GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Seventh Semester – Regular) Examinations, November – 2023

BPECS7031 – Deep Learning

(CSE)

Time: 3 hrs   Maximum: 70 Marks

Answer ALL Questions
The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   **(1 x 10 = 10 Marks)**

Q.1. Answer *ALL* questions   [CO#]   [PO#]

a. Which technique is commonly used for dimensionality reduction and feature extraction in machine learning?   CO1   PO1
   (i) Principal component Analysis   (ii) K-means clustering
(iii) Decission Tree   (iv) Support vector machines

b. What does the convergence theorem for the perceptron guarantee about the learning process?   CO1   PO1
   (i) It ensures convergence to a global minimum   (ii) It guarantees convergence for linearly separable data.
(iii) It prevents the model from overfitting   (iv) It accelerates the convergence rate.

c. What is the consequence of high bias in a machine learning model?   CO1   PO1
   (i) Increased sensitivity to small fluctuations in the training data   (ii) Overfitting to the training data
(iii) Underestimation of the true model parameters   (iv) Overestimation of the true model parameters

d. Which regularization technique adds a penalty term based on the absolute values of the weights?   CO2   PO1
   (i) L1 regularization   (ii) L2 regularization
(iii) Dropout regularization   (iv) Elastic Net regularization

e. What type of architecture is generally required to solve the XOR problem using a neural network?   CO2   PO2
   (i) Shallow neural network   (ii) Recurrent neural network
(iii) Deep neural network   (iv) Linear regression model

f. Which of the following is a common application of computer vision?   CO3   PO2
   (i) Sentiment analysis   (ii) Speech recognition
(iii) Object detection   (iv) Text summarization

g. What is a denoising autoencoder designed to do?   CO4   PO1
   (i) Add noise to input data   (ii) Remove noise from input data
(iii) Increase the complexity of the model   (iv) None of the above

h. Which type of autoencoder is known for its ability to generate new data samples similar to the training data?   CO4   PO1
   (i) Contractive autoencoder   (ii) Variational autoencoder
(iii) Sparse autoencoder   (iv) Stacked autoencoder

i. Which dimensionality reduction technique is often used as a preprocessing step before applying autoencoders?   CO4   PO1
   (i) Principal Component Analysis (PCA)   (ii) Support Vector Machines (SVM)
(iii) K-Means clustering   (iv) Decision Trees

j. How does regularization in the context of loss functions impact the training of a   CO1   PO1
    machine learning model?
      (i) Accelerates convergence   (ii) Increases the risk of overfitting
    (iii) Reduces the importance of outliers   (iv) Introduces non linearity to the model

PART – B: (Short Answer Questions) (2 x 10 = 20 Marks)

Q.2. Answer *ALL* questions   [CO#]   [PO#]

		[CO#]	[PO#]
a.	What are the applications of Deep Learning?	CO1	PO2
b.	Define Variance.	CO1	PO2
c.	What is early stopping?	CO2	PO2
d.	What is Back propagation?	CO2	PO2
e.	What is the purpose of Normalisation in CNN?	CO3	PO2
f.	Define RNN with an example.	CO3	PO2
g.	Name one type of auto encoder that is specifically designed to introduce noise to the input data during training?	CO4	PO1
h.	What is Convergence Theorem for Perceptron?	CO4	PO2
i.	Define a Linear Perceptron.	CO1	PO2
j.	What are the causes for underfitting?	CO2	PO1

PART – C: (Long Answer Questions) (10 x 4 = 40 Marks)

Answer *ALL* questions

		Marks	[CO#]	[PO#]
3. a.	What are McCulloch-Pitts units and How it Works?	5	CO1	PO1
b.	What is Deep Feed Forward Neural Network? Explain its key features and use cases.	5	CO2	PO2
	(OR)			
c.	Mention the difficulties in training Deep Neural Networks.	10	CO2	PO1
4. a.	Write 5 different types of activation functions explain with suitable diagrams.	5	CO2	PO2
b.	Explain in details about bias – variance trade off.	5	CO2	PO2
	(OR)			
c.	Discuss the optimization methods in deep learning.	5	CO2	PO2
d.	Explain in detail about Greedy layer-wise training.	5	CO2	PO2
5. a.	Draw and explain the Architecture of CNN.		CO3	PO2
b.	Give a detailed overview of VGGNet and LeNet.	5	CO3	PO2
	(OR)			
c.	Mention some applications of Computer Vision in CNN.	5	CO3	PO2
d.	What is Pooling and purpose of Pooling?	5	CO3	PO2
6. a.	Why optimization is needed for Deep Learning and explain the optimizer SGD for CNN.	10	CO4	PO2
	(OR)			
b.	Discuss the role of the encoder and decoder in an auto encoder. How they contribute to the overall learning process?	10	CO4	PO3

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