LEVERAGING THE SIGNIFICANT INPUTS/DATA BASED ON LONG AND SHORT TERM MEMORY TO ENHANCE THE EFFECTIVE PREDICTION OF STOCK MARKET

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ABSTRACT

A model that will use an LSTM model to predict stock prices is proposed in this study. Will use information from the past to predict stock prices. Because it can learn long-term dependencies in data, stacked LSTM is an ideal method for stock market prediction due to its dynamic and complex nature. This means that the predictions will be more accurate because it uses historical data. The model's accuracy will be checked using test data after it has been trained, and then the model will use this model to forecast stock prices for the next 30 days.

INTRODUCTION

Stocks are a type of financial instrument representing ownership in a company or business and a proportionate claim on the company's assets (what it owns) and income (what it makes in profits). Stocks can also be referred to as equity or shares, which stand for corporation ownership holdings.[6] A stock market, also known as an equity market or share market, is a group of individuals who buy and sell stocks, also known as shares. 7] These securities, such as equity crowdfunding platforms that make shares of private companies available to investors, can be traded privately or listed on a public stock exchange. 8] A stock market prediction predicts a stock's future value. These predictions are based on a fundamental analysis of a company's economy and stock performance in the past [9]. The stock market is known for being prone to change.

Predicting stock prices is difficult due to several factors, including a company's financial performance, unforeseen events, and global economic conditions. Physical and physiological factors that influence rational and irrational behaviour also play a significant role. Other parameters include market rumours and investor sentiment.[14] Together, these factors contribute to the unpredictability and difficulty of accurately forecasting stock values. Stock market prediction helps investors choose when to buy and sell equities based on information gleaned from these stocks' previous prices. We investigate the potential for data analysis to transform this field. When every piece of information about a company's stock market development is immediately accessible to market participants and investors, the effects of those developments have already been included in the stock price, according to the efficient market hypothesis.[5] All market events affect the historical spot price, which can use to predict the company's future behaviour. We use methods that are based on machine learning to predict future trends using historical stock price

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data.[4] ML methods can reveal patterns and insights that we had not previously noticed, and as a result, they could be used to make extremely accurate forecasts.[1] Long short-term memory (LSTM) networks are recurrent neural networks that can learn long-term dependencies in data.[3] They have a long memory for patterns that they choose to recall. LSTM is used to understand the intricate dynamics of human behaviour because it is a great option for modelling sequential data. This project proposes a framework that uses the LSTM (Long ShortTerm Memory) model to examine and predict a company's expansion in the long run based on historical data. Additionally, the built model will predict stock prices for the next thirty days.

METHODOLOGY

A. Theory built this project with an LSTM model. It is a sophisticated RNN that can deal with dependencies over long periods and recall data. Made it to get around the limitation of RNN, which is that they can't remember long-term dependencies because of gradients that disappear.
The LSTM functions similarly to RNN cells. The Forget gate, the Input gate, and the Output gate are the three gates that make up the LSTM cell.
The first gate decides whether the earlier timestamp's data is useful or can be forgotten. The cell learns information from the input in the second section. The updated data from the current timestamp is transferred to the next timestamp in the third section.

B. TensorFlow for Materials and Components: TensorFlow is a free, open-source library for dataflow. It is primarily utilized for neural network training. These brain networks perform the procedure on multi-faceted clusters, known as 'Tensors'. Thanks to this library, we can build programs and applications based on machine learning.

Keras: A neural network Python interface is provided by the Keras library. It displays error messages that are easy to understand and use. It lessens cognitive strain. All of the neural networking build blocks, including layers, objectives, activation functions, and so on, are implemented in this library. The code is made simpler by making use of these activation functions.

Library of Scikit-learn: The Support Vector Machine (SVM) algorithm is supported by Scikit-learn, a machine learning library. It is based on the NumPy and Matplotlib libraries. Regression, classification, and dimensionality reduction all make use of it.

NumPy: Open-source and free, Numpy is a library. A library can use in Python and manages calculations of exhibits.

Pandas: Data is analyzed with the help of the Pandas library. It is a library based on Python. This library makes it possible to combine multiple datasets. We can import data from Excel, CSV, and JSON.

Matplotlib: Matplotlib is a graph plotting and visualization library that makes it simple to comprehend and identify correlations.

Line plots, histograms, bar plots, scatter plots, and other plots are all supported.
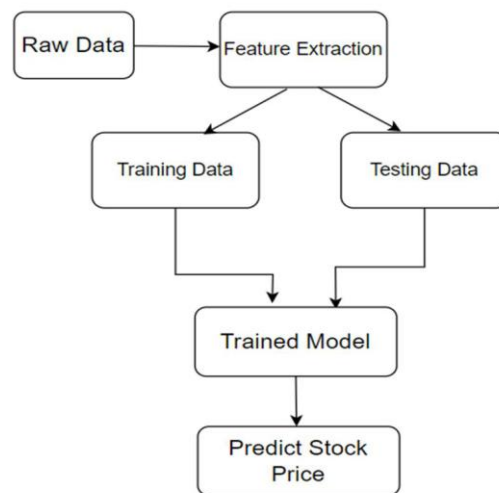
ALGORITHM

Fig 1: Flow chart

1) Gather Stock Information: For data collection, we will utilize the Pandas_datareader library. Tigo is a financial information stage that makes top-notch monetary instruments realistic. Tigo has been used to obtain data on the stock market. Utilization was made of the apple stock market dataset (AAPL).

2) Pre-processing: Selection of a Field: Out of all the fields present, such as open, close, low, high, etc., We'll pick one to see how the stock price moves. The stock's closing price is the value in the selected field.

3) Sizing: LSTM is sensitive to scale. A min-max scaler is used to reduce the dataset's values to values between 0 and 1.

4) Split between training and testing: The testing size is 35%, while the training size is 65% of the entire dataset.

5) Building the LSTM model: The next value depends on the values that came before it because the data we're working with is "time series data." Day 3 is dependent on days 1 and 2, and so on. Timesteps: how many previous day's outputs should be considered equal to 3 when calculating the next day's output? We have assumed that the timestep is 100 for this project. As a result, we will add 100 values to our x_train and have one value in our y_train. The same goes for x_test and y_text.

6) Determine the accuracy of the test data predictions. Use the built model to predict the test data and then plot the predicted values to see how accurate the model is.

7) Utilize Our Model to Predict Stock Prices for the Next 30 Days: The predicted output could be plotted using the model to predict stock prices for the next 30 days.
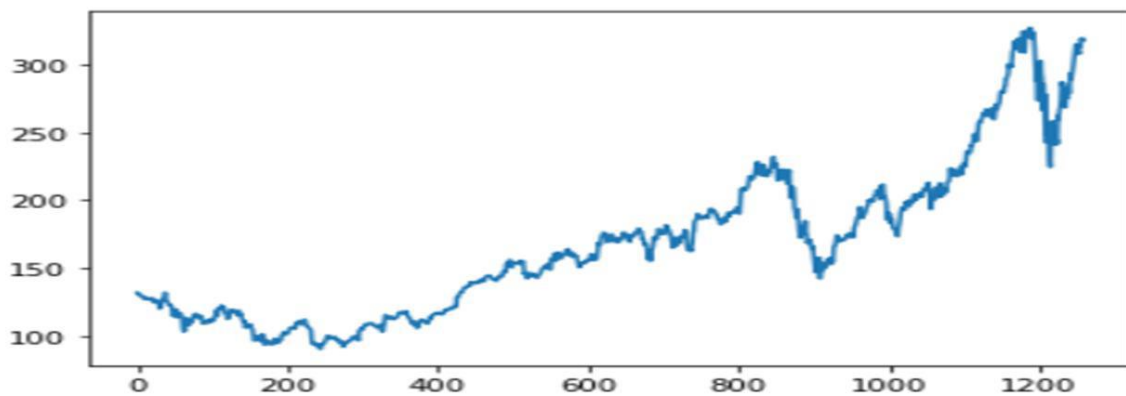
RESULTS

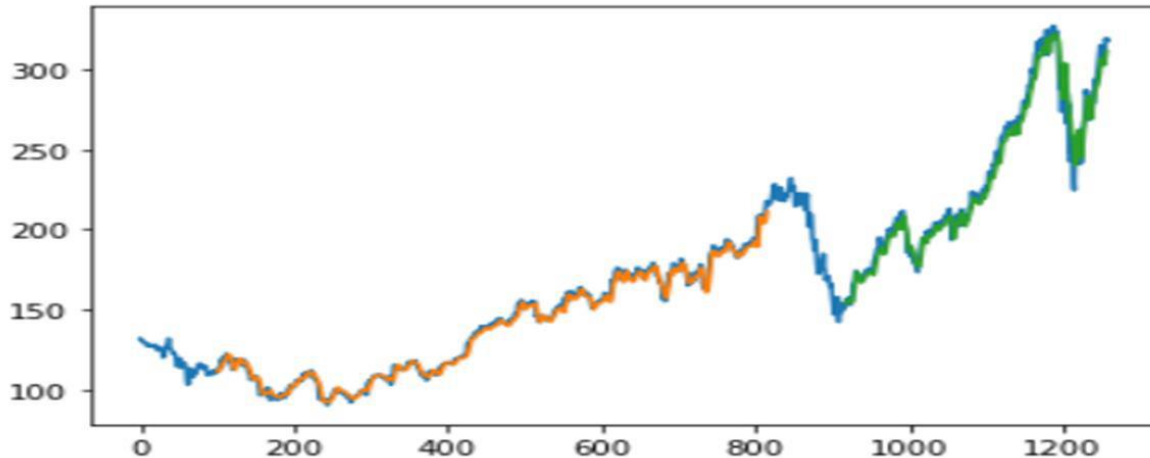

Fig.2. The stock prices of apple from 2015-2022

Fig.3. The train and test predicted output plot

CONCLUSION

A model that can remember past values and use historical data is needed for stock prediction. Several techniques, including SVR and regression, have some disadvantages. As a result, the LSTM is appropriate for stock forecasting.

We created an LSTM model for this project to forecast stock prices using their previous values. Used a train-test check to verify the model's accuracy. Finally, the built model was used to predict the stock values for the next thirty days.

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