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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: ES – Cluster Elective **Duration: 3 hrs.**
Course Code: 19EC7CE2DL **Max Marks: 100**
Course: Deep Learning **Date: 28.02.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) Define Deep learning and mention few applications of it. Machine learning differs from rule based programming - justify. **07**

b) Write short notes on the following libraries: Tensorflow, Keras, PyTorch. **06**

c) Briefly explain the K-Means Clustering algorithm. List out various distance measures used in clustering. **07**

UNIT - II

2 a) Consider two neurons N1 and N2 are connected. The input 'x'=0.1 is applied to N1 and actual output of N2 is 0.25. Weights and biases at N1 and N2 are initialized as: w1=0.15, b1=0.4 and w2=0.45, b2=0.65. Learning rate =0.4. Apply sigmoid activation and mean squared error as the loss function. Using GD through back propagation, update w1 and w2. Analyze the condition of vanishing gradient. **10**

b) What is the use of activation function in a neural network? Analyze various activation functions and their utilities. **10**

OR

3 a) What is a perceptron? Briefly explain the working of a multilayer perceptron model. **10**

b) Given in the table, the scores for three classes at the output layer of a classifier. Apply sigmoid and softmax activations individually. If the one-hot encoded output is [1,0,0], calculate the cross entropy loss. Discuss on the results of sigmoid and softmax. **10**

class	Scores
1	1.2
2	0.5
3	-0.33

UNIT - III

4	a)	When an optimizer function is needed in the process of model building? Briefly discuss on SGD with momentum and AdaGrad optimizers.	**10**
	b)	Write a python program to develop a Dense Neural Network based regression model. The architecture has 2 dense layers having 16 neurons each. The given dataset has 10 features and a target column. Use BatchNormalization, activations, optimizer and loss function appropriately.	**10**

UNIT - IV

5	a)	Briefly explain the functioning of a feed forward Convolutional Neural Network mentioning the feature learning through convolution and pooling	**10**
	b)	Write a python program to develop the architecture of an image classifier model classifying among 10 classes with the given specification. The network has 2 convolutional layers having 32 and 64 filters respectively, of size 3X3, followed by Maxpooling with pool size 2X2 and one dense layer having 512 neurons. The input image dimension is 28X28X3.	**10**

OR

6	a)	With the structure of a single Inception module, analyze the performance improvements of GoogleNet.	**10**
	b)	More number of smaller size filters reduces model overfitting than less number of larger size filters. Justify with an image dimension of 7x7.	**10**

UNIT - V

7	a)	Illustrate one Recurrent Neural Network cell and mention its limits using gradient descent. Assume the RNN cell is fed with a sequence of four words.	**10**
	b)	Briefly discuss on Autoencoder architecture. Mention few of its applications.	**10**

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