Total No. of Questions : 8]

SEAT No. :

PE2433

[Total No. of Pages : 2

[6584]-383
B.E. (AIDS)
MACHINE LEARNING
(2019 Pattern) (Semester - VII) (417521)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***

Q1) a) Explain evaluation measures (SSE, MSE) for regression model. For a given data having 100 examples, if squared errors SEI, SE2, and SE3 are 13.33, 3.33 and 4.00 respectively, calculate Mean Squared Error (MSE). State the formula for MSE. **[6]**

b) Explain K nearest neighbor classification algorithm with suitable example. **[6]**

c) What are kernel functions in SVM? Describe the Radial Basis Kernel, Gaussian, Polynomial, and Sigmoid kernel **[6]**

OR

Q2) a) Explain Baysian Linear Regression. **[6]**

b) Differentiate between balanced and imbalanced classification. **[6]**

c) Explain the concept of a soft margin SVM. How does it differ from a hard margin SVM? **[6]**

Q3) a) Explain the DBSCAN algorithm. How does it work? What are its advantages and disadvantages. **[9]**

b) Discuss the applications of clustering techniques in market segmentaion, social network analysis, image segmentation, and anomaly detection. Provide examples for each application. **[8]**

OR

Q4) a) Describe the Gaussian Mixture Model (GMM) for distribution-based clustering. How is it different from other clustering algorithms? **[9]**

b) Explain the K-Means clustering algorithm. What are its advantages and disadvantages. **[8]**

P.T.O.

Q5) a) Explain the concept of ensemble learning. Why is ensemble learning considered beneficial in machine learning? **[6]**

b) Discuss the concept of stacking in ensemble learning. What are the different methods used for variance reduction in stacking? **[6]**

c) Describe the Random Forest ensemble method in detail. **[6]**

OR

Q6) a) Differentiate between homogeneous and heterogeneous ensemble methods. provide examples of each type. **[6]**

b) Describe the concept of a voting ensemble. What are the different types of voting techniques? **[6]**

c) Explain the Adaptive Boosting (AdaBoost) algorithm in detail. **[6]**

Q7) a) Define reinforcement learning. Why is reinforcement learning important in the field of machine learning? **[9]**

b) Explain Markov's Decision Process (MDP). What is the Markov property in the context of MDP? **[8]**

OR

Q8) a) Introduce Q-learning. What are the important terms used in Q-learning? How does Q-learning work? **[9]**

b) Compare and contrast supervised, unsupervised, and reinforcement learning. Provide examples of each type. **[8]**

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