StockDL: A Hybrid Deep Learning Library to predict the annual yields from stocks for Inexpensive Computational Environment

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Keywords: LSTMs, RNN, CNN, Financial Deep Learning, Stacked LSTMs, Stocks, Time Series prediction

Abstract

Predicting and analyzing the stock market has been of primary interest to researchers, investors, and market experts. The technology has been evolving continuously from manual to automated collection, tuning, and data analysis to generate insights and predict the rise or fall of a stock. This work presents stockDL, a deep learning solution to analyze, understand the historical stock data and calculate the gross and annual yield for the chosen stock ticker. The proposed solution is comprehensive and user-friendly. It includes data collection and preprocessing and utilizes various mathematical and deep learning techniques for feature extraction combined with state-of-art neural network architectures to predict the market trends. The stockDL algorithm assimilates two traditional stock trading techniques, Buy and Hold strategy and Moving Average ribbon trading strategy, with two Deep Learning Models created using the state-of-art Long Short-Term Memory networks. The first model is a pure LSTM network, whereas the second network is a Mixture of Convolution Neural networks and LSTMs. stockDL uses the data of the past five years from the date of generating the predictions, making the model immune from any sudden fluctuations in the historical data. When evaluated on the four stock symbols (AAPL, GOOGL, HDFCBANK.NSE, RELIANCE.NSE), the model has attained state-of-art for deep learning backed algorithmic trading in a controlled computational environment. The novel solution introduced in this study is faster and more accurate than any existing deep-learning solutions available. It is immune from any sudden dramatic decline among significant sections of the stock market Market Crash). This work contributes to the stock analysis and research community in both the technical and financial domains.