DSMM Term 2

BDM2053 (Big Data Algorithm and Statistics) – Group 4

Lambton College Mississauga

Stock Data Analysis Model for Amazon (Using LSTM for prediction)

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Overview

The stock market is a market where stocks and other securities of publicly traded corporations are bought and sold. It plays a significant role in the global economy by giving investors chances to make money and giving businesses money to expand. To make wise investment selections, stock market analysis is the process of assessing the performance of the stock market and specific stocks.

LSTM (Long Short-Term Memory) stock data analytics is a method for analysing and forecasting stock market patterns using deep learning algorithms. Recurrent neural networks (RNNs) of the LSTM variety are particularly effective at interpreting consecutive data, including stock prices.

Each time new data is updated, the model is updated as well. Up to a point, it can help you predict the value of your investment profitably. LSTM-based stock data analytics do have some limits, though, much like any prediction model.

Goals

The purpose of stock market data prediction is to evaluate past stock price data and forecast future market trends using deep learning techniques. This can be helpful for firms and other organisations that rely on the stock market for funding or other purposes, as well as for investors and analysts wanting to make informed investment decisions.

Some of the specific goals of stock market data prediction may include:

1. Predicting the closing prices: Stock market prediction aims to forecast the future prices of stocks accurately. This goal involves analyzing various factors that affect the stock prices, such as company financials, market trends, global events, and economic indicators.
2. Identifying trends and patterns: This analysis involves recognizing patterns in the stock market, such as bull and bear markets, seasonal trends, and market cycles. Understanding these trends can help investors make informed decisions about buying or selling stocks.
3. Managing risk: By using predictive models, investors can assess the risk associated with a particular stock or portfolio. This analysis allows investors to minimize their exposure to risk and make more informed decisions about investments.

4. Developing trading strategies: Finally, stock market prediction can help investors develop trading strategies. By analyzing historical data and predicting future trends, investors can develop strategies that maximize returns while minimizing risk. These strategies may involve buying and selling stocks, options, or other financial instruments based on the predictions generated by the predictive models.

Scope

This project is based on historical information about a Amazon that was gathered from an open source platform that maintains all stock indices. The fundamental concept behind LSTM-based stock data analytics is to use past stock price data to train a deep learning model, which is then used to forecast future stock prices. Technical indicators along with other pertinent economic and financial data are used to train the model.

Methodology and Milestones

The project will be divided into five Data Science milestones, namely Ask, Get,

Explore, Modelling, and Share.

1. Ask

Some of the questions we were trying to answer are:

- What are the potential future stock prices for a particular company or industry?
- How likely is it that a particular stock will increase or decrease in value?
- What factors are influencing stock prices and how are they likely to change in the future?
- What are the trends and patterns in stock prices over time, and how can investors use this information to make informed investment decisions?
- How can investors optimize their portfolio to maximize returns and minimize risks?
- What role does investor sentiment play in stock market prediction, and how can it be incorporated into predictive models?
- What impact do macroeconomic events have on stock prices, and how can investors prepare for these events?

2.Get

We chose Yahoo Finance as our source of data and gathered the federal interest rates data from an API by the Federal Reserve Bank.

Yahoo Finance: https://finance.yahoo.com/quote/AMZN/history?p=AMZN

3.Explore

To gain insights into the data, we will employ data visualization tools and descriptive statistics to identify any noticeable patterns and trends. Additionally, we will conduct statistical analysis to uncover any relationships that may exist between the different variables in the data. By doing so, we hope to gain a deeper understanding of the data and make informed decisions based on the results of our analysis.

4.Modelling

We prepared our data using several features such as the Interest rates, USDX, VIX and many more technical and macroeconomic data. We will then use the collection of this data in order to feed it into our deep learning model.

Deep learning methods are used to examine past stock price data and forecast future market pattern. In order to predict future stock values, this procedure entails preparing the data, selecting pertinent features or predictors, training the LSTM model, testing the model's performance, and deploying the model.

To help investors and analysts make wise investment decisions, LSTM modelling for stock data prediction ultimately aims to offer them insights and direction. It's crucial to keep in mind that no forecasting model is faultless, and that stock market investment always carries some degree of risk. Hence, while making investing decisions, it's crucial to view these models critically and to use them as one of many sources of information.

5.Share

The ultimate result will be the stock value projection for the next day. We can still alter the parameters to get the desired output. Other results such as data visualizations and statistics of the data are presented for validation.

The table below shows the timeline of the project per milestone.

Timeline	Date
Ask	March 18, 2023
Get	March 20, 2023
Explore	March 21, 2023
Modelling	April 3, 2023
Share	April 13, 2023: Presentation