SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

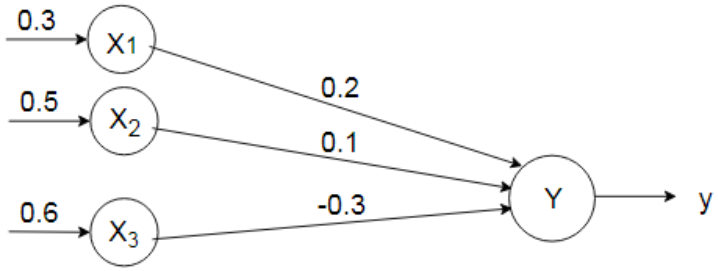
QUESTION BANK (DESCRIPTIVE)

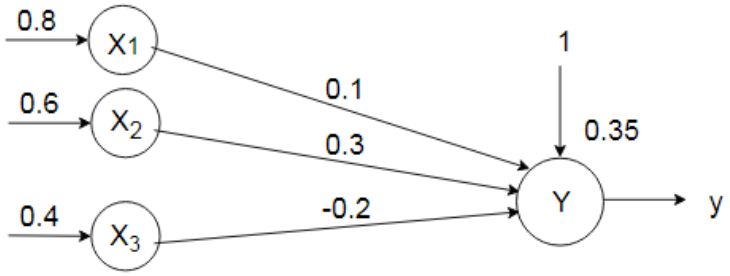
Subject with Code : Neural Networks and Fuzzy Logic (20EE0239)

Course & Branch: B.Tech - EEE **Year & Sem:** IV-B.Tech & I-Sem

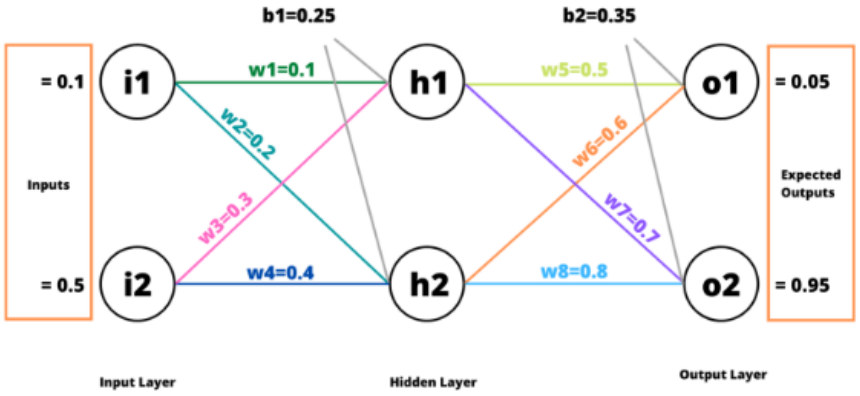
Regulation: R20

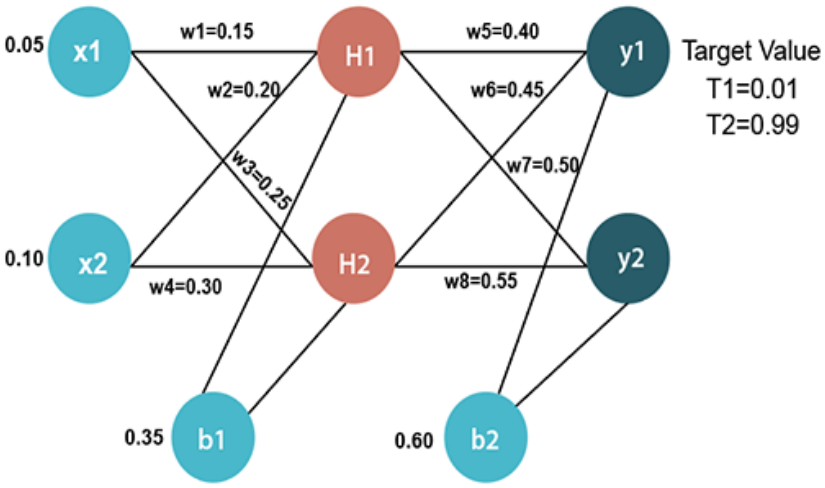
UNIT –I
FUNDAMENTALS OF ARTIFICIAL NEURAL NETWORKS

1	a	Explain organization of human brain	[L1][CO1]	[6M]
	b	Discuss the functioning of biological neuron	[L2][CO1]	[6M]
2	a	How artificial neuron is inspired from the biological neuron? Explain.	[L2] [CO1]	[6M]
	b	Explain the basic architecture of McCulloch – Pitts neuron model.	[L3] [CO1]	[6M]
3	a	Explain characteristics of Artificial neural network.	[L2] [CO1]	[6M]
	b	What is generalization? Explain.	[L2] [CO1]	[6M]
4	a	For the network shown in figure, calculate the net input to the neuron? 	[L3] [CO1]	[6M]
	b	How do Neural Networks Work?	[L1] [CO1]	[6M]
5		Explain types of activation functions used in artificial neural network	[L2] [CO1]	[12M]
6	a	What are the advantages of neural networks over conventional computers?	[L1][CO1]	[6M]
	b	Discuss the applications of ANN.	[L2] [CO1]	[6M]
7		In detail, explain an Architectures of Neural Network with suitable figures	[L2] [CO1]	[12M]
8		Try to implement XOR problem with two inputs and discuss on it.	[L4] [CO1]	[12M]
9	a	Implement a perceptron to solve simple AND problem with two inputs.	[L4] [CO1]	[6M]

	b	Obtain the output of the neuron Y for the network shown in the figure 	[L3] [CO1]	[6M]
10	a	Discuss different learning mechanisms used in artificial neural networks	[L2] [CO1]	[8M]
	b	Why thresholding function is not used as activation function in Multi-Layer Feed Forward Networks.	[L3] [CO1]	[4M]

UNIT –II
SUPERVISED NETWORKS

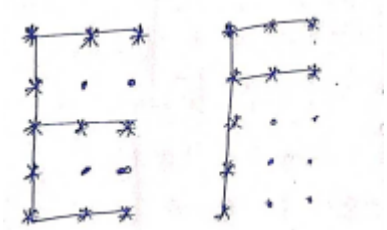
1	a	Explain Supervised learning in detail with block diagram.	[L1][CO2]	[4M]
	b	Give the perceptron weight updating rule and the learning algorithm	L3] [CO2]	[8M]
2	a	Justify, why single layer perceptron network could not solve even XOR problem.	[L4][CO2]	[6M]
	b	Derive the equation for weight change for discrete perceptron network.	[L3] [CO2]	[6M]
3		Find the total error at the output for a given neural network. 	[L3] [CO2]	[12M]
4		Explain input layer, hidden layer & output layer computations in Backpropagation Network.	[L2] [CO2]	[12M]
5	a	Explain how supervised learning happens in neural networks with example.	[L2] [CO2]	[7M]

	b	Why We Need Backpropagation?	[L2] [CO2]	[5M]
6		Explain the weight adjustment procedure IN MLFFN using Back propagation algorithm	[L1] [CO2]	[12M]
7	a	Define Learning factors. Explain the learning factors in Back propagation Algorithm	[L2] [CO2]	[10M]
	b	What is the objective function of gradient descent?	[L1] [CO2]	[2M]
8	a	Explain about Back Propagation learning in detail.	[L2] [CO2]	[6M]
	b	List the advantages and disadvantages of BPA	[L1] [CO2]	[6M]
9	a	In the given Neural network, compute the total error at the output. 	[L3][CO2]	[12M]
10	a	How does Perceptron work?	[L1] [CO2]	[6M]
	b	Describe about the application of Neural networks to electric load forecasting	[L2] [CO2]	[6M]

UNIT –III
ASSOCIATIVE MEMORIES

1	a	What is Associative Memory? Explain it in detail.	[L1][CO3]	[4M]
	b	Train auto associative memory network to find optimal weight matrix using outer product rule to store input row vector [1 1 1 1] and [-1 1 1 -1]. Find the weight matrix and check with test vector using [1 1 1 1] and [-1 1 1 -1]	[L4][CO3]	[8M]
2	a	Describe about Bidirectional Associative Memory with its architecture.	[L2] [CO3]	[8M]

<table>
<tr><td></td><td>b</td><td>Why BAM is required and its limitation.</td><td>[L2] [CO3]</td><td>[4M]</td></tr>
<tr><td>3</td><td>a</td><td>Suppose one has N=3 with the pattern pairs given by,
A1=[1 0 0 0 0 1], B1=[1 1 0 0 0]
A2=[0 1 1 0 0 0], B2= [1 0 1 0 0]
A3=[0 0 1 0 1 1], B3=[0 1 1 1 0], retrieve correct output using input</td><td>[L4][CO3]</td><td>[8M]</td></tr>
<tr><td></td><td>b</td><td>Distinguish Auto associative & Hetero associative memories.</td><td>[L2] [CO3]</td><td>[4M]</td></tr>
<tr><td>4</td><td>a</td><td>Write an Algorithm to store and recall of BAM</td><td>[L3][CO3]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Train auto associative memory network to find optimal weight matrix using outer product rule to store input row vector [1 0 0 1] and [1 1 1 1]. Find the weight matrix and check with test vector using [1 0 0 1] and [1 1 1 1]</td><td>[L4][CO3]</td><td>[8M]</td></tr>
<tr><td>5</td><td>a</td><td>Explain about Pattern Recognition with example.</td><td>[L2][CO3]</td><td>[6M]</td></tr>
<tr><td></td><td>b</td><td>With example, explain how to calculate Hamming Distance</td><td>[L2][CO3]</td><td>[6M]</td></tr>
<tr><td>6</td><td>a</td><td>With architecture and algorithm explain about Discrete Hopfield Network.</td><td>[L2][CO3]</td><td>[7M]</td></tr>
<tr><td></td><td>b</td><td>Compute how to store and recall two associations, A1:B1 and A2:B2.
• A1 = (1, 0, 1, 0, 1, 0), B1 = (1, 1, 0, 0)
• A2 = (1, 1, 1, 0, 0, 0), B2 = (1, 0, 1, 0)</td><td>[L3][CO3]</td><td>[5M]</td></tr>
<tr><td>7</td><td></td><td>Train bidirectional associative network to store input vectors S=S1, S2, S3, S4 to the output vectors T= T1, T2. Training input and target pairs are in binary form. Obtain the weight vectors in bipolar form.
<table>
<tr><td>Input/Target</td><td>S1</td><td>S2</td><td>S3</td><td>S4</td><td>T1</td><td>T2</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>2</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td></tr>
<tr><td>4</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td></tr>
</table></td><td>[L4][CO4]</td><td>[12M]</td></tr>
<tr><td>8</td><td>a</td><td>What are the phases involved in pattern recognition process and Explain in detail.</td><td>[L2][CO4]</td><td>[12M]</td></tr>
<tr><td></td><td>b</td><td>What are the applications of pattern recognition.</td><td>[L2][CO4]</td><td>[12M]</td></tr>
<tr><td>9</td><td></td><td>Construct and test a BAM network t associate letters E & F with simple bipolar input output vectors. Target output for E is (-1,1) and for F is (1,1). Display matrix size is 5*3. Input patterns are,</td><td>[L4][CO4]</td><td>[12M]</td></tr>
</table>

				
10		Explain about types of associative memories along with architecture and algorithm.	[L2][CO4]	[12M]

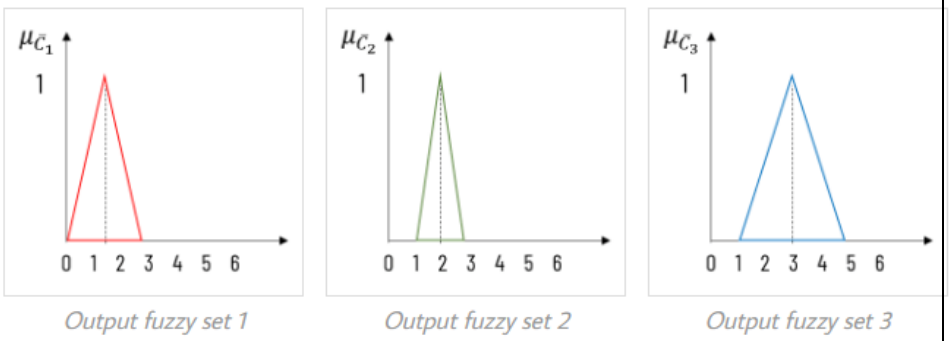
UNIT –IV
CLASSICAL AND FUZZY SETS

1	a	Define membership function. What are the membership functions used in fuzzy designing?	[L1][CO5]	[6M]
	b	Explain fuzzy intersection operation	[L2][CO5]	[6M]
2	a	Compare and contrast Fuzzy vs Crisp	[L2][CO5]	[6M]
	b	Determine the union and intersection of the fuzzy sets, where A = {(1.0.1). (2.0.5). (3, 0.8), (4, 1.0), (5.0.7). (6.0.2)} and B = {(1.1). (2.0.8), (3.0.4), (4.0.1)}	[L3][CO5]	[6M]
3		Explain Operations performed on crisp sets using given datas, X = {1, 2, 3, 4, 5, 6, 7, 8, 9} A = {1, 2, 3, 4, 5} B = {3, 4, 5, 6} C = {6, 7, 8, 9}	[L3][CO5]	[12M]
4		What are the operations performed on fuzzy sets. Explain it in detail.	[L2][CO5]	[12M]
5	a	Explain Cartesian product on fuzzy sets.	[L2][CO5]	[6M]
	b	Discuss how fuzzy relations are formed based on Cartesian product.	[L2][CO5]	[6M]
6		Give the properties of crisp sets. By using the following sets, X = {1, 2, 3, 4, 5, 6} A = {1, 2, 3}, B = {2, 3, 4}, C = {5, 6}	[L3][CO5]	[12M]
7	a	Consider two fuzzy subsets of the set X, X = {a, b, c, d, e} referred to as A and B. A = {1/a, 0.3/b, 0.2/c 0.8/d, 0/e) and B = {0.6/a, 0.9/b, 0.1/c, 0.3/d,	[L3][CO5]	[7M]

		0.2/e} Find:. (i) Complement. (ii) Union. (iii) Intersection iv) Difference		
	b	Consider two fuzzy sets of the set A = {(a1, 0.2), (a2, 0.7), (a3, 0.4)} B = {(b1, 0.5), (b2, 0.6)} Find,the relation R (AxB)	[L3][CO5]	[5M]
8	a	Explain the Features of Membership Functions	[L2][CO5]	[5M]
	b	Give the properties of fuzzy sets.	[L2][CO5]	[7M]
9		Consider a set P = P.P12, P, P, of four varieties of paddy plants, set D = {D1, D2, D3, D4 } of the various diseases affecting the plants and S={S1,S2,S3,S4} be the common symptoms of the diseases. Let R be a relation on PxD and S be a relation on DxS For, R = $\begin{array}{c} \\ P_1 \\ P_2 \\ P_3 \\ P_4 \end{array}\begin{array}{c} \begin{array}{cccc} D_1 & D_2 & D_3 & D_4 \end{array} \\ \begin{bmatrix} 0.6 & 0.6 & 0.9 & 0.8 \\ 0.1 & 0.2 & 0.9 & 0.8 \\ 0.9 & 0.3 & 0.4 & 0.8 \\ 0.9 & 0.8 & 0.1 & 0.2 \end{bmatrix} \end{array}$ S = $\begin{array}{c} \\ D_1 \\ D_2 \\ D_3 \\ D_4 \end{array}\begin{array}{c} \begin{array}{cccc} S_1 & S_2 & S_3 & S_4 \end{array} \\ \begin{bmatrix} 0.1 & 0.2 & 0.7 & 0.9 \\ 1.0 & 1.0 & 0.4 & 0.6 \\ 0.0 & 0.0 & 0.5 & 0.9 \\ 0.9 & 1.0 & 0.8 & 0.2 \end{bmatrix} \end{array}$ Obtain the association of the plants with the different symptoms of the diseases using max-min composition	[L3][CO5]	[12M]
10	a	What is fuzzy logic? Explain it in detail	[L2][CO5]	[6M]
	b	What is the sources fuzzy information? and explain each.	[L2][CO5]	[6M]

UNIT –V
FUZZY LOGIC SYSTEMS

1	a	What are the basic building blocks in fuzzy logic ?	[L1][CO6]	[6M]
	b	What are the advantages of fuzzy logic control?	[L1][CO6]	[6M]
2		Explain fuzzy inference using Modus ponens and Modus tollens.	[L2][CO6]	[12M]
3		Justify, how temperature control is achieved by using fuzzy logic.	[L4][CO6]	[12M]
4		Explain fuzzy rule based system in fuzzy logic.	[L3][CO6]	[12M]
5	a	Why defuzzification is important in fuzzy logic.	[L3][CO6]	[6M]
	b	What are the applications of fuzzy logic.	[L2][CO6]	[6M]
6	a	List out different defuzzification methods available.	[L1][CO6]	[6M]
	b	Explain any one of the defuzzification method.	[L2][CO6]	[6M]

7	a	Explain Centre of gravity defuzzification method with an example.	[L2][CO6]	[6M]
	b	With an example, discuss Centre of Sums defuzzification method	[L2][CO6]	[6M]
8		Find crisp value corresponding to the following fuzzy output sets using various defuzzification methods.  Output fuzzy set 1 Output fuzzy set 2 Output fuzzy set 3	[L3][CO6]	[12M]
9		Discuss any one fuzzy logic application in electrical engineering.	[L2][CO6]	[12M]
10	a	Explain working of Greg Viot's Fuzzy Cruise controller.	[L2][CO6]	[6M]
	b	Design a Greg Viot's Fuzzy Cruise controller for an autonomous car.	[L4][CO6]	[6M]