GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2722710   **Date: 31/05/2016**

Subject Name: Neuro Computing and Applications

Time: 10:30 am to 01:00 pm   **Total Marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Describe different type of activation functions used for supervised training of neural network.	**07**
	(b)	õNeural network exhibits a graceful degradation in performance rather than catastrophic failureö- In this statement which benefit of neural network is evident? Discuss it fully comparing with conventional computing.	**07**
Q.2	**(a)**	Starting with input node (forward step), derive weight updating equations for neuron j when a) neuron j is an output node for back propagation learning algorithm. Clearly mentions all assumptions made.	**07**
	(b)	Describe in brief following factors affecting the performance of artificial neural network models. i) Selection of training method ii) Number of nodes	**07**

OR

	(b)	Describe in brief following factors affecting the performance of artificial neural network models. i) Number of hidden layers ii) Initialization of interconnecting weights	**07**
Q.3	**(a)**	What is stability plasticity dilemma? Explain basic ART network architecture.	**07**
	(b)	Consider six number of points in two dimensional Euclidian space (x , y) as Shown below. Input pattern coordinates are:	**07**

Point	X	Y	Point	X	Y
1	7	6	**4**	2	3
2	6	5	**5**	9	8
3	8	10	**6**	3	2

Assume threshold distance a) 5 b) 3. Determine clusters using VQ in each case. Comment on the results in view of threshold distance and clusters formed.

OR

Q.3	**(a)**	Explain concept of Associative Memory. Explain Hopfield model of associate memory with necessary details.	**07**
	(b)	A hetro associative network is given.	**07**

S1 = (1 1 0 0)   t 1 = (1 0)
S2 = (0 1 0 0)   t 2 = (1 0)
S3 = (0 0 1 1)   t 3 = (0 1)
S4 = (0 0 1 0)   t 4 = (0 1)

a) Find the weight matrix b) Test the network with (1) input vector [1 1 1 1] & (2) input vector [-1 1 -1 -1]

Q.4 **(a)** Explain KOHONEN model architecture for Self Organization Map (SOFM). **07**

(b) Consider the typical problem for training using BP algorithm , where training set is given as under: **07**

Sr.No	INPUT				OUTPUT
1	0.25	0.20	0.12	0.06	0.1

i) Compute the stage wise outputs using sigmoid as activation function for hidden neuron. Take linear activation function otherwise.
ii) Compute the error and hence weight updates to the concerned neurons for one complete step.

OR

Q.4 **(a)** Explain in brief Support Vector machine with necessary details. **07**

Q.4 **(b)** Explain with necessary details Radial Basis Function networks. Enlist three major differences between RBF and multi-layer Perceptron. **07**

Q.5 **(a)** Explain Simple Recurrent model (SRN) for recurrent network architectures in brief. **07**

(b) Discuss application of neural networks in any robotics /control application in brief. **07**

OR

Q.5 **(a)** Explain NARX model for recurrent network architectures in brief. **07**

(b) Discuss application of neural networks in any image processing application in brief. **07**

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