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Question Paper Code: 49311

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Elective

Electrical and Electronics Engineering

14UEE911 - FUZZY LOGIC AND NEURAL NETWORK

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Fuzzy logic is usually represented as
 - IF-THEN-ELSE rules
 - IF-THEN rules
 - OR
 - AND
- The values of the set membership is represented by
 - Discrete Set
 - Degree of truth
 - Probabilities
 - Both (b) & (c)
- Fuzzy logic is a form of
 - Two-valued logic
 - Crisp set logic
 - Many-valued logic
 - Binary set logic
- Fuzzy logic is usually represented as
 - IF-THEN-ELSE rules
 - IF-THEN rules
 - Both (a) & (b)
 - None of these
- A four input neuron has weights 1,2,3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4,10,5 and 20 respectively. The output will be
 - 238
 - 76
 - 119
 - 100

6. A perceptron is a
- (a) Feed-forward neural network (b) Back-propagation algorithm
(c) Back-tracking algorithm (d) Feed Forward-backward algorithm
7. An associative network is
- (a) A neural network that contains no loop
(b) A neural network that contains feedback
(c) A neural network that has only one loop
(d) None of these
8. In artificial Neural Network interconnected processing elements are called
- (a) nodes or neurons (b) weights (c) axons (d) Soma
9. _____ is/are the way/s to represent uncertainty.
- (a) Fuzzy Logic (b) Probability
(c) Entropy (d) All the above
10. Neural Networks are used for application of complex _____ with many parameters.
- (a) Linear Functions (b) Nonlinear Functions
(c) Discrete Functions (d) Exponential Functions

PART - B (5 x 2 = 10 Marks)

11. List any 4 properties of fuzzy sets.
12. Differentiate fuzzification and defuzzification based on their definition.
13. Compare artificial neural network and biological network based on their attributes.
14. What are recurrent networks?
15. List few applications of fuzzy logic and artificial neural network.

PART - C (5 x 16 = 80 Marks)

16. (a) Let $A = \{(x_1, 0.2), (x_2, 0.7), (x_3, 0.4)\}$ and $B = \{(y_1, 0.5), (y_2, 0.6)\}$ be two two fuzzy sets defined on the universe of discourse $X = \{x_1, x_2, x_3\}$ and $Y = \{y_1, y_2, y_3\}$ respectively. Find the Cartesian product of the A and B and the fuzzy relation R.

(16)

Or

- (b) Fuzzy logic provides an alternative solution to non-linear control because it is closer to the real world. Give reasons. (16)
17. (a) Formulate the properties of Adaptive fuzzy control and explain. (16)
- Or
- (b) Illustrate the properties of fuzzy set theory and explain with suitable schematics. (16)
18. (a) Explain briefly about the perceptron multilayer net with its algorithm. (16)
- Or
- (b) Draw and explain the architecture of back propagation network. Also derive the updation of hidden layer weights. (16)
19. (a) Illustrate Hopfield Artificial Neural Network with neat sketch. (16)
- Or
- (b) Explain in detail the procedure for designing the neural network using competitive learning. (16)
20. (a) Explain applications of Genetic algorithm in medical science. (16)
- Or
- (b) (i) State applications of Kohonen self-organizing map. (8)
- (ii) Explain adaptive and Resonance theory. (8)
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