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Stock Price Prediction System using Machine Learning

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Abstract: *Stock price prediction is the process of using historical stock price data to forecast the future prices of a stock. The goal of stock price prediction is to identify patterns and trends in the historical data that can be used to predict the future prices with reasonable accuracy. There are many different approaches to stock price prediction, including technical analysis, fundamental analysis, and machine learning algorithms. Technical analysis involves the use of charts and technical indicators to identify trends and patterns in the historical stock price data. Fundamental analysis, on the other hand, involves the analysis of the financial and economic factors that can impact the stock price, such as earnings reports, economic indicators, and industry trends. Stock price prediction is an important area of research in finance and economics, with many different algorithms being used to predict future prices. One such algorithm is the Long Short-term memory (LSTM) Regression algorithm, which is a type of artificial neural network. This project presents a study of LSTM Regression algorithm for stock price prediction. The algorithm is trained on historical stock price data and used to predict the future prices of a stock. The performance of the algorithm is evaluated using various metrics, including the Mean Squared Error (MSE) and the coefficient of determination (R-squared). The results of the study show that LSTM Regression algorithm is a powerful tool for stock price prediction, and can provide accurate and reliable predictions for a wide range of stocks. The study also highlights the importance of selecting appropriate input features, and the need to carefully tune the hyperparameters of the algorithm to achieve optimal performance. Overall, the study demonstrates the potential of LSTM Regression algorithm for stock priceprediction, and provides insights into its strengths and limitations..*

Keywords: Stock price, Prediction, LSTM, Machine Learning, Python

I. INTRODUCTION

This project is aimed at developing a framework to develop the framework to predict the stock prices that are collected from KAGGLE sources about various companies Stock price prediction is an important application of machine learning in finance. Predicting stock prices accurately is crucial for investors and traders who aim to make informed investment decisions. One of the popular machine learning algorithms used for stock price prediction is the LSTM (Long Short Term Memory) algorithm. Stock data forecasting is the process of using historical stock market data to predict future trends and make informed investment decisions.Then using statistical methods and machine learning algorithms to make predictions on future stock prices. Common methods for stock data forecasting include time series analysis, regression analysis, and machine learning algorithms like artificial neural networks and decision trees. In time series analysis, past stock prices are used to make predictions about future prices. Regression analysis is used to identify the relationship between stock prices and other financial indicators. Machine learning algorithmscan learn complex patterns in the data and make predictions based on those patterns.

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II. EXISTING SYSTEM

There are several existing systems for stock price prediction, each with its own strengths and weaknesses. One of the simplest methods is the use of moving averages, which takes the average of a specific number of past prices to predict the next price. Another popular technique is linear regression, which fits a straight line through past stock prices to determine future trends. In recent years, machine learning has gained popularity as a preferred approach for stock price prediction due to its ability to process large volumes of data and detect complex patterns. The use of deep learning models such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) has also shown promising results in stock price prediction. These models can capture long-term dependencies and temporal patterns in the stock prices, making them more effective for prediction. Autoregressive integrated moving average (ARIMA) models take into account the trend and seasonality of a time series to predict future prices. For more complex predictions, artificial neural networks (ANNs) can be used, which use a layered structure of artificial neurons to analyse past stock prices and predict future ones. Long short-term memory (LSTM) is a type of recurrent neural network that can remember previous inputs and use that information to make predictions. Each of these methods has its own advantages and disadvantages, and the most appropriate approach will depend on the specific circumstances of the stock being analysed. Despite these advancements, predicting stock prices accurately remains a challenging task due to the volatility and complexity of the stock market. Moreover, there is always a degree of uncertainty and unpredictability associated with stock price movements. Hence, it is important to use a combination of approaches and continuously monitor market trends and sentiment to make informed investment decisions.

Disadvantages

- Difficult to handle large number of stock datasets
- Time and computational complexity is high
- False positive rate is high
- Only support the labelled datasets

III. PROPOSED SYSTEM

Stock price prediction using LSTM algorithm has become increasingly popular in recent years due to the ability of LSTM to capture long-term dependencies in time series data. The process of creating an LSTM model for stock price prediction involves several steps. The first step is to collect the historical stock price data and split it into training and testing sets.

The training set is used to train the LSTM model, while the testing set is used to evaluate its performance. The second step is data preprocessing, where the raw stock price data is converted into a format that can be used by the LSTM model. This usually involves normalization and scaling. The third step is feature engineering, where useful features are extracted from the stock price data, such as moving averages, technical indicators related to the stock.

Finally, the LSTM model is trained on the training data, and it learns to predict the future stock prices based on the historical data and extracted features. By using an LSTM algorithm, investors can better understand the market trends and make more informed decisions regarding their investments.

3.1 Proposed System Architecture

In this Proposed System architecture, user can input the stock datasets and perform preprocessing steps to eliminate the null values and extract the features such as date with closed price values. Finally build the model using LSTM model and predict the price. And also predict the future prices based on number of days.System architecture refers to the overall design and structure of a system, which includes hardware, software, network, and other components. It is a conceptual model that describes the relationships and interactions between different components of a system and how they work together to achieve a common goal. System architecture can be classified into different categories based on the type of system being developed.

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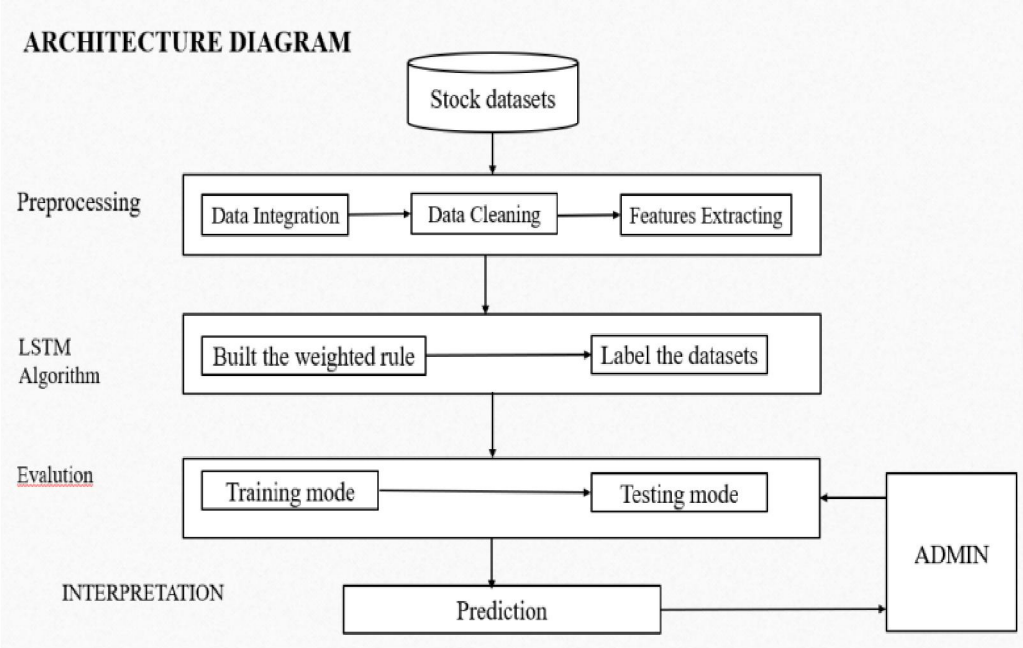

Fig.1 Architecture Diagram

IV. IMPLEMENTATION

For this process, data can be collected from Kaggle Web data sources about stock prices. Multiple companies stocks are collected and the companies are AAPL, Amazon, Google and so on.It contains the attributes such as opening price, closing price, date, volume and so on.We can eliminate the irrelevant values and also estimate the missing values of data.thenThe goal of feature selection is to reduce the complexity of the model by eliminating irrelevant or redundant features, which can improve accuracy, reduce over fitting, and speed up the training process. The layers are created to build the model and the epochs and the loss in the predicted values are plotted as a graph to evaluate the difference between the predicted and actual prices of the stock.In the part of Future Price Prediction, the closing prices for the next given number of days is predicted and is represented as a graph and also provides the error rate in the predicted prices in a graph of epochs versus the loss in predicted values.

V. EXPERIMENT RESULTS

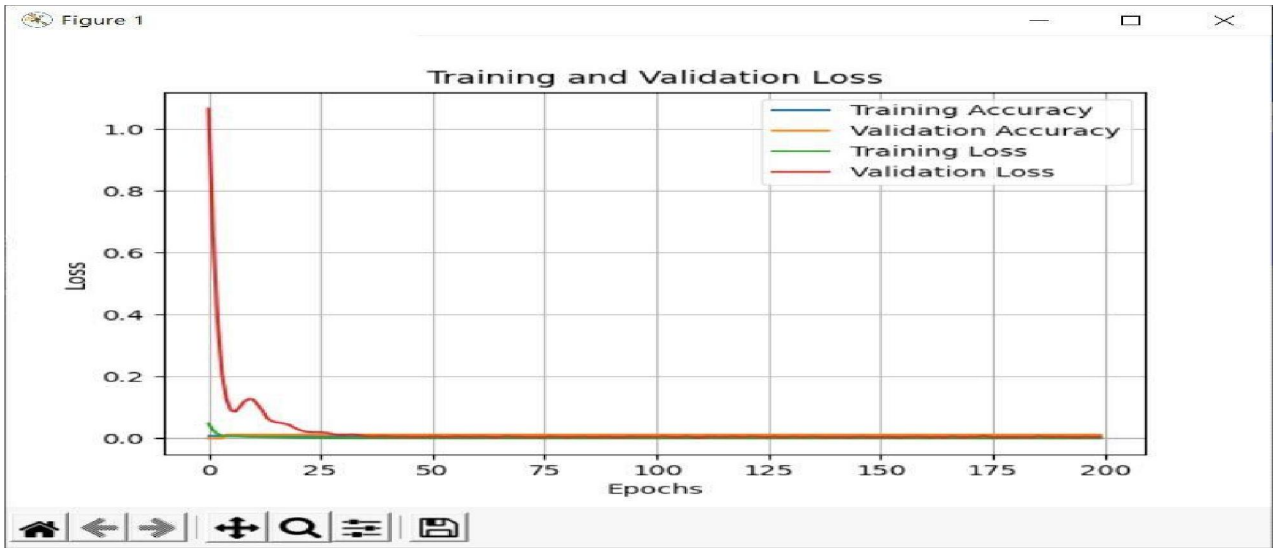

Fig.2 Training and validation loss

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Fig .3 whole closing Stock price prediction

Fig.4 future Prediction of next 15 days

VI. CONCLUSION

Predicting stock prices is a challenging problem in machine learning, and there is no single algorithm or model that can guarantee accurate predictions. However, the Long Short Term Memory regression algorithm can be a useful tool for this task. LSTM regression is a type of artificial neural network that can learn complex non-linear relationships between input features and output values. In the context of stock price prediction, the input features may include historical prices, trading volumes, news articles, and other relevant data, while the output values are the predicted stock prices. To use LSTM regression for stock price prediction, historical data can be used to train the model, and the model can then be used to make predictions on new data. The model can be evaluated using metrics such as Root Mean Squared Error (RMSE), Accuracy score to measure its performance. It is important to note that stock price prediction is a highly

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complex and unpredictable task, and the accuracy of the predictions will depend on a variety of factors, including the quality of the data, the choice of input features, the model architecture and hyperparameters, and external events that may impact the stock market. In conclusion, LSTM regression can be a useful tool for stock price prediction, but it is important to carefully evaluate the performance of the model and to use it in conjunction with other analysis and expert judgment when making investment decisions.

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