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25226

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following :** **10**
- a) List the steps involved in training a model for supervised learning.
 - b) Define Support Vector Machine (SVM).
 - c) State the use of activation functions in neural networks.
 - d) State applications of CNN. (Any 2)
 - e) Define fine Tuning in neural network.
 - f) Differentiate between feature extraction and feature engineering. (Any 2 points)
 - g) List the key differences between RNNs and Transformers. (2 points each)

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- 2. Attempt any THREE of the following : 12**
- a) Explain numerical and categorical data with example of each.
 - b) List the advantages and disadvantages of using PCA for dimensionality reduction.
 - c) Describe the basic architecture of Artificial Neural Network with diagram.
 - d) List any 2 types of pooling operations. State their characteristics.
- 3. Attempt any THREE of the following : 12**
- a) List and explain any two types of SVM.
 - b) Describe the working principle of K-Mediod algorithm.
 - c) Explain the architecture of LeNet with its main components.
 - d) Explain the vanishing gradient problem in RNN and how LSTM solves it.
- 4. Attempt any THREE of the following : 12**
- a) Explain the basic architecture of a Variational Autoencoder.
 - b) Differentiate between Apriori and Eclat algorithms with examples.
 - c) List types of gradient Descent. Describe Gradient Descent optimization algorithm.
 - d) Differentiate between ResNet and GoogleNet (any 4 points).
 - e) Describe Generative Pre-training Transformer (GPT) and its working mechanism.

5. Attempt any TWO of the following : 12

- a) A company wants to generate synthetic images of faces using GANs. Explain the architecture and training process of GANs for this task.
- b) Explain the functioning of Perceptron Learning Algorithm with example.
- c) Explain the functions of different layers in a CNN.

6. Attempt any TWO of the following : 12

- a) A bank wants to predict whether a customer will default on a loan using historical data such as income, credit score, loan amount, and repayment history.
Explain how supervised learning can be applied to solve this problem.
 - b) Calculate the output of a neuron with inputs [2, 3], weights [0.4, 0.6], bias=1, and sigmoid activation function.
 - c) Illustrate the process of implementing Deep Learning for Image Data.
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