STOCK PRICE PREDICTION USING LSTM

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Abstract—This paper presents the design and implementation of stock price prediction using Long Term Short Term Memory (LSTM).Machine learning is effectively implemented in forecasting stock prices. The objective is to predict the stock prices in order to make more informed and accurate investment decisions. We propose a stock price prediction system that integrates mathematical functions, machine learning, and other external factors for the purpose of achieving better stock prediction accuracy and issuing profitable trades. There are two types of stocks. Intraday trading by the commonly used term "day trading". Interday traders hold securities positions from at least one day to the next and often for several days to weeks or months. LSTMs are very powerful in sequence prediction problems because they're able to store past information. This is important in our case because the previous price of a stock is crucial in predicting its future price. While predicting the actual price of a stock is an uphill climb, we can builda model that will predict whether the price will go up or down

I. Introduction

Throughout the preceding two years. owing in large part to technological developments, stock trading has attracted a lot of attention. Investors look for strategies and tactics that could increase profits while reducing risk. SMP is potentially a type of statistical forecasting that analyses past dataand forecasts future values. A meeting of stock buyers and sellers could be referred to as a stock exchange, sometimes known as a share market. Equity crowd funding platforms are a market where investors can purchase shares of individual businesses. Additionally, to other asset classes, common equality shares are also listed on stock exchanges. For instance, corporate bonds and convertible bonds. Many time series forecasting algorithms have proven their effectiveness in practice. Time series forecasting is a common technique widely used in many real-world applications such as weather forecasting and financial market forecasting. The most popular algorithms today are based on recurrent neural networks (RNNs) and their special types long short-term memory (LSTM) and gated recurrent units (GRU). Time series forecasting is a common technique widely used in many realworld applications such as weather forecasting and financial market forecasting. The stock market is a representative field that presents time-series data, and many researchers have studied it and proposed various models. Using continuous data over a period of time to predict the next unit time result. This project uses an LSTM model to predict stock prices.

II. PROPOSED METHODOLOGY

RNN (Recurrent Neural Network) Recurrent Neural Networks (RNNs) are neural networks that are mostly used for preprocessing datasets such as time series. It is used for stock price prediction. The logic behind this is that after a certain sequence, the price is remembered and the model gains experience based on that pattern. At a high level, the RNN generally uses 'for' loop to iterate through time steps of the given datasets sequence while keeping a constant state that stores information about the time steps appeared till now. Since RNNs can only retain sequence patterns for a short time, we switch to LSTMs, which can remember patterns in both short-term and long-term memory. LSTM (Long-Term Short-Term Memory) LSTM is commonly used for machine learning regression and time series forecasting. It distinguishes LSTM neural networks from other neural networks so that data can be stored for long periods of time. The LSTM is mostly made to avoid longer period dependency errors. Keeping the required information for a longer period of time is effectively its general behaviour. of wireless communication that uses electromagnetic or electrostatic coupling in the extreme-frequency range of electromagnetic frequencies. that is produced in connection with the database for further information.

III. SYSTEM SPECIFICATION

A. Hardware Requirments

A ram of 4 GB with 500 GB storage, a CPU of 2 GHZ or faster and the architecture of either 32 or 64 bits

B. Software Requirments

- Jupyter Notebook
- Python - Used as a Scripting Language
- Any operating system MAC,Linux,Windows 7 or above

C. Functional Requirments

- The software must accept stock data CSV files from the Yahoo Financial website dataset as input .
- The software should perform preprocessing (such as checking for irregular data sets) on the training dataset model.
- Processing the given datasets by giving out the best Stock Closing Price result.
- Web-App must use LSTM algorithm as the primary unit of the software.
- web -APP must maintain and secure user info

D. Non Functional Requirments

- Ease of use: We define our software interface in terms of making it easy for all kinds of stock traders and other stock market stakeholders to understand the stock forecasting software interface.
- Efficiency: Maintains the highest possible accuracy of stock closing prices in the least minimum time possible using stock datasets.
- Performance: A attribute of stock forecasting software that tells its feedback from different user action .

IV. STOCK PRICE PREDICTION USING LSTM

A. Technologies Used

- Operating Systems - Microsoft Windows 10/11, MAC and Linux
- Machine Learning Libraries - Pandas, Pandas datareader
- NumPy, SKlearn, Matplotlib, Keras.models Programming Languages - Python
- Frontend Frameworks - Streamlit
- Web Server Software - Python Flask Server

B. Data Collection

Dataset collection will play out an integral part in any project. For this project, datasets were collected from a 3rd party API i.e., Yahoo Finance. The main advantages of using this API for this project are:

- Provides robust, powerful and reliable inventory information.
- Provides more than 20 years of data.
- Provides different categories of fundamental and technical stock data.
- Provides JSON/CSV format for easy integration with Python, R, PHP and many other web APIs.

The process of data collection is critical to any project. Therefore, in order to retrieve accurate and valid data, the Streamlit app sends user requests to the Python Flask middleware. The Python Flask API is integrated with third party APIs. B. Yahoo Finance integrated to collect required data. This data is in CSV file format. The Python Flask API returns data to the Streamlit app to fulfill user requests. During this process, the data was checked, transformed, corrected and prepared for various financial visualization

Fig. 1. System Architecture

C. System architecture

The below figure 1 shows the model of stock price prediction

- The input is in the form of a raw dataset.
- The data set is a collection of valuations of stock market information about some companies.
- The initial step is to convert raw data into processed data, Which is done by data cleaning since the raw data collected has multiple attributes, but only some of those attributes are needed for the prediction
- Then,in feature extraction, the data set is divided into two subsets.
- Training Set and Test Set The training set is used to train a model, while the testing set is used to test the trained model.
- shaping of data set takes place
- After preprocessing, we are going to analyse the data using LSTM algorithms.
- Next, we get the output in the graph format.

D. Result and Discussion

Multiple literature papers were taken into consideration which paved the way for this project.The major advantage of using this algorithm is time and it has can remember information for a longer period of time.

- Secure login and registration of user into the web application
- Users were able to choose , view and download list of all availabe company stocks
- A knowledge about stock market is also made available for users
- The LSTM algorthim generates output in the form of graphs for the user chosen stock
- Users can take up decisions based on these graphs
- Prediction for next 30 days is supported by this algorithm
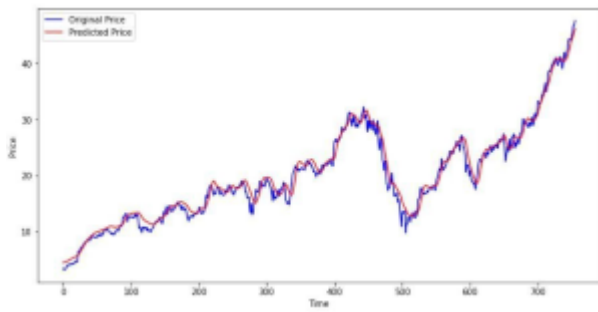- figure 2 and figure 3 illustrate final resulted plot
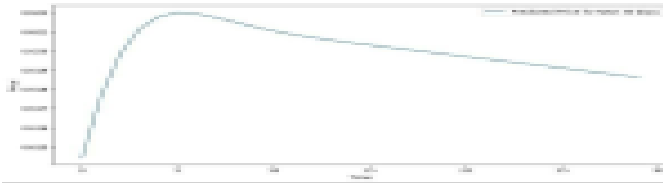
Fig. 2. final output graph(1)

Fig. 3. final output graph(2)

E. Conclusion

Because the stock market is so unpredictable, investors must invest after evaluating influencing aspects such as public opinion, historical data, and news events. Many researchers have tried to build prediction models based on machine learning algorithms to predict the exact value of stocks using various tools and approaches, but have not yet found the best solution. Our method describes one of the machine learning methods used by researchers to predict stock market trends and prices using machine learning and artificial intelligence algorithms, taking into account the many features, characteristics, and aspects . We can use an LSTM in almost no time and start making predictions. Just transform the data from a one-dimensional array to a two-dimensional by lagging the time series for a number of steps and then start your train-test-validationWe designed a web application to predict stock prices that can register and store user information within the database and allows us to select stock from company based on interest

F. Future Work

- Extending the web application to crypto trading
- Additionality of sentinel analysis in the algorithm

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