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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	7/8/25
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	14/8/25
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.	13/11/25
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-9 Build a Recurrent Neural Network

13/09/25

Aim:

To implement a Recurrent Neural Network for predicting the next value in a sine wave sequence.

Objective:-

- Understand how RNNs learn sequential dependencies.
- Apply RNN for time series forecasting.
- Evaluate prediction accuracy using test data.

Pseudocode:-

1) Generate sine wave dataset.
2) Convert to sequences of length 50(X) with next value as target(y).
3) Split into training and testing sets.
4) Reshape to [samples, timesteps, features].
5) Build RNN:
   - SimpleRNN(50, activation='tanh')
   - Dense(1)
6) Compile model.
7) Train for 10 epochs.
8) Evaluate MSE.

Results:-

Epoch	Loss	Val_loss
1/10	0.0420	0.0048
2/10	0.0016	5.2527e-04
3/10	1.8424e-04	5.6854e-05
4/10	4.4656e-05	2.7030e-05
5/10	2.2604e-05	2.3010e-05
6/10	1.6518e-05	1.2060e-05
7/10	1.1889e-05	1.0162e-05
8/10	7.7479e-06	7.3630e-06
9/10	6.8603e-06	6.4271e-06
10/10	6.3672e-06	4.9440e-06.

Test MSE: 0.000005

Observation:

- Training and validation loss decreased steadily.
- Model achieved near-zero MSE (~1.39e-06)
- Predictions closely matched true actual sine wave values.

Result:

The RNN was successfully implemented.

Results (contd.)

	Predicted	Actual
1)	-0.5611	-0.5649
2)	-0.4764	-0.4796
3)	-0.3879	-0.3895
4)	-0.2955	-0.2955
5)	-0.1996	-0.1986

Diagram