BTS(C) -VII – 05 - 070 (C)

B.Tech. Degree VII Semester Examination, November 2005

IT/CS/EC/CE/ME/SE/EE/EI/EB 705 C ARTIFICIAL NEURAL NETWORKS

(2002 Admissions)

Time: 3 Hours Maximum Marks: 100

I (a) Design a Hebbian neuron/net to implement the logical 2 input AND function using bipolar input-output patterns. (8)

(b) Give the sigmoidal function used in artificial neural networks and their significance. Plot them. (6)

(c) Define and explain the error function for delta rule. (6)

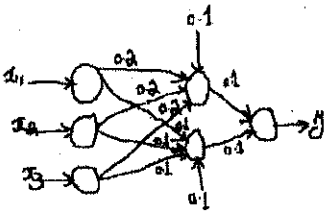
OR

II. (a) What are the assumptions made in artificial neural networks? (6)

(b) Define and plot the identity function, binary step function, binary sigmoidal function, and bipolar sigmoidal function used in neural networks. (8)

(c) Define and explain the generalized delta rule. How is it different from the original form of the delta rule? (6)

III (a) Find the new weights when the neural network shown below is prese4nted with the input pattern (1 1 1) and the target output is 1. Use a learning rate of 0.1 and bipolar sigmoidal activation function, $\varphi(x) = \frac{2}{1+e^{-x}} - 1$. (10)



(b) Explain the outer product rule. (5)

(c) When the training in a network is stopped? (5)

OR

IV (a) define and explain the error signal terms in the output and hidden layers of a two layer network. (6)

(b) What are the features and limitations of using a momentum term in back propagation training algorithm? (6)

(c) How the initial weight and the learning rate parameter is selected in BP algorithm? Also compare per-pattern and per-epoch learning. (8)

V (a) Consider a Kohenen net with two cluster (output) units and five input units. The Weight vectors for the output units are W_1=[1, 0.8, 0.6, 0.4, 0.2] and W_2=[1, 0.5, 1, 0.5, 1]. Use the square of the Euclidean distance to find the winning neuron for the input pattern X=[0.5, 1, 0.5, 0, 0.5]. Find the new weights for the winning unit. Assume learning rate as 0.2. (10)

(b) Explain one typical application of counter propagation network. (10)

OR

VI (a) Explain how training is carried out in Kohenen and Gross berg layers in a counter propagation network. (10)

(b) Compare counter propagation and feed forward type neural networks. (5)

(c) How do we compute a normalized vector? Normalize X=[0.5, 1, 0.5, 0, 0.5]. (5)

VII	(a)	Explain how training is applied to Boltzman machine.	(6)
	(b)	Explain what do you mean by simulate annealing.	(6)
	(c)	Write short note on simulated annealing.	(8)
		OR	
VIII	(a)	Explain the motivation to apply statistical methods in ANN training.	(6)
	(b)	Write short note Cauchy training.	(6)
	(c)	Explain how ANN can be applied to solve any one optimization problem.	(8)
IX	(a)	Using the outer product construction method, design a Hopfield network to store the patterns, A=[+1, +1, −1], B=[-1, +1, -1], and C=[-1, -1, +1].	(8)
	(b)	Explain how data is stored and retrieved in an ART-1 structure.	(8)
	(c)	Explain how an associative memory is different from ordinary memory.	(4)
		OR	
X	(a)	Calculate the weights of a 2×2 BAM to store the following pairs of input-output patterns. $\{X_1=[+1, +1, -1], Y_1=[-1, +1, -1, +1]\}$ and $\{X_2=[+1, -1, +1], Y_2=[+1, -1, +1, -1]\}$.	(8)
	(b)	Explain how data is stored and retrieved in an ART-1 structure.	(6)
	(c)	Explain mutation and cross over operations in genetic algorithm.	(6)

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