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VISUALIZING AND FORECASTING STOCKS USING DASH

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Abstract: In the money world stock exchanging is one of the most significant exercises. Stock exchange forecast is a demonstration of attempting to decide the future estimation of a stock. This paper clarifies the forecast of stock utilizing machine learning. The specialized and major or the time arrangement examination is utilized by the majority of the stockbrokers while making the stock predictions. The programming language is utilized to foresee the financial exchange utilizing AI in Python. Right now, we propose a Machine Learning (ML) approach that will be trained from the accessible stock's information for a precise prediction. Right now, study utilizes an AI procedure called Long Short-Term Memory (LSTM) Algorithm to foresee stock costs

Index Terms **- : Stock Market, Machine learning, Predictions, Long Short Term Memory**

I. INTRODUCTION

These days, as the associations between overall economics are fixed by globalization; outer aggravations to the money related markets are never again residential. With developing capital markets, an ever-increasing number of information is being made day by day. The inherrent estimation of an organization's stock is the worth controlled by assessing the normal future incomes of a stock and limiting them to the present, which is known as the book value. This is different from the market estimation of stock that is controlled by the organization's stock cost.

Investing in the stock market is among the common ways investors attempt to grow their money, but it's also among the riskier investment options available. Understanding the basic concept of the stock market is the first step in becoming an informed investor. While the stock market is an extremely complex system, its basic traits are much simpler.

II. LITERATURE SURVEY

[1] Ashish Sharma, Dinesh Bhuriya, Upendra Singh proposed stock market prediction has become an increasingly important issue in the present time. One of the methods employed is technical analysis, but such methods do not always yield accurate results. So it is important to develop methods for a more accurate predictions that are obtained from the stock price after considering all the factors that might affect it. The technique that was employed that was employed in this instance was a regression. Since financial stock marks generate enormous amounts of data at any given time a great volume of data needs to undergo analysis before a prediction can be made. Each of the techniques listed under regression habits own advantages and limitations over its other counterparts. One of the noteworthy techniques that were mentioned was linear regression. The way linear regression models work is that they may alternatively also be fitted in other ways, such as by diminishing the "lack of fit" in some other norm, or by diminishing a handclapped version of the least square's loss function. Conversely, the least squares approach can be utilized to fit nonlinear model.

[2] K.Hiba Sadia, Aditya Sharma, Adarsh Paul, SarmsthaPadhi proposed a stock prediction using few classifiers includes the Random Forest Classifier, SVM Classifier. The outcome of the paper is to sum it up, the accuracy of the SCM Model to Test Set is 0.787 whereas the Random Forest Classifier is calculated to 0.808.

[3] Ashutosh Sharma, Sanket Modek, Eashwaran Sridhar published the Data Visualization and Stock Market and Prediction paper in IRJET. In the paper they compared the benchmark model- Linear regression to the final improved LSTM Model, Mean Squared Error. Output graph showing the pattern prediction by LSTM model and the actual pattern observed in the dataset of closing price.

[4] V Kranthi Sai Reddy proposed the paper on Stock Market Prediction using ML in IRJET Journal. In this paper the prediction of stock market is done by the Support Vector Machine (SVM), Radial Basis Function (RBF). The model generates higher profit compared to the selected benchmarks. SVM does not give over fitting and results are highly efficiency.

[5] Stock Market Prediction via Multiple Source Multiple Instance Learning published by XI Zhang, Siyu Qu, Jiejun Huang, Binxing Fang, Philip Yu in IEEE Journal. Accurately predicting the stock market is a challenging task, but the modern web has proved to be a very useful tool in making this task easier. Due to the interconnected format of data, it is easy to extract certain sentiments thus making it easier to establish relationships between various variable and roughly scope out a pattern of investment. Investment pattern from various firms show sign of similarity, and the key to successfully predicting the stock market is to exploit these same consistencies between the data sets. The way stock market information can be predicted successfully is by using more than just technical historical data and using other methods like the use of sentiment analyzer to derive an important connection between people's emotions and how they are influenced by investment in specific stocks. One more important segment of the prediction process was the extraction of important events from web news to see how it affected stock prices.

[6] A Survey on Stock Market Prediction using SVM published by Sachin Sampat, Kailash Patidar, Megha Jain in IJCTET Journal.The recent studies provide a well-grounded proof that most of the predictive regression models are inefficient in out of sample predictability test. The reason for this inefficiency was parameter instability and model uncertainty. The studies also concluded the traditional strategies that promise to solve this problem. Support vector machine commonly known as SVM provides with the kernel, decision function, and sparsely of the solution. It is used to learn polynomial radial basis function and the multi-layer perceptron classifier. It is a training algorithm for classification and regression, which works on a larger dataset. There are many algorithms in the market, but SVM provides with better efficiency and accuracy. The correlation analysis between SVM and stock market indicates strong interconnection between the stock prices and the market index.

[7] Deep learning for Stock Prediction Using Numerical and Textual Information published by Ryo Akit,Akira Yoshihara, Takashi Matsuba, Kuniaki Uehara in IEEE Journal. They used LSTM to decide the size of each minibatch was 30, Lstm had one layer and were unrolled 20 steps, and on the basis traine the Lstm for 50% dropout on the non-recurrent connection. This paper proposed an approach to predict stock prices by employing distributed representation of news articles and correlations with the company.

[8] Stock Market prediction using an improved training algorithm of Neural Network by Mustain Billah, Sajjad Waheed, Abu Hanifa in IEEE Xplore. In this study, Root Mean square error (RMSE) & the coefficient of multiple determinations(r^2) used in this project. In this ANN uses this improved algorithm for training, it shows 53% more accuracy in stock prediction than ANFIS.

[9] Stock Market Movement prediction using LDA- online Learning Model by Tanapon Tantisrip, Nuanwan, Sonthornphisaj published in IEEE Xplore. Financial organizations and merchants have made different exclusive models to attempt and beat the market for themselves or their customers, yet once in a while has anybody accomplished reliably higher-than-normal degrees of profitability. Nevertheless, the challenge of stock forecasting is so engaging in light of the fact that the improvement of only a couple of rate focuses can build benefit by a large number of dollars for these organizations.

[10] A Review of stock Market prediction using neural Networks by Aditya Menom, Shivali Singh, Hardik Parekh published in IEEE Xplore. Lstm model, when run with only text processing gave moderately accurate results. Resulted in high accrete than using neural network with OHLC. They accurately predicted the result via using Deep learning model. Prediction movement using financial news and people's opinions.

III. DISADVANTAGES OF THE EXISTING SYSTEM

- The existing system fails when there are rare outcomes or predictors, as the algorithm is based on bootstrap sampling.
- The previous results indicate that the stock price is unpredictable when the traditional classifier is used.
- The existing system does not perform well when there is a change in the operating environment.
- The existing system needs some form of input interpretation, thus need of scaling.
- It doesn't exploit data pre-processing techniques to remove inconsistency and incompleteness of the data.

IV. LIMITATIONS OF RNNs

Recurrent Neural Networks works just fine when we are dealing with short-term dependencies. This is when applied to problems like: The color of the sky is _____.

RNNs turn out to be quite effective. This is because this problem has nothing to do with the context of the statement. The RNN need not remember what was said before this, or what was its meaning, all they need to know is that in most cases the sky is blue. Thus, the prediction would be: The color of the sky is blue _____.

However, RNNs fail to understand the context behind an input. Something that was said long before, cannot be present. The reason behind this is the problem of Vanishing Gradient. In order to understand this, you'll need to have some knowledge about how a feed-forward neural network learns. We know that for a conventional feed-forward neural network, the weight updating that

is applied on a particular layer is a multiple of the learning rate, the error term from the previous layers' errors. As a result of this, the gradient almost vanishes as we move towards the starting layers, and it becomes difficult to train these layers.

V. PROPOSED SYSTEM

We proposed an online web-based application using learning model for predicting the price of a given stock. The challenge of this project is to accurately predict the future closing value of a given stock across a given period of time in the future. For this project we will be using a Long short-term memory networkusually just called LSTMs to predict the closing price of the stock using a dataset of past prices. We have used keras to feed a LSTM model to predict the stock prices using historical closing price and trading volume and visualize both the predicted price, values over time and the optimal parameters for the model. The model predicts 30 data points based on the test dataset and the last data point is pushed as the output. This model was set as a backend for a website with input data integration functionality.

VI. METHODOLOGY

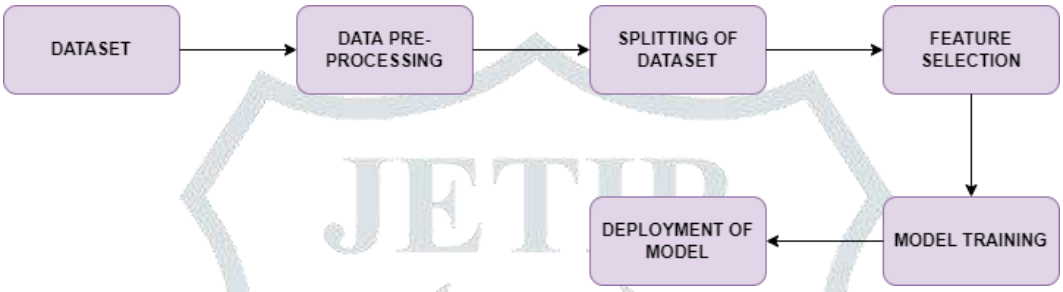


Fig 1: Methodology used for our Prediction Using Machine Learning

6.1 Dataset: The data used in this paper is of the Apple company is upto May 2020. This is a series of data points indexed in time order or a time series. Our goal was to predict the closing price for any given date after training. For ease of reproduction and re usability, all data was pulled from the KAGGLE. The prediction has to be made for Closing (Adjusted closing) price of the data. we just need to make prediction for "CLOSE" price. The dataset is of following form 'AAPL.csv'..

Unnamed: 0	symbol	date	close	high	low	open	volume	adjClose	adjHigh	adjLow	adjOpen	adjVolume	divCash	splitFactor
0	AAPL	2015-05-27 00:00:00+00:00	132.045	132.260	130.05	130.34	45833246	121.682558	121.880685	119.844118	120.111360	45833246	0.0	1.0
1	AAPL	2015-05-28 00:00:00+00:00	131.780	131.950	131.10	131.86	30733309	121.438354	121.595013	120.811718	121.512076	30733309	0.0	1.0
2	AAPL	2015-05-29 00:00:00+00:00	130.280	131.450	129.90	131.23	50884452	120.056069	121.134251	119.705890	120.931516	50884452	0.0	1.0
3	AAPL	2015-06-01 00:00:00+00:00	130.535	131.390	130.05	131.20	32112797	120.291057	121.078960	119.844118	120.903870	32112797	0.0	1.0
4	AAPL	2015-06-02 00:00:00+00:00	129.960	130.655	129.32	129.86	33667627	119.761181	120.401640	119.171406	119.669029	33667627	0.0	1.0

Fig 2: Dataset of APPLE company stock

6.2 Data Pre-Processing Whenever training time series data we should divide the data differently we should train the data with respective date. Always in time-series data the one data is dependent on other data. The training size should be 65% of the data frame, the test size should be the difference between the length of the dataset and the training size.

6.3 Data Preprocessing: Mainly we consider time steps, if we want to predict the price of the stock in a day that how previous data should be considered. Thick that timestep value will be 100. Let's split the data X, Y. in the 0th iteration the first 100 elements go to first record and the 101 elements will be put up in the X. The 100 elements will be put up in the Y.

6.4 Prediction: Predict both x_train and the X_test, after that we should scalar inverse transform because we want to see the root mean square performance.

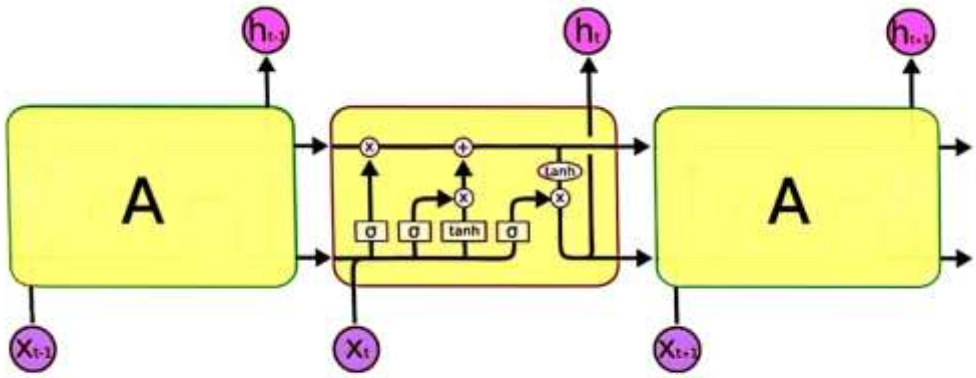
Let close price be:120,130,125,140,134,150,160,190,154,160,174

Train 120,130,125,140,134,150 Test---160,190,154,160,174 Timesteps=3

X_train			Y_train
F1	F2	F3	O/P
120	130	125	140
130	125	140	134

Y_train			Y_test
F1	F2	F3	O/P
160	190	154	160
190	154	160	174

6.5 Architecture of LSTMs:



Source

Fig 3 Architecture of LSTMs

A typical LSTM network is comprised of different memory blocks called cells (The rectangles that we see in the image). There are two states that are being transferred to the next cell: the cell state and the hidden state. The memory blocks are responsible for remembering things and manipulations to this memory is done through three major mechanisms, called gates. LSTMs are widely used for sequence prediction problems and have proven to be extremely effective. The reason they work so well is that LSTM can store past important information and forget the information that is not.

LSTM has three gates:

- The input gate: The input gate adds information to the cell state.
- The forget gate: It removes the information that is no longer required by the model.
- The output gate: Output Gate at LSTM selects the information to be shown as output.

VII. CONCLUSION AND FUTURE ENHANCEMENT

Comparing the benchmark model - Linear Regression to the final improved LSTM model, the Mean Squared Error improvement was significant. The mean balancing done over processed LSTM helped us get better results and more accurate patterns over historical data sets. Predicting stock market prices is a risky trend and can often lead to inaccurate value predictions mainly because of how many factors it depends upon. This project can be extended and modified in future by training the model on more features and including some important nonnumeric features as well with the help of a subject matter expert.

The LSTM model can be tuned for various parameters such as changing the number of LSTM layers, adding dropout value or increasing the number of epochs. But are the predictions from LSTM enough to identify whether the stock price will increase or decrease? Certainly not! As we mentioned stock price is affected by the news about the company and other factors like demonetization or merger/demerger of the companies. There are certain intangible factors as well which can often be impossible to predict beforehand.

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