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B.Tech. Degree VIII Semester Examination April 2018

EC/EI 1804 (E4) NEURO – FUZZY SYSTEMS (2012 Scheme)

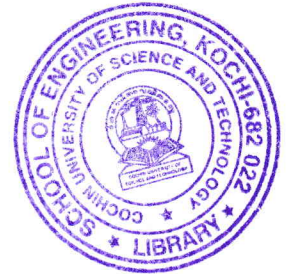
Time: 3 Hours

Maximum Marks: 100

PART A (Answer *ALL* questions)

(8 × 5 = 40)

- I. (a) Substantiate the advantage of input output mapping and adaptivity in neural networks.
- (b) What are the basic concepts in Error correction learning?
- (c) Briefly describe adaptive echo canceller and mention its significance.
- (d) Mention desired characteristics of associative memory.
- (e) Distinguish Fuzzy Set from Crisp Set.
- (f) Briefly describe chain strength analogy in fuzzy compositions.
- (g) Give the static properties of Fuzzy controllers.
- (h) Substantiate Fuzzy PD and PI controllers.



PART B

(4 × 15 = 60)

- II. (a) Integrating a priori knowledge regarding the structure of a human brain, model a computational neuron using block diagram, SFG and architectural diagram. (8)
- (b) Describe single layer and multilayer neural networks in detail. (7)
- OR**
- III. (a) Implement an AND gate using perceptron, assume bipolar inputs and activations. (8)
- (b) Describe Error Back Propagation neural network with the help of architectural details and algorithm. (7)
- IV. (a) Indicate various applications of neural networks in detail. (9)
- (b) Pattern storage is an important application of pattern recognition. Explain how a neural network can be used for this purpose. (6)

OR

- V. (a) Describe an application of neural network in pattern recognition. (8)
- (b) Illustrate the concept of Pattern Mapping in detail. (7)
- VI. (a) Mention properties and operations of fuzzy set and crisp set. (8)
- (b) Indicate the differences between probability and fuzzy logic. (7)

OR

(P.T.O.)

- VII. (a) Describe in detail about Fuzzy composition and properties of fuzzy relation. (8)
- (b) Let $X = \{x_1, x_2\}$, $Y = \{y_1, y_2\}$ and $Z = \{z_1, z_2, z_3\}$ be three universe of discourse. Let (7)

$$\underline{R} = \begin{matrix} & y_1 & y_2 \\ \begin{matrix} x_1 \\ x_2 \end{matrix} & \begin{bmatrix} 0.7 & 0.5 \\ 0.8 & 0.4 \end{bmatrix} \end{matrix} \quad \text{and} \quad \underline{S} = \begin{matrix} & z_1 & z_2 & z_3 \\ \begin{matrix} y_1 \\ y_2 \end{matrix} & \begin{bmatrix} 0.9 & 0.6 & 0.2 \\ 0.1 & 0.7 & 0.5 \end{bmatrix} \end{matrix}.$$

be the fuzzy relations defined in the corresponding universe. Find out the RoS using min max composition and sagittal diagram.

- VIII. (a) Describe Fuzzification and de-fuzzification in detail. (8)
- (b) Explain Neuro Fuzzy systems in detail. (7)

OR

- IX. (a) Describe reflexivity, symmetry and transitivity in detail. (8)
- (b) It is required to select an appropriate analyzer for gas with suitable pressure range and good instrument dead time. Consider three analyzers A, B and C. Set P gives pressure range suitability and OT gives instrument dead time suitability. Find the best and the worst instrument in either category or both category. (7)

$$\underline{P} = \left\{ \frac{0.7}{A} + \frac{0.3}{B} + \frac{0.9}{C} \right\} \quad \text{OT} = \left\{ \frac{0.5}{A} + \frac{0.9}{B} + \frac{0.4}{C} \right\}.$$
