Stock Market Prediction and analysis Using Machine Learning(ML) Algorithms

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Project tittle - Stock Market Prediction and analysis Using Machine Learning(ML) Algorithms
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Abstract-In Stock Market Prediction, the aim is to predict the future value of the financial stocks of a company. The recent trend in stock market prediction technologies is the use of machine learning which makes predictions based on the values of current stock market indices by training on their previous values. Machine learning itself employs different models to make prediction easier and authentic. The paper focuses on the use LSTM based Machine learning to predict stock values. Factors considered are open, close, low, high and volume.
Index Terms- Close, high, low ,LSTM model, open, and volume.

Introduction -stock market is a place where you can invest your money and earn a good amount of money. This market completely depends on the economy of the countries , global signals, currency and policies . In the stock market, there are shares in the names of different companies .stock exchange is the mediator that allow buying and selling shares. stock market is a network of exchanges of sorts, and companies list shares on an exchange . Investors then purchase shares and buy and sell them among one another. Many of the investors are major funds controlling lots of money. This project seeks to utilize Deep learning models ,Long –short Term memory (LSTM) Neural Network algorithm ,to predict stock price. . I will use Keres to build a LSTM to predict stock closing prices .

Problem definition- The challenge of our project is to predict the future 30 days prices stock across a given period of time in the future. For this project I will use a Long Short Term Memory networks usually just called “LSTM Model” to predict closing prices using a dataset of past prices. In this project we will visualize it. In this project we measure Mean Squared Error (MSE) calculated as the difference between predicted values and an actual values of the target stock at adjusted closing price .

Description about dataset -

The data used in this project is of Reliance company from 2015-11-18 to 2020-11-17 and taken from kaggle.The open column tell us the price at which a stock started trading when the market opened on a day .The close columns tell us the price of an single stock when the stock exchange closed of the market High column tell us highest price of period the low column tell us the lowest price of the period My goal was to predict the closing price for any given date after training. In our project data frame look like this:

	Date	Open	High	Low	Close	Adj Close	Volume
0	2015-11-18	463.799988	465.649994	454.975006	456.000000	436.671021	5142766.0
1	2015-11-19	459.450012	469.350006	458.625000	467.375000	447.563873	5569752.0
2	2015-11-20	467.000000	476.399994	462.774994	473.424988	453.357422	5167930.0
3	2015-11-23	475.000000	478.950012	473.100006	476.875000	456.661224	4800026.0
4	2015-11-24	476.500000	485.799988	475.524994	483.850006	463.340515	6768886.0
...	...	...	...	...	...	...	...
1228	2020-11-10	2077.000000	2090.000000	2041.199951	2084.550049	2084.550049	17045147.0
1229	2020-11-11	2089.000000	2095.000000	1978.099976	1997.199951	1997.199951	26178477.0
1230	2020-11-12	1981.000000	2008.449951	1965.000000	1980.000000	1980.000000	18481466.0
1231	2020-11-13	1982.000000	2036.650024	1981.750000	1996.400024	1996.400024	20946864.0
1232	2020-11-17	2085.000000	2085.000000	1985.000000	1993.250000	1993.250000	21479385.0

1233 rows × 7 columns

Now we can see in our data frame .we have 7 columns Date, Open, Close, High ,Low, Adj close, Volume.

Methodology- I have divided this project in three part :

Data - preprocessing -

1.Using pandas library we load the data into pandas dataframe

2.In this component I understand data types of each attributes ,data shape , describing the data (mean ,std, etc.),correlations ,data cleaning

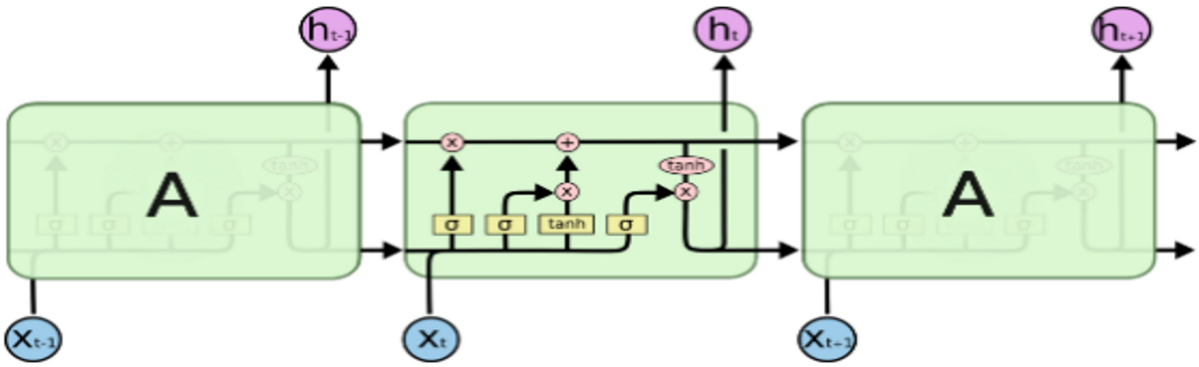
Data visualization –In this part we visualize the data (graphs)

Create LSTM model -

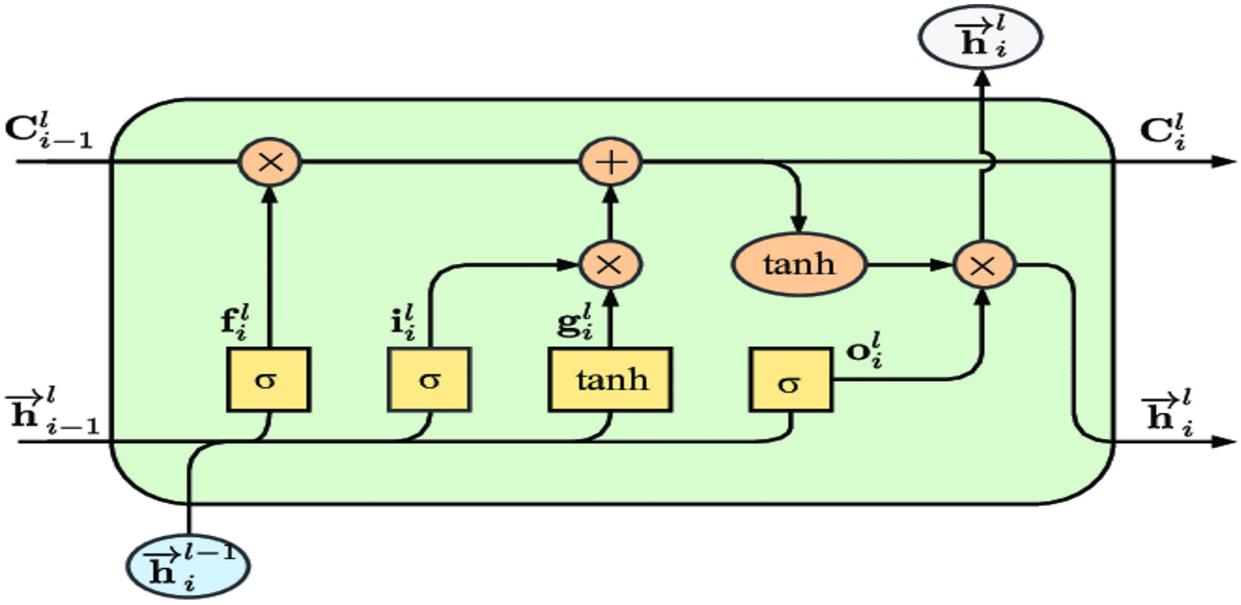
First we splitting the dataset –In this part we divided dataset in two part

1.training set 2.test set

This is important part of our project. For creating this model I will use keras library. Now we see



The repeating module in an LSTM contains four interacting layers.



LSTM(Long short term memory)- Here , we will use a Long Short Term Memory Network (LSTM) for building our model to predict the stock prices of Tata global National stock Exchange company. LTSMs are a type of Recurrent neural network for learning long term dependencies. It is used for processing and predicting time series data. As we can see above image ,we can see LSTM have chain like structure . General Recurrent Neural Network have single neural network. LSTMs have four interacting layers communicating extraordinarily.

LSTMs work in a three-step process-

1. We can see above figure In The first step ,LSTM is to decide which information to be omitted from the cell in that particular time step. It is decided with the help of a sigmoid function. It looks at the previous state (ht-1) and the current input xt and computes the function.
2. There are two functions in the second layer. The first is the sigmoid function, and the second is the tanh function. The sigmoid function decides which values to let through (0 or 1). The tanh function gives the weightage to the values passed, deciding their level of importance from -1 to 1.
3. The third step is to decide what will be the final output. First, you need to run a sigmoid layer which determines what parts of the cell state make it to the output. Then, you must put the cell state through the tanh function to push the values between -1 and 1 and multiply it by the output of the sigmoid gate.

★ **Terminologies used-**Brief summary of the various terminologies relating to our proposed stock prediction system:

- Training set : Subsection of the original data that is used to train the neural network model for predicting the output values.
- Test set : Part of the original data that is used to make predictions of the output value, which are then compared with the actual values to evaluate the performance of the model.
- Activation function: in a neural network, the activation function of a node defines the output of that node as a weighted sum of inputs.
- Batch size : number of samples that must be processed by the model before updating the weights of the parameters.
- Epoch : a complete pass through the given dataset by the training algorithm.

- Dropout: a technique where randomly selected neurons are ignored during training i.e., they are "dropped out" randomly. Thus, their contribution to the activation of downstream neurons is temporally removed on the forward pass, and any weight updates are not applied to the neuron on the backward pass.

★ **Result –** we show the actual and predicated stock price of the company Reliance company . The model was trained with batch size of 64 and 50 epochs. And prediction made almost matched actual prices observed in the graph

And I will predict future 30 days closing price we can see below fig.

References

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