B

B. Tech. Degree VI Semester Special Supplementary Examination November 2022

CS 19-202-0606(IE) NEURAL NETWORKS AND DEEP LEARNING
(2019 Scheme)

Time: 3 Hours   Maximum Marks: 60

Course Outcome
On successful completion of the course, the students will be able to:

CO1: Identify the basic concepts of deep learning.
CO2: Analyse the deep learning architectures which are appropriate for various types of learning tasks in different domains.
CO3: Illustrate use of TensorFlow libraries to implement deep neural networks.
CO4: Apply TensorFlow in NLP applications.

Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 –Analyze, L5 – Evaluate, L6 – Create
PO – Programme Outcome
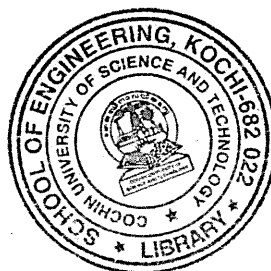
PART A
(Answer *ALL* questions)

			(8 × 3 = 24)	Marks	BL	CO	PO
I.	(a)	Compare biological neuron and artificial neuron.		3	L2	1	1
	(b)	Design a McCulloch Pitts Neuron to solve the function (x1 AND x2) OR (x2 AND x3) OR x4.		3	L3	1	3
	(c)	Given an input that is 63 × 63 × 16 and convolve it with 32 filters that are each 7 × 7, using a stride of 2 and no padding. What is the output volume?		3	L3	2	3
	(d)	Discuss why RNNs work better with text data.		3	L2	2	2
	(e)	Write a program to define two "one dimensional" vectors and subtract the vectors using TensorFlow 2.0.		3	L3	3	5
	(f)	Discuss on how to implement pooling in TensorFlow.		3	L2	3	5
	(g)	Compare Word2Vec and Doc2Vec.		3	L2	4	2
	(h)	Explain one-hot encoding.		3	L1	4	1

PART B
(4 × 12 = 48)

			Marks	BL	CO	PO
II.	(a)	Explain the architecture and training algorithm of perceptron networks. Design a perceptron network for the AND gate. State its limitations.	8	L2	1	1
	(b)	Explain the intuition behind Gradient descent procedure.	4	L1	1	1
		OR				
III.		Explain the architecture and training algorithm for Back propagation neural networks. What are its limitations?	12	L2	1	1

(P.T.O.)

			Marks	BL	CO	PO
IV.	(a)	Explain the architecture of Convolutional Neural Networks.	6	L2	2	1
	(b)	Consider a dataset consisting of 32 × 32 RGB images are present. Assume the first convolution layer consists of 8 filters of size 5 × 5 followed by a max pooling layer of size 2 × 2. The second convolution layer consists of 16 filters of size 5 × 5 followed by a max pooling layer of 2 × 2. There are 3 fully-connected layers consisting of 120, 84, and 10 units respectively. Calculate the output shape of each layer and the number of learnable parameters in each stage.	6	L3	2	3

OR

V.		Explain the vanishing gradient problem. How does LSTM solve this problem? Explain the LSTM architecture with detailed diagrams.	12	L2	2	2
VI.		Elucidate the steps involved in building a deep learning model with TensorFlow.	12	L2	3	5

OR

VII.	(a)	Discuss about overfitting. Explain any two techniques to reduce overfitting.	5	L2	3	2
	(b)	Explain the different types of sequence prediction in LSTM.	7	L2	3	2
VIII.		Discuss the vectorization approaches for text representation. Explain each technique in detail.	12	L2	4	1

OR

IX.		Compare the different word2vec and doc2vec embedding architectures.	12	L2	4	2

Blooms's Taxonomy Levels
L1 – 11%, L2 – 68%, L3 – 21%.

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