END TERM EXAMINATION

EIGHTH SEMESTER [B.TECH] SEPTEMBER-OCTOBER 2020

Paper Code: ETIT-410 **Subject: Soft Computing**

Time: 2 Hours **Maximum Marks :75**

Note: Attempt any three questions in all including question no.1 which is compulsory.

Q1 Attempt the following in brief: (5x5=25)

(a) What is soft computing? Analyze how soft computing is related to machine learning.

(b) Explain Artificial Neural Networks and activation function with an example.

(c) Discuss for which types of problem ANN is suitable and for which it is unsuitable.

(d) How is fuzzy set different from crisp set? Real world is more relatable in fuzzy rather than crisp set. Argue in support or against it. "Crisp set is a special type of fuzzy set. "Justify the statement with the help of properties of fuzzy sets.

(e) Old={(20,0),(30,0.2),(40,0.4),(50,0.6),(60,0.8),(70,1),(80,1)}. Then find alpha-cut for the set old where alpha =0.4.

Q2 (a) A two layer network is to have four inputs and six outputs. The range of the outputs is to be continuous between 0 and 1.What can you tell about the network architecture? Specifically, (8)

(i) How many neurons are required in each layer?

(ii) What are the dimensions of the first-layer and second layer weight matrices? (Hidden layer neurons are 5)

(b) Write the advantages, disadvantages and applications of Artificial Neural Networks. (8)

(c) Given U = {1,2,3,4,5,6.7} A = {(3,0.7), (5,1), (6,0.8)} then find – A. (9)

Q3 (a) What are the design parameters of ANN? Explain the three classifications of functions. (8)

(b) Draw the basic topologies for Non-recurrent Networks and Recurrent Networks. Distinguish between them and also specify the learning law used by them. (8)

(c) Discuss the classification of activation functions used in Artificial Neural Networks. (9)

Q4 (a) Differentiate between Hard Computing and Soft Computing. (8)

(b) Discuss the applications of fuzzy logic in the current scenario. (8)

(c) Explain about fuzziness of a fuzzy set. (9)

Q5 (a) Define Membership function in respect of fuzzy set and also explain the role of alpha cut. (8)

(b) Explain how fuzzy inference system is different from crisp system. Can we say a fuzzy logic based system is the generalization of Crisp system? (8)

(c) If A and B are two fuzzy sets with membership function $\mu_{A(x)} = \{0.2, 0.5, 0.6, 0.1, 0.9\}$ $\mu_{B(x)} = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ then find the value of $\mu_{A \cap B}$ (9)

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Q6 (a) Explain fuzzy rule generation by taking an example of fuzzy logic based any domestic product. (8)

(b) Explain linguistic variable and linguistic hedges with examples. (8)

(c) Discuss the applications of neuro fuzzy systems. (9)

Q7 (a) What is fuzzification and defuzzification? Explain why are they required. (8)

(b) Explain centroid and weighted average defuzzifiation methods. (8)

(c) "Genetic algorithm is an unsupervised learning method" comment on the statement. (9)

Q8 (a) Give an example of combinatorial problem. What is the most difficult in solving these problems? (8)

(b) Discuss the steps for Genetic Algorithm. (8)

(c) Explain the architecture of Neuro Fuzzy Systems. (9)

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