." Comment, Explain the concept of clustering and types of Clustering techniques in Machine Learning by giving examples of each. (CO4)

   (c) "For enhancing the performance of any Machine Learning model features or attributes plays an important role." Justify the statement. Explain the difference between Feature Selection and Feature Scaling. (CO4)

5. (a) Explain the concept of Reinforcement Machine Learning. How Markov Decision Process can be implemented using Reinforcement Machine Learning ? (CO5)

   (b) What do you mean by CNN ? Explain all the layers of CNN architecture. (CO5)

   (c) What do you understand by the term Deep Learning ? Explain various types of deep learning algorithms in detail. (CO5)