Stock Price Prediction Using Neural Networks

Overview

This project is a Python implementation which uses different neural network models (LSTM, GRU, and Dense Neural Network) to predict stock prices based on historical data. The dataset is sourced from Yahoo Finance, and the models are implemented using Keras.

The script demonstrates the implementation and comparison of three neural network models to predict stock prices. The models are:

1. **LSTM (Long Short-Term Memory)** - Ideal for time-series prediction as it can retain long-term dependencies in the data.

2. **GRU (Gated Recurrent Unit)** - A simplified version of LSTM with a faster training time, making it an efficient alternative.

3. **Dense Neural Network (DNN)** - A fully connected neural network that processes the data as a flat structure rather than sequences.

The script evaluates and compares these models to determine which performs best for stock price prediction.

Project Files

- **stock_data.xlsx**: An example Excel file containing the stock data. (You can replace it with your own stock data file.)

- **sourabh_chauhan_rl.py**: The main Python script that loads the data, builds the models, and makes predictions.

Prerequisites

- *Python 3.x*
- *Required libraries:*
    - numpy
    - pandas
    - scikit-learn
    - keras
    - matplotlib

Installation

Install required dependencies:

- *pip install keras*
- *pip install tensorflow*
- *pip install numpy*

- *pip install pandas*
- *pip install scikit-learn*
- *pip install matplotlib*

How to Run the Project

1. Download your stock data from Yahoo Finance:
    - Search for your desired stock ticker.
    - Navigate to the "Historical Data" tab.
    - Set the range of dates (ex., 5 years) and download the data as a .xlsx file.
    - Place the downloaded file in the project directory and update the file name in the script if necessary.

OR

1. Run/use the Python script to download the stock Historical Data from Yahoo Finance:
   python stock_data_download.py

2. *To run the python script, simply run the following command:*
   python sourabh_chauhan_rl.py

3. Follow the on-screen prompts to select which models you want to use for prediction:
    - Enter **1** for LSTM, **2** for GRU, **3** for DNN, or **4** for all models.

4. After running the script, the reports for all three models will be displayed in the console along with next prediction stock price and best model.