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**Presidency University**

**Bengaluru**

 **School Of Computer Science and Engineering & Information Science**

**Summer term End-Term Examinations, Aug 2024**

**Date**: 08/08/2024

**Time**: 9:30 am to 12:30 pm

**Max Marks**: 100

**Weightage**: 50%

**Odd Semester**: 2023 - 24

**Course Code**: CSE3010

**Course Name**: Deep Learning Techniques

**Department:** SoCSE

 **Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

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| --- | --- | --- | --- | --- |
| **Q.No** | **Questions** | **Marks** | **CO** | **RBT** |
| 1 | 1. Define Deep Learning. List the applications of deep learning in various domains.
 | 4 | CO1 | L1 |
| 1. Briefly explain various optimization techniques.
 | 6 | CO1 | L2 |
| 1. What is an Activation Function, explain the commonly used activation function.
 | 10 | CO1 | L3 |
| OR |
| 2 | 1. Build a NN with 2 Input neurons and 2 hidden layers each with 3 Neurons and I output layer with 2 neurons
 | 4 | CO1 | L1 |
| 1. Discuss any two ways to detect, whether your Neural Network suffers vanishing gradient Problem
 | 6 | CO1 | L2 |
| 1. Explain the loss functions related to classification and regression.
 | 10 | CO1 | L3 |

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| 3 | 1. Why padding is required in convolution and what are the typical values that can be set for padding?
 | 4 | CO2 | L1 |
| 1. Explain LSTM architecture in detail.
 | 6 | CO2 | L2 |
| 1. Explain convolutional neural network architecture in detail
 | 10 | CO2 | L3 |

OR

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| 4 | 1. Define sequential data with suitable examples.
 | 4 | CO2 | L1 |
| 1. Explain GRU architecture in detail.
 | 6 | CO2 | L2 |
| 1. Illustrate the working of convolution operation and dimension calculation of convolved feature map.
 | 10 | CO2 | L3 |

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| 5 | 1. Give the brief architectural details of the Boltzmann machine.
 | 4 | CO3 | L1 |
| 1. Describe the KSOM algorithm in detail.
 | 6 | CO3 | L2 |
| 1. Explain any two types of auto-encoders in detail.
 | 10 | CO3 | L3 |

OR

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| 6 | 1. What are the properties of auto-encoders?
 | 4 | CO3 | L1 |
| 1. Describe the greedy technique of deep belief networks.
 | 6 | CO3 | L2 |
| 1. Consider a fully connected neural network with 4 input nodes and 2 output nodes. Following training samples are given: X1=(1,0,1,0); X2=(1,0,0,0);X3=(1,1,1,1);X4=(0,1,1,0). Initial Weight Matrix is given as: Unit 1=[0.3,0.5,0.7,0.2] and Unit2=[0.6,0.5,0.4,0.2] Classify each of the training data to one of the units by applying Kohonen's SOM. Take learning rate of 0.6.
 | 10 | CO3 | L3 |

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| 7 | 1. Give the algorithmic steps of Probabilistic Neural Networks.
 | 4 | CO4 | L1 |
| 1. Explain the architecture of the training phase of Hopfield Neural Networks.
 | 6 | CO4 | L2 |
| 1. Construct Hopfield Neural Network for the Input pattern: 11011, 10101. calculate the weight matrix and find the correct pattern of the distorted pattern (11110) for the sequence 5 3 4 1 2
 | 10 | CO4 | L3 |

OR

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| 8 | 1. Design 5-Node Hopfield Neural Networks (HNN).
 | 4 | CO4 | L1 |
| 1. Explain the architecture of Probabilistic Neural Networks.
 | 6 | CO4 | L2 |
| 1. Explain the Min-Max strategy of Generative Adversarial Networks.
 | 10 | CO4 | L3 |

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| 9 | 1. What do you mean by Optimization? list the types of Gradient Descent Algorithms?
 | 4 | CO1 | L1 |
| 1. How do NNs learn? Explain with a neat diagram.
 | 6 | CO1 | L2 |
| 1. Describe briefly hyper-parameter techniques used in deep learning.
 | 10 | CO1 | L3 |

OR

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| 10 | 1. Why is RNN preferred to ANN?
 | 4 | CO2 | L1 |
| 1. Illustrate the basic RNN architecture in detail.
 | 6 | CO2 | L2 |
| 1. Apply the relevant formula to compute the activation size and number of parameters at convolution, fully connected, and softmax layer for the following table.

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| --- | --- | --- | --- | --- |
| **Sl No** | **Layer** | **Activation shape** | **Activation size** | **# Parameters** |
| 1 | Input layer | (32,32,3) |  |  |
| 2 | CONV1(f=5,s=1) | (28,28,8) |  |  |
| 3 | POOL1 | (14,14,8) |  |  |
| 4 | CONV2(f=5,s=1) | (10,10,16) |  |  |
| 5 | POOL2 | (5,5,16) |  |  |
| 6 | FC3 | (120,1) |  |  |
| 7 | FC4 | (84,1) |  |  |
| 8 | SOFTMAX | (10,1) |  |  |

 | 10 | CO2 | L3 |