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**Presidency University**

**Bengaluru**

**School of Engineering & School of Computer Science Engineering**

**Make-up Examination July 2024**

**Date**: 05 JULY 2024

**Time**: 01:30pm – 04.30pm

**Max Marks**: 100

**Weightage**: 50%

**Even Semester**: B. Tech. 2023 - 24

**Course Code**: CSE3016

**Course Name**: Neural Networks and Fuzzy Logic

**Department:** Computer Science and Engineering

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*
3. *Scientific Calculators, mobile phones or any resources (internet) are STRICTLY PROHIBITED.*

**PART A** (CO1, Comprehension)

**Answer any six questions. 6x5= 30 Marks**

* 1. **Define Artificial Neural Network?**
  2. **What is perceptron? Give limitations of Rosenblat’s perceptron?**
  3. **Describe the characteristics of ANN? What is Perceptron? Describe Multilayer Perceptron?**
  4. **Define Height and Core of a Fuzzy set with suitable examples?**
  5. **Define fuzzy inference. List the different types of fuzzy inference?**
  6. **Recall Fuzzy quantifier and their types?**
  7. **Distinguish between Discrete and Continuous Fuzzy set?**
  8. **Explain the properties of alpha-cut in detail?**

**PART B** (CO2, Comprehension)

**Answer any five questions. 5x6=30 Marks**

* 1. **An activation function is used to decide whether a neuron can be activated or not. Write a note on different activation functions used in neural networks comparing them with graphs, equations, their respective derivatives, features etc etc.**
  2. **Neural network learns from its environment and improves its performance. List any 4 types of learning and briefly explain them.**
  3. **Back propagation is a commonly used technique for training neural network. Explain the computations with the help of equations happening during forward pass and backward pass.**
  4. **How do you estimate the error of machine learning algorithms? Explain with reference of repressors and classifiers?**
  5. **Let a,b,c,d and e be five students who scored 55,35,60, 85 and 75 out of 100 respectively in Science. For the universe discourse U={a,b,c,d,e} defined on Fuzzy set S with following membership function. Compute the membership value of each element of Fuzzy set S using the below formula and draw the graph.**
  6. **Give the equation to find algebraic sum and algebraic difference of two fuzzy sets. And also apply the same formula on the given A(x)={(x1,0.1),(x2,0.2),(x3,0.3),(x4,0.4)} and B(x)={(x1,0.5),(x2,0.7),(x3,0.8),(x4,0.9)}.**
  7. **Demonstrate equal and complement of Fuzzy sets with an example.**

**PART C** (CO3, Problem Solving)

**Answer any 3 Questions. (4Qx 10M= 40M)**

* 1. **Explain Bias and variance in details with respect to overfitting and under fitting?**
  2. **What is a cost function? How it differs from loss function? Write different types of loss functions with respect to regression and classification?**
  3. **What is gradient descent? How it is effective in error optimization? Explain with diagram and impact of learning rate on it?**
  4. **What is overfitting an d? What is impact of low bias and high variance on the network? What is the relationship of bias and variance of an ideal model?**
  5. **Explain in detail the different types of Fuzzy relations and Fuzzy set operations?**
  6. **Max min composition and Max product composition Let A and B be two fuzzy relations expressed in the matrix form, Find C, the composition of two fuzzy relations. Also find the max-product composition for the same?**