Code: 20A05703c

R20

B.Tech IV Year I Semester (R20) Regular Examinations December/January 2024

DEEP LEARNING

(Common to IT, AI&DS, CSE (DS) & CSE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a)	Define a scalar and give an example of its use in linear algebra.	2M
(b)	What is conditional probability, and how is it calculated?	2M
(c)	Define overfitting in the context of machine learning and suggest one technique to mitigate it.	2M
(d)	What is the role of gradient descent in training machine learning models?	2M
(e)	Discuss the benefits of sparse representations in deep learning models.	2M
(f)	Define semi-supervised learning and discuss its advantages when labeled data is limited.	2M
(g)	Describe the purpose of pooling layers in CNNs and how they reduce the spatial dimensions of feature maps.	2M
(h)	Provide an example of an application where the convolution operation is commonly used.	2M
(i)	Explain the basic idea behind Recurrent Neural Networks (RNNs) and their use in sequential data processing.	2M
(j)	Define what an autoencoder is and how it is used in unsupervised learning.	2M

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

2	Discuss how eigenvalue decomposition is used in machine learning algorithms. Provide an example of its application in dimensionality reduction or recommendation systems.	10M
	OR	
3	Discuss the application of information theory in machine learning. Explain how entropy is used to measure uncertainty.	10M
4	Describe the challenges associated with hyper parameter tuning in machine learning models. Explain techniques for hyper parameter optimization.	10M
	OR	
5	Discuss the steps involved in training a neural network using stochastic gradient descent (SGD). Include the role of loss functions and regularization techniques.	10M
6	Discuss the challenges faced during the training of deep neural networks and describe optimization strategies to address these challenges.	10M
	OR	
7	Explain the role of various optimization algorithms, including stochastic gradient descent (SGD), in training deep neural networks.	10M
8	Discuss the concept of structured outputs in the context of CNNs. Provide examples of tasks where structured outputs are important.	10M
	OR	
9	Discuss the benefits of unsupervised feature learning in the context of CNNs, such as using auto encoders or generative adversarial networks (GANs) for feature extraction.	10M
10	Explain the role of gated recurrent units (GRUs) and long short-term memory (LSTM) units in mitigating the vanishing gradient problem.	10M
	OR	
11	Discuss the concept of adversarial training in the context of Generative Adversarial Networks (GANs) and how GANs can be used to create realistic data samples.	10M

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