SRN | | | | | | | | | | | | |

PES UNIVERSITY

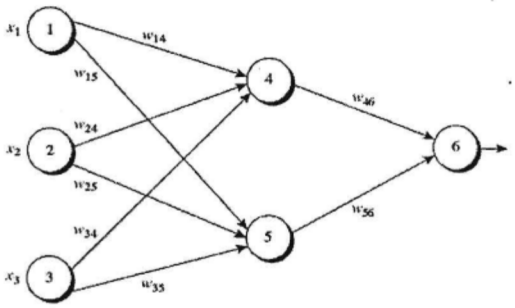
PES University, Bengaluru
(Established under Karnataka Act No. 16 of 2013)

UE18CS343

December 2021: END SEMESTER ASSESSMENT (ESA) B.TECH VI SEMESTER

UE18CS343 – TOPICS IN DEEP LEARNING

Time: 3 Hrs | Answer All Questions | Max Marks: 100

1	a)	Explain briefly back propagation Algorithm with an example	6
	b)	Figure shows a multilayer feed-forward neural network. Let the learning rate be 0.9. The initial weight and bias values of the network are given in Table, along with the first training tuple, X = (1, 0, 1), with a class label of 1(use logistic activation function for all layers). Calculate the net input and error at each node.  Initial Input, Weight, and Bias Values x_1 x_2 x_3 w_{14} w_{15} w_{24} w_{25} w_{34} w_{35} w_{46} w_{56} θ_4 θ_5 θ_6 1 0 1 0.2 −0.3 0.4 0.1 −0.5 0.2 −0.3 −0.2 −0.4 0.2 0.1	10
	c)	What is Regularization? List types of Regularization?	2+2
2	a)	Briefly explain the following Kernel functions a) Polynomial b) Gaussian	6
	b)	Explain the general idea of the Sequential Minimal Optimization (SMO) algorithm	6
	c)	Explain Multiclass Classification Using SVM?	8
3	a)	Explain the below functions with respect to Autoencoders $\mathbf{h} = g(W\mathbf{x_i} + \mathbf{b})$ $\hat{\mathbf{x}}_\mathbf{i} = f(W^*\mathbf{h} + \mathbf{c})$ With help of a diagram explain how Under Complete and Over Complete Autoencoders work?	6
	b)	How Recurrent Neural Networks can help in solving problems related to text input. Give some examples.	7
	c)	What is Attention Mechanism? Explain how they can help in resolving issues related to RNN and LSTM?	7

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4	a)	Given an input image of size 227x227x3 with number of filters as 128 to be applied on the image, stride as 4, size of filter as 11x11 Calculate new width, new height, new depth of the image (Assume no padding is used).	6
	b)	For an image of size 227x227x3 with number of kernels used on the image as k=96, Filter size F=5x5, Stride=4, Padding=0 calculate the number of parameters.	6
	c)	Why GAN's are called 2 player game models?	8
5	a)	List the two fundamental operations of a Graph neural Network (GNN)? Explain the working of a GNN using Neural Message Passing?	12
	b)	What is the difference between the initial representation of a graph node(input to GNN) and the output representation of a graph node(output of GNN)?	4
	c)	List applications of sequence-to-sequence models and explain them briefly	4