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Dr. D. Y. Patil Institute of Management & Entrepreneur Development
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Total No. of Questions : 5]

SEAT No. :

PF-5661

[Total No. of Pages : 2

[6651]-38
M.C.A. (Management)
DEL 616 MJ : DEEP LEARNING
(2024 Pattern) (Semester - III)

Time : 2½ Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicates full marks.*
3) *Use of scientific calculator is allowed.*

Q1) Solve Any two : **[2 × 5 = 10]**

a) Discuss deep learning real-world applications.

b) What is activation function? Explain ReLU activation function with example.

c) What is a loss function? Explain any one loss function with example.

d) List different optimization techniques in neural network. Briefly explain SGD.

Q2) Solve Any two : **[2 × 5 = 10]**

a) Consider the following input image matrix to be feed to CNN, apply the convolution operation using given 2 × 2 kernel (stride = 1, No padding)

2	4	3	2	3
5	7	6	3	6
8	9	9	5	8
4	3	2	1	7
5	3	4	2	6

Input Image matrix

4	2
1	3

Kernel

b) Describe CNN architecture - Alex Net with suitable diagram.

c) Illustrate and explain working of VOLO object detection algorithm with a neat diagram.

d) Explain how vision Transformers (ViTs) differ from CNNs in processing images.

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Q3) **Attempt any two :** **[2 × 5 = 10]**

a) Discuss the vanishing and exploding gradient problems in RNNs.

b) Explain LSTM architecture and describe how it is advantageous over standard RNNs.

c) Differentiate between wordzvec, Glove and Fast Text.

d) What is attention mechanism in transformers. Explain the concept of self - attention.

Q4) **Attempt Any Two :** **[2 × 5 = 10]**

a) What is VAE? Explain its architecture.

b) Propose an approach using PPO to train a self driving car's lane-following behaviour.

c) Illustrate how to tune hyperparameters of a CNN using random search.

d) Discuss a framework for bias detection and fairness evaluation in AI Models.

Q5) **Attempt any One :** **[1 × 10 = 10]**

a) Design and implement a deep learning model using Tensor Flow/ PyTorch to classify medical images into normal and abnormal categories. Describe the entire process including dataset collection, data preprocessing, model architecture (such as CNN), training and evaluation metrics. Justify your model.

b) Design and implement a deep learning model using Tensor Flow/PyTorch to classify hand-written digit images. Describe the entire process including dataset collection, data processing, model architecture (Such as CNN), training and evaluation metrics. Justify your model.

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