Total No. of Questions : 8]

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T.E.(Mechanical)

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (2019 Pattern) (Semester - II) (302049)

Time:2¹/₂ Hours] [Max. Marks : 70 Instructions to the candidates: Neat diagram must be drawn wherever necessary. 1) Figures to right side indicate full marks. 2) 3) Use of calculator is allowed. Assume suitable data wherever necessary. **4**) Explain following terms: [6] *Q1*) a) Accuracy. i) Precision. Recall. F-1 Score. iv) Explain the procedure to find out the optimum value of K in K-means b) clustering? [5] Explain the following terms **[6]** c) Entropy. i) Information gai ii) OR *Q2*) a) Explain the steps in KNN algorithm. What is SVM? How does it work? [5] b) Explain the evaluation parameters for regression model c) [6] Explain the steps involved in development of ML model. [7] Quality Engineer wants to solve a two-class classification problem for predicting whether a product is defective. The actual number of products containing no defect are 950 (Truly predicted positives = 900), the actual number defective products are 150 (Truly predicted negatives = 130). So, calculate accuracy, precision, recall and fl score. [4] Explain hyperparameter tuning parameters in decision tree. [7] c) OR

P.T.O.

- What are the different cross validation techniques? Explain K-fold cross **Q4**) a) validation with neat sketch. [7]
 - A sugar factory produces 3 sizes of sugar from three different nets. Daily b) 1000 tons of sugar produced from net-1, 3000 tons produced from net-2 and 2000 tons produced from net-3. The last year season experience shows that 1.5% of the total sugar produced from net 1 is waste sugar. the corresponding fractions of waste sugars for the remaining nets are 2.5% and 2% respectively. A certain amount of sugar is taken as a sample at random and is found to be waste sugar. Find out the probability that it is produced from. [4]
 - i) ii) iii)
 - What are the different classification algorithms? Explain logistic regression c) with neat sketch. [7]
- 05) a) Explain the concept of Reinforcement learning with suitable example.Define following terms in Reinforcement learning. [8]
 - i) Agent
 - ii) State
 - Environment iii)
 - iv) Reward
 - Define Markov property. Explain why Markov property is most applicable b) in solving Reinforcement learning problems. 61
 - The transfer function of neuron on one layer of a neural network is c) assumed to be of sigmoid from. Evaluate the output of neuron 248.26.28 2100 DE corresponding to input x = 0.62. How is the nature of sigmoid function? (Justify the answer with plot). [4]

OR

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- **Q6**) a) Explain Convolution Neural Network (CNN) using neat flow diagram. Explain padding and striding in CNN. [8]
 - Explain Q-learning algorithm with flow diagram. b) [6]
 - A neuron with 4 inputs has the weights 1,2,3,4 and bias 0. The activation c) function is linear, say the function f(x) = 2x. If the inputs are 4,8,5,6 compute the output. Draw a diagram representing the neuron. [4]
- How deep learning can be used for Tuning of control algorithm? **Q7**) a) [6] [5]
 - Explain AI based fault detection. b)

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Explain in detail various applications of AI in mechanical engineering.[6] c)

OR

- How AIML can be used in Dynamic system reduction **Q8**) a) [6]
 - Explain HMI with suitable examples. [5] b)
 - c) Explain applications of AI in process optimization. [6]