Title: Stock Price Trend Prediction using LSTM

□ Introduction

Stock market forecasting is a valuable tool for investors. This project uses a Long Short-Term Memory (LSTM) model to predict future stock prices based on historical data.

□ Abstract

We built a deep learning model using LSTM to predict future stock prices from past trends. Historical data was sourced via the Yahoo Finance API for Apple Inc. (AAPL) from 2018 to 2023. Data preprocessing included normalization, sequence generation, and technical indicator integration (Moving Averages, RSI). The model was trained, evaluated, and visualized using trend plots.

🔗 Tools Used

- Python 3.10
- Libraries: yfinance, pandas, numpy, matplotlib, scikit-learn, TensorFlow/Keras
- Jupyter Notebook

🔄 Steps Involved

1. Collected stock data using `yfinance`
2. Visualized raw closing prices
3. Normalized data using MinMaxScaler
4. Created input sequences (60 past days → next day)
5. Built LSTM model with 2 layers and Dropout
6. Trained model with 25 epochs
7. Predicted single-day and multi-day future prices
8. Visualized actual vs predicted prices
9. Added Moving Averages (MA50, MA200)
10. Calculated and plotted RSI
11. Saved trained model (`stock_price_lstm_model.h5`)

□ Conclusion

The LSTM model effectively captured stock price trends and produced competitive predictions. With further optimization and integration into dashboards, this project can serve as the base for a real-time financial analysis tool.

🗀 Deliverables

- ✅ Jupyter Notebook (`.ipynb`)
- ✅ Trained model file (`.h5`)
- ✅ Graphs (plotted in notebook)
- ✅ PDF report