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

Question Paper Code: 1047405

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV/ DEC 2024
Seventh Semester
Computer Science and Engineering
U20CS733 - DEEP LEARNING
(Regulation 2020)

Time: Three Hours Maximum: 100 Marks

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. What is meant by Loss Function?

2. Comment on gradient descent in deep learning.

3. Classify the different layers of CNN.

4. Why GAN is called adversarial?

5. Differentiate between autoencoder and denoising autoencoder.

6. How does batch normalization improve gradient flow and prevent vanishing or exploding gradients?

7. Name some commonly used optimization algorithms in deep learning.

8. Define the concept of a "learning rate" in optimization.

9. Write the significance of ImageNet in the history of deep learning.

10. Mention the role of the reward function in reinforcement learning.

PART – B (5 x 16 = 80 Marks)

11. (a) You are part of a team developing a deep learning model for object detection in autonomous vehicles. The objective is to accurately identify and classify objects in real-time, enabling the vehicle to make informed decisions. The dataset includes images from various sensors, such as cameras. , lidars and capturing diverse traffic scenarios.

a. Justify the choice of activation function for the output layer in the neural network architecture.

Identify and justify the appropriate loss function for training the objects detection neural network. (16)

(OR)

(b) You are a cybersecurity analyst working for a company that aims to enhance its network security through the use of deep learning. The task is to develop a deep learning. The task is to develop a deep learning model for network intrusion detection, specifically identifying normal object anomalies in network traffic. The dataset includes various features such as source and destination IP addresses, ports and packet sizes.

a. Justify the choice of activation function for the output layer in the neural network architecture.

Identify and justify the appropriate loss function for training the objects detection neural network. (16)

12. (a) Apply Convolutional Neural network for Image Processing and explain the basics in deep neural networks. (16)

(OR)

(b) Consider the input size kernel size. (16)

1	2	2	1
3	2	1	0
1	2	3	4
3	1	1	3

1	2
2	1

Padding =1,stride=1 find Maxpooling and Average pooling

13. (a) Illustrate the purpose of Denoising autoencoders. Explain its working principle in Estimating the Score. (16)

(OR)

(b) Implement a batch normalization layer in a deep learning framework (e.g., TensorFlow, PyTorch) for a simple neural network. (16)

14. (a) Consider the following input matrix. (16)

12	2	30	14	50
3	7	22	37	45
5	14	18	1	20
28	31	26	5	7
48	35	4	9	76
2				

a. Given the stride rate 1 and kernel size 2x2. Compute the outputs for the pooling operation on the given input matrix.
b. Given the stride rate 1 and kernel size 3x3. Compute the output for the Average pooling operation on the given input matrix
c. Use the following kernel and give the feature maps with stride rate 2.

2	1	2
1	10	1
2	1	2

(OR)

(b) What is sequence to sequence concept? Discuss its working principle in RNN? (16)

15. (a) Discuss the key aspects/ tasks of Natural language processing and give real time applications. (16)

(OR)

(b) Choose any deep learning application and answer the following questions:
a. Specify the appropriate type of dataset for your application and outline the necessary components that the dataset should contain for training the neural network.
b. Which deep learning architecture would you select for the feature extraction module of your application and why?
c. Sketch a diagram illustrating the process flow.
d. How do you measure the performance of the model you developed and validate? (16)

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