NAME: Aarush Talukdar Reg: RA2311047010014.

Serial. No.	Topic.	Date.	Signature.
1)	Exploring the Deep Learning Platforms & Frameworks	31/07/2025.	
2)	Implement a Classifier using an open-source dataset	7/8/2025	
3)	Study of Classifiers with respect to Statistical Parameter	7/8/2025	
4)	Build a simple feed forward network to recognize handwritten character	14/8/2025	
5)	Study of Activation Functions and its role	9/9/2025	9/9
6)	Implement gradient descent and backpropagation in deep neural network.	13/9/2025	
7)	Build a CNN model to classify Cat & dog image	13/9/2025	
8)	Experiment using LSTM	13/9/2025	
9)	Build a Recurrent Neural Network	13/9/2025.	
10)	Perform compression on MNIST	02/11/25	
11)	Experiment using VAE		
12)	Implement a DCGAN		
13)	Understand pre-trained model		
14)	Transfer Learning		
15	YOLO Model		

Completed

Exp-10 - Perform compression on MNIST dataset using auto encoder

Aim:

To perform image compression and reconstruction on the MNIST dataset using an Autoencoder.

Objective:-

To train an unsupervised neural network that learns compressed representations of handwritten digits and reconstructs them with minimal loss.

Algorithm:-

1) Start
2) Import necessary libraries - PyTorch, Torchvision, Matplotlib
3) Load Dataset:
   - Apply transformations.
   - Load MNIST training and test data using DataLoader.
4) Define Autoencoder Architecture:-
   - Encoder.
   - Decoder.
5) Initialize the model.
6) Training Phase:-

6) a) For each epoch:

i) Load a batch of images.

ii) Flatten images to 784-dimensional vectors.

iii) Forward pass through the Autoencoder.

iv) Compute reconstruction loss between input and output.

v) Backpropagate and update weights using optimizer.

b) Display loss per epoch.

7) Testing phase:-

- Pass ~~trained~~ test images through the trained Autoencoder.
- Obtain reconstructed images.

8) Visualization.

9) End.

Observation:

The Autoencoder successfully compressed and reconstructed recognizable digits. The MSE loss decreased steadily across epochs.

Result:

The aforementioned experiment was successfully implemented.

Epoch	Loss
1	0.2069
2	0.1684
3	0.1604
4	0.1610
5	0.1490
6	0.1541
7	0.1405
8	0.1508
9	0.1426
10	0.1429