Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2024 - 25

Class:	BE	**Semester:**	VII
Course Code:	CSC701	**Course Name:**	DL

Name of Student:	ANKIT VINOD BARI
Roll No. :	61
Assignment No.:	1
Title of Assignment:	
Date of Submission:	
Date of Correction:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Completeness	5	5
Demonstrated Knowledge Legibility	3	2
Legibility	2	2
Total	10	9

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Completeness	5	3-4	1-2
Demonstrated Knowledge Legibility	3	2	1
Legibility	2	1	0

Checked by

Name of Faculty : Prof. Raunak Joshi

Signature : RJ

Date :

Assignment No. - 1

DL

Q. 1) write note on MLP.

→ A multilayer perceptron (MLP) is a class of artificial neural networks that consist of multiple layers of nodes in a directed graph, where each layer is fully connected to the next one. It is one of the most fundamental and widly used types of neural networks in deep learning.

- Structure -

(i) Input layer - Takes input features.
- each node corresponds to one feature.

(ii) Hidden layer - one or more layers of neurons.
- each neuron applied a weighted sum followed by a non-linear activation function.

(iii) Output layer - produces the final prediction.
- uses a suitable activation function.

- Working principle -

- MLP uses forward propagation to generate predictions and backpropagation to adjust the weights based on the error betn predicted and actual output.
- loss function like mean squared error or cross entropy loss are used to quantify prediction errors.

- key characteristics -

(i) Supervised learning - MLP's are trained with labeled data.

(ii) Universal approximator - MLP's can approximate any continuous function with enough neurons.

(iii) Requires fixed-sized input - cannot handle sequence or varying input lengths without preprocessing.

- App^n -

- Image and speech recognition
- Handwriting classification
- forecasting and financial modeling.

Q. 2) write and explain the basic terminologies in deep learning.

→ (i) Neuron (Node) - A neuron is the basic unit in a neural.
- It receives input, applies a weight, adds a bias and passes the result through an activation function to produce output.

(ii) layers - Neural network consist of several network layers.
- Input layer - Takes in raw data.
- hidden layers - perform transformations using neurons.
- output layer - produces the final result.

(iii) weight and biases - weights are the parameters that scale the input signals.
- biases allow models to shift the activation.

(iv) Activation function - Introduces non-linearity into the network, enabling it to learn complex patterns.

(v) loss function - measures how far the model's prediction are from the actual values.

(vi) forward propagation - The process of passing input data through the network to generate an output.

(vii) Backpropagation - A method of updating weights using the gradient of the loss function.

(viii) epoch - one complete pass through the entire training dataset.

(ix) learning rate - A hyperparameter that determines the step size at each iteration while moving towards a minimum of a loss function.

(x) Overfitting, underfitting - model learns training data too well, & model is too simple to capture.

(xi) dropout - a regularization technique where random neurons are ignored during training to prevent overfitting.

(xii) Optimizer - Algorithm used to minimize the loss function.