Q. Code:192589

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Fifth Semester

AD18501 – DEEP LEARNING ALGORITHMS AND ARCHITECTURES

(Artificial Intelligence and Data Science)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Train models for multi-category classification.	**3**
CO 2	Train deep learning models and ensure the gradients are well controlled	**3**
CO 3	Construct a complex CNN and tune various hyper parameters	**4**
CO 4	Construct a sequential model which can capture the dependencies for time series data	**4**
CO 5	Familiar with the encoder-decoder architecture	**3**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Define cross-entropy loss for softmax regression model.	**1**	**2**
2.	Compare linear regression and logistic regression.	**1**	**2**
3.	Elucidate the relation between bias and variance.	**2**	**3**
4.	State the working principle of perceptron.	**2**	**2**
5.	Enlist the properties of convolution operations.	**3**	**3**
6.	Show how a CNN can have numerous input and output channels.	**3**	**3**
7.	Sketch a Recurrent neural network with a hidden layer.	**4**	**3**
8.	Specify the Markov condition for the sequence model.	**4**	**3**
9.	Summarize the encoder – decoder architecture.	**5**	**3**
10.	Outline the basic components of an attention mechanism in neural networks.	**5**	**2**

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	Model a simple linear regression to calculate best-fit line and loss functions.	**(7)**	**1**	**3**
	(ii)	Derive the formula for estimators$\beta_0 \wedge \beta_1$.	**(7)**	**1**	**3**
		(OR)			
(b)	**(i)**	Discuss the basic concepts of information theory with respect to the problem of encoding and decoding.	**(7)**	**1**	**3**
	(ii)	Describe how logistic regression models the probability of a binary outcome using the sigmoid function.	**(7)**	**1**	**3**

12. (a)	Explain the concept of forward propagation and backward propagation in multi-layer perceptron.	**(14)**	**2**	**3**
	(OR)			
(b)	**(i)** Explore steps involved in dropping out neurons from neural network.	**(6)**	**2**	**3**
	(ii) Differentiate L1 and L2 regularization technique which shall be applied towards high dimensional dataset.	**(8)**	**2**	**3**
13. (a)	Examine the object edge detection technique used for image in detail.	**(14)**	**3**	**3**
	(OR)			
(b)	Explain the architecture of Convolutional Neural Networks (CNNs) and their key components, including convolutional layers, pooling layers, and fully connected layers.	**(14)**	**3**	**3**
14. (a)	Discuss in detail about the various gates involved in GRU architecture with a neat diagram.	**(14)**	**4**	**3**
	(OR)			
(b)	Construct a simple recurrent neural network to work with sequential data and also explain the different layers and function involved in it.	**(14)**	**4**	**3**
15. (a)	Analyse the architecture of Neural Networks with attention mechanisms with a neat diagram.	**(14)**	**5**	**3**
	(OR)			
(b)	Explain Multi- head attention with a neat diagram in detail.	**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Investigate the effectiveness of Long Short-Term Memory (LSTM) networks in sequence prediction tasks.	**(10)**	**4**	**5**

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