Week 13: Recurrent Neural Networks (RNNs) and LSTMs

Summary

This project explores Recurrent Neural Networks (RNNs) and Long Short-Term Memory (LSTM) models for sequence and time-series prediction tasks. It includes theoretical understanding, hands-on implementation using synthetic data, and a client project predicting real stock prices (Netflix - NFLX.csv) using LSTM.

Model Overview

Model Used: LSTM Neural Network
Dataset: Netflix stock price data (Close column)
Training Ratio: 80% training, 20% testing
Input Window: Previous 60 days → predict next day price

Model Architecture

Layer	Details
LSTM	50 units, return_sequences=True
LSTM	50 units
Dense	25 neurons
Dense	1 neuron (output)
Optimizer	Adam
Loss	Mean Squared Error

Results

• Root Mean Squared Error (RMSE): printed at runtime (approx. 2–3 depending on run).
• Visualization: displays training, validation, and predicted stock prices.
• The model successfully captures stock price trends using temporal dependencies.

Files Submitted

1. week_13_recurrent_neural_networks_(rnns)_and_lstms.py (Python script)
2. Model output screenshots (plots and RMSE print)
3. Summary PDF (this file)