PREDICTION OF STOCK PRICE USING MACHINE LEARNING TECHNIQUE

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ABSTRACT

One important investment is buying the stocks. Foreseeing stock markets is a strategy used to analyse the market based on both recent and historical data. Previous statistical techniques that just considered stock price history are insufficient to accurately forecast the stock market. Better techniques are required because of this. In order to predict stock market prices effectively for equities in various business sectors, this study proposes a recommended solution and its implementation for the Indian stock market. *Objectives and scope:* Main motivation is to predict the future stock prices of stocks listed under National stock exchange of India. To develop a system to predict the moving average of the stock .To develop a classify stock market based on many influencing parameters **[1].** The performance of the classifier was measured in terms of Mean Square Error (MSE) value and compared to other classifier.

Introduction:

Involves coding or programming of the software.The output of the phase is typical library,excetables, user manual and a software documentation model to predict next day's price. To provide visualization of data. *Methodology*: Long Short Term Memory (LSTM) classifier, Recurrent Neural Network (RNN) method is used here to. *Result:* In this work, we proposed a LSTM approach to classify stock market based on many influencing parameters, where the price is dependent. *conclusion* : Stock market prediction is a complex activity, especially with globalization. An event in one part of world can affect the stock price in a stock exchange located far off. Hence predict the future stock prices of stocks listed under National stock exchange of India using the Long short term memory .

Key words: Stock market price prediction, LSTM classifer, Recuurent Neural network.

I. INTRODUCTION

A complete, accurate model for predicting stock market performance has never been proposed in the history of stock performance literature. The annual report of the company's finances can be used to examine a stock. The annual report offers a wealth of data that can be analysed using several ratios. Financial ratios may be crucial instruments for predicting stock performance, according to prior research. Financial ratios are used to predict future trends in stock price by analysts, investors, and researchers. As a key factor in determining the value of stock shares, ratio analysts have become more prominent **[2].** For stock valuation, financial ratios are therefore employed. Every country's shares are listed on one or more stock exchanges where the shares of other countries are also listed companies can be sold or bought. According to government rules and regulations, the promoter group sells a significant percentage of shares to the public when a business first lists itself on any stock exchange to become a

public company **[3]**. Promoter groups or institutional investors acquire a company's shares on the initial market onto incorporation. The National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE) are India's two major exchanges for shares **[4]**. Objectives: Designing a graphical interface for clients to enter stock index code and testing dates, designing a system for predicting the stock's moving average, creating a model to anticipate the next day's price, and providing visualisation of the data are all targets. The primary objective is to accurately predict the future stock prices of the stocks listed under National stock exchange of India using the LSTM (Long Short Term Memory) Recurrent Neural Network, hybrid machine learning system based on Genetic Algorithm (GA) and Support Vector Machines (SVM) for stock market prediction **[5],[6]**. There is no foolproof method for estimating share prices in the stock market, but some studies have suggested the use of Artificial Neural Network (ANN) models to make predictions**[8]**. The aim of this project is to predict stock prices for a short period, which is a time series problem. Long Short-Term Memory (LSTM) models are widely used for time-series forecasting of stock prices, as they can identify long-term patterns in sequential data. LSTM models are a type of recurrent neural network that can remember past inputs and handle temporal dependencies. Historical price data can be used as input to an LSTM model for stock price prediction Although no significant rule to estimate the price of the share in share market, hence Artificial Neural Network (ANN) method was propose in one study **[7],[8],[9].** Present project is to predict stock prices for a few days, which is a time series problem. The LSTM model is very popular in time-series forecasting of stock prediction**[1],[10].**

II.   LITERATURE REVIEW

Harsh Panday, V Vijayarajan et.al [1] presented a hybrid algorithm that in corporate Twitter sentiment analysis and Long Short Term Memory to predict next day closing values of a stock. LSTM has proven to be the best algorithm to predict stock values.

Rohit Choudhry and Kumkum Garg [5] presented a hybrid machine learning system based on Genetic Algorithm (GA) and Support Vector Machines (SVM) for stock market prediction. From all the technical indicators.The system uses a variety of indicators from the technical analysis field of   study. They also used stock prices of different companies to forecast the price of a stock A set of technical indicators obtained from the stock to be predicted. The result shows that the GA helped in improving the performance of the SVM system significantly.

Zabir Haider Khan, Tasim Sharmin et.al [8] mentioned that the share market is an unsuitable place for predicting since there are no significant rule to estimate the price of the share in share market, hence Artificial Neural Network (ANN) method was proposed, which has two modules. one is training session and other is predicting price based on previously trained data. They used Back propagation algorithm for training session and Multilayer Feedforward network as a network model for predicting price. The ultimate goal is to increase the yield from the investment.

Osman Hegazy, Omar S.Soliman et.al [6] conveyed that Stock market prediction is the act of trying to determine the future value of a company stock or other financial instrument traded on a financial exchange. This model is based on the study of stocks historical data and technical indicators. The algorithm integrates Particle swarm optimization (PSO) and least square support vector machine (LS-SVM).

J. Moody   et.al [12]   presented a new prediction algorithm that exploits the temporal correlation among global stock markets and various financial products to predict the next-daystock trend with the aid of SVM

(support vector machine).The same algorithmis also applied with different regression algorithms to trace the actual increment in the share market.

Luca Di Persio and Oleksandr Honchar [7] presented an Artificial Neural Network (ANN) approach to predict stock market, particularly with respect to the forecast of the trend movements

up or down exploiting different Neural Networks architectures that provide provide numerical analysis of concrete financial time series. Better results were obtained by this network.

CF Tsai, SP Wang et al [9] In their research examines a predictive machine learning approach for financial news articles analysis using several different textual representations.

III. METHODOLOGY

The algorithm used here are Reccurent Neural Network (RNN) and Long Short term memory (LSTM). RNNs rely on the information from previous output to predict for the upcoming data/input. This feature becomes extremely useful when dealing with sequential data.

Long Short Term Memory networks is a special kind of RNNs that deals with the long term dependency problem effectively. LSTM networks have a repeating module that has 4 different neural network layers interacting to deal with the long term dependency problem [1],[10].

Step 1: The historical stock data is collected from National stock exchange (NSE) and data is used for the prediction of future stock prices. Step 2: The pre-processing stage involves Part of data reduction for numerical data, Data Normalization, Data cleaning-Fill in missing values and Integration of data files. After the dataset is converted into a clean dataset, the dataset is divided into training and testing sets so as to evaluate. Here, the training values are taken as the more recent values.

Step 3: In this layer, only the features which are to be fed to the neural network are chosen.Here

Date, open, high, low, close, and volume are choosen.

Step 4: Training Neural Network:

In this stage, the data is fed to the neural network and trained for prediction assigning random biases and weights. LSTM model is composed of a sequential input layer followed by 2 LSTM layers and dense layer with ReLU activation and then finally a dense output layer with linear

Activation function. LSTM decide the informations and the output is given.

IV.TRAINING NEURAL NETWORK (LSTM MODEL)

Training data is essential for neural networks to develop and enhance their accuracy over time.The neural network is fed the data and trained for prediction while applying random biases and weights. Our LSTM model (**FIGURE:1**)is made up of a dense layer with an Adam optimizer, three LSTM layers, and a sequential input layer. This module's purpose is to train an LSTM model with N days' worth of prices as input and output N+1 days' worth of prices .

V. LSTM PREDICTION

Based on the last N days' worth of prices as input, this module forecasts the stock's opening price. The test data, which has undergone comparable modification or preprocessing as the training data, is where the N day price is collected from. Next, combine the training and test sets on the 0 axis, choose 60 as the time step once more, apply Min Max Scaler, and reshape the data. The stock prices are then shown using inverse_transform in a legible manner. Afterward, we can see the difference between our anticipated stock price and the real stock price by using the matplotlib **[10].**
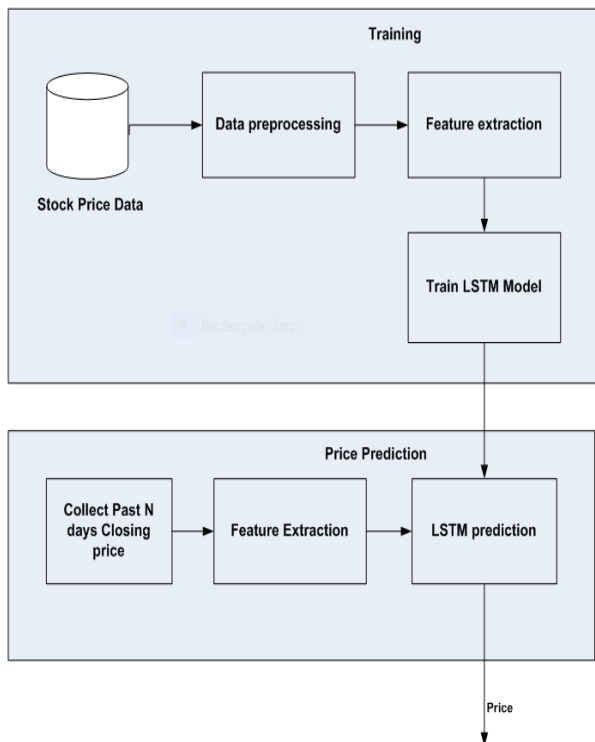
FIGURE : 1. SYSTEM ARCHITECTURE

VI. ANALYSIS

Root Mean Square Error is used to assess the system's effectiveness (RMSE). The RMSE value is used to reduce error or the discrepancy between the desired and obtained output values.The root mean square error (RMSE) is the sum of all square errors. RMSE amplifies and harshly penalises big errors in comparison to the analgous Mean Absolute Error.

RMSE = square root of 1/n mean of y^1-y^2[11].

VII. WORK EXPERIMENT

The data from https://www.quandl.com and the historical stock data was collected from the National stock exchange. Daily dataset was obtained and kept a window size of 60 days. Data ranges from 02.02.2021 to 3.2.2022. Sequence data: We got 1312 sequences from 02.02.2021. to 3.2.2022. From these data set we 590 samples for training purpose and 66 samples for validation purpose was used. For training the model RMS prop as the optimizer and normalized each vector of the sequence, Google cloud engine as a training platform [Machine type: n1-standard-2 (2 vCPUs, 7.5 GB memory), CPU platform: Intel Ivy Bridge] and used Ubuntu 16.04, Keras (Frontend) and Tensorflow (Backend) as the learning environment were used. Various set of parameters with a different number of epochs to measure the RMSE of Training and Testing dataset was also considered in this experiment.

VIII. RESULTS

Predicting the price: Step1: A test vector was grouped using the closing price for each 60-day period. Step 2: Run the LSTM model on all test vectors for a period of 60 days to acquire the predicted value. Step 3:A graph (**FIGURE :2**) with the predicted price is created. The difference between the expected and real prices is measured in Step 4 using MSE and RMSE (**TABLE:1**).The new dataset using an LSTM model on the new dataset. Predicted_stock_price = regressor predict (X_test).predicted_stock_price=sc.inverse_transform (predicted_stock_price).

Parameters	No. of Epochs	Training RMSE	Testing RMSE
Open/ Close	250	0.01491	0.01358
Open/ Close	500	0.01027	0.00918
High/Low/Close	250	0.01511	0.014
High/Low/Close	500	0.01133	0.01059
High/Low/Open/ Close	250	0.0133	0.01236
High/Low/Open/ Close	500	0.00983	0.00859

TABLE 1: Comparative Results Using Different Parameters and epochs

FIGURE:2 Actual trend Vs Predicted stock trend

IX. CONCLUSION

The stock market is becoming increasingly popular, which is motivating experts to develop fresh approaches to prediction. The forecasting method benefits everyone who deals with the stock market, including investors and researchers. A forecasting model with high accuracy is necessary to assist in making predictions about the stock indexes. Recurrent neural networks and long short-term memory units are two of the most exact forecasting technologies had been utilised in this work, and they benefit investors, analysts, and anybody else interested in the stock market by giving them a thorough understanding of the market's future state.

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