KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2019

Marks Scored:

Level : B.E.
Year : IV
Course : ETEG 425
Semester : II

Exam Roll No. :
Time: 30 mins.
F. M. : 10

Registration No. :
Date :

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate option.

1. Neural Networks are complex ..... with many parameters.
   a. Linear Functions
   b. Nonlinear Functions
   c. Discrete Functions
   d. Exponential Functions

2. In an Unsupervised learning,
   a. Specific output values are given
   b. Specific output values are not given
   c. No specific Inputs are given
   d. Neither inputs nor outputs are given

3. A perceptron is a .....
   a. Feed-forward neural network
   b. Back-propagation algorithm
   c. Back-tracking algorithm
   d. Feed Forward-backward algorithm

4. Perceptron can learn
   a. AND
   b. XOR
   c. OR
   d. None

5. An artificial neuron receives n inputs x1, x2, x3.....xnwith weights w1, w2,.....wn attached to the input links. The weighted sum ..... is computed to be passed on to a non-linear filter called activation function to release the output.
   a. Σ wi
   b. Σ xi
   c. Σ wi + Σ xi
   d. Σ wi * xi

6. What is classification?
   a. deciding what features to use in a pattern recognition problem
   b. deciding what class an input pattern belongs to
   c. deciding what type of neural network to use
   d. None of the above

7. How is Fuzzy Logic different from conventional control methods?
   a. IF and THEN Approach
   b. FOR Approach
   c. WHILE Approach
   d. Else If approach

8. Epochs represent the total number of..... .
   a. input layer nodes
   b. passes of the training data through the network
   c. network nodes
   d. passes of the test data through the network

17. What is true regarding backpropagation rule?
    a. it is a feedback neural network
    b. actual output is determined by computing the outputs of units for each hidden layer
    c. hidden layers output is not all important, they are only meant for supporting input and output layers
    d. None of the above

18. Given two fuzzy sets A and B
    A = (x1 , 0.5), (x2 , 0.1), (x3 , 0.4) and B = (x1 , 0.2), (x2 , 0.3), (x3 , 0.5) union of the two set i.e. is given by
    a. (x1 , 0.5), (x2 , 0.1),(x3 , 0.4)
    b. (x1 , 0.5), (x2 , 0.3), (x3 , 0.5)
    c. (x1 , 0.2), (x2 , 0.3), (x3 , 0.5)
    d. (x1 , 0.2), (x2 , 0.1), (x3 , 0.4)

19. Which of the following cannot be stated using fuzzy logic?
    a. Color of an apple
    b. Height of a person
    c. Date of birth of a student
    d. Speed of a car

20. Both fuzzy logic and artificial neural network are soft computing techniques because
    a. Both gives precise and accurate results.
    b. Artificial neural network gives accurate result, but fuzzy logic does not.
    c. In each, no precise mathematical model of the problem is required.
    d. Fuzzy gives exact result but artificial neural network does not.

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Level : B.E.
Year : IV
Time : 2 hrs. 30 mins.

Course : ETEG 425
Semester : II
F. M. : 40

SECTION "B"
[5Q. × 8 = 40 marks]

Attempt *ANY FIVE* questions. Symbols and abbreviations have usual meanings. Assume suitable values for missing data.

1. a. Consider a 4 input, 1 output parity detector. The output is 1 if the number of inputs is even. Otherwise, it is 0. Is this problem linearly separable? Justify your answer. [3]
   b. Draw the architecture of a single layer perceptron (SLP) and explain its operation. Mention its advantages and disadvantages. [3]
   c. Differentiate between local minimum and global minimum? [2]

2. a. Draw the architecture of Back Propagation Network (BPN) and explain in detail. List the limitations of BPN. [5]
   b. Explain how the Self Organizing Map (SOM) Network is trained. Once the SOM network is trained, how does it operate? [3]

3. a. Apply the Hebb net to the training patterns that define AND function with bipolar inputs and targets. [4]
   b. For the following noisy versions of training patterns, identify the response of network by segregating it into correct, incorrect or indefinite.
   (0.-1,1), (0,1,-1), (0 0 1), (0 0 -1), (0 1 0), (1 0 1), (1, 0, -1), (1 -1 0), (1 0 0), (1 1 0), (0, -1, 0), (1 1 1) [4]

4. a. Define bias and threshold in context of ANN.What is the basic concept behind Adaptive Resonance Theory (ART) ? [2+2]
   b. Explain various strengths and weaknessesof neural nets and Fuzzy Logic. [4]

5. a. How fuzzy sets are different from crisp sets? Give at least two examples. [3]
   b. With suitable example explain the extension principle. Name few consumer products in which fuzzy electronics is used. [3]
   c. Explain the different simple operations on Fuzzy sets. [2]

6. a. Compare fuzzification with defuzzification. Explain different types of defuzzification methods. [4]
   b. Draw a block diagram of a possible fuzzy logic control system. Explain briefly about each block. [4]