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STOCK PRICE PREDICTION USING RNN ALGORITHM

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Abstract-- In this project we attempt to implement deep learning approach to predict stock prices. Machine learning is effectively implemented in forecasting stock prices. The objective is to predict the stock prices in order to make more informed and accurate investment decisions. We propose a stock price prediction system that integrates mathematical functions, deep learning, and other external factors for the purpose of achieving better stock prediction accuracy and issuing profitable trades.

There are two types of stocks. You may know of intraday trading by the commonly used term "day trading." Interday traders hold securities positions from at least one day to the next and often for several days to weeks or months. LSTMs are very powerful in sequence prediction problems because they're able to store past information. This is important in our case because the previous price of a stock is crucial in predicting its future price. While predicting the actual price of a stock is an uphill climb, we can build a model that will predict whether the price will go up or down.

Keywords: LSTM, CNN, ML, DL, Trade Open, Trade Close, Trade Low, Trade High

1.INTRODUCTION

Stock price is the price of a single stock among the number of stocks sold by a company listed in public offering. Having stocks of a public company allows you to own a portion of it. Original owners of the company initially sell the stocks to get additional investment to help the company grow. This initial offering of stocks to the public is called Initial Public Offering (IPO).

Predicting the accurate stock price has been the aim of investors ever since the beginning of the stock market. Millions of dollars worth of trading happens every single day, and every trader hopes to earn profit from his/her investments. Investors who can make right buy and sell decisions will end up in profits. To make right decisions, investors have to judge based on technical analysis, such as company's charts, stock market indices and information from newspapers and micro blogs. However, it is difficult for investors to analyze and forecast the market by churning all this information. Therefore, to predict the trends automatically, many Artificial Intelligence (AI) techniques have been investigated. Some of the first research in prediction of stock prices dates

back to 1994, in which a comparative study with machine learning regression models was performed. Since then, many researchers were investing resources to devise strategies for forecasting the price of the stock.

2.PROBLEM STATEMENT

Time Series forecasting & modelling plays an important role in data analysis. Time series analysis is a specialized branch of statistics used extensively in fields such as Econometrics & Operation Research. Time Series is being widely used in analytics & data science. Stock prices are volatile in nature and price depends on various factors. The main aim of this project is to predict stock prices using Long short term memory (LSTM).

3.EXISTING METHODS

3.1 STOCK MARKET PREDICTION USING MACHINE LEARNING

The research work done by V Kranthi Sai Reddy Student, ECM, Sreenidhi Institute of Science and Technology, Hyderabad, India. In the finance world stock trading is one of the most important activities. Stock market prediction is an act of trying to determine the future value of a stock other financial instrument traded on a financial exchange. This paper explains the prediction of a stock using Machine Learning. The technical and fundamental or the time series analysis is used by the most of the stockbrokers while making the stock predictions. The programming language is used to predict the stock market using machine learning is Python. In this paper we propose a Machine Learning (ML) approach that will be trained from the available stocks data and gain intelligence and then uses the acquired knowledge for an accurate prediction. In this context this study uses a machine learning technique called Support Vector Machine (SVM) to predict stock prices for the large and small capitalizations and in the three different markets, employing prices with both daily and up-to-the-minute frequencies.

3.2FORECASTING THE STOCK MARKET INDEX USING ARTIFICIAL INTELLIGENCE TECHNIQUES

The research work done by Lufuno Ronald Marwala A dissertation submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Master of Science in Engineering. The weak form of Efficient Market hypothesis (EMH) states that it is impossible to forecast the future price of an asset based on the information contained in the historical prices of an asset.Three artificial intelligence techniques, namely, neural networks (NN), support vector machines and neuro-fuzzy systems are implemented in forecasting the future price of a stock market index based on its historical price information. Artificial intelligence techniques have the ability to take into consideration financial system complexities and they are used as financial time series forecasting tools.

Two techniques are used to benchmark the AI techniques, namely, Autoregressive Moving Average (ARMA) which is linear modelling technique and random walk (RW) technique. [2] emphasized that Security is an important issue in current and next-generation networks. Blockchain will be an appropriate technology for securely sharing information in next-generation networks. Digital images are the prime medium attacked by cyber attackers. [3] proposed a secure hash message authentication code. A secure hash message authentication code to avoid certificate revocation list checking is proposed for vehicular ad hoc networks (VANETs). The group signature scheme is widely used in VANETs for secure communication, the existing systems based on group signature scheme provides verification delay in certificate revocation list checking. The results show that the

ranking of performances support vector machines, neuro-fuzzy systems, multilayer perceptron neural networks is dependent on the accuracy measure used.

4. PROPOSED SYSTEM

The prediction methods can be roughly divided into two categories, statistical methods and artificial intelligence methods. Statistical methods include logistic regression model, ARCH model, etc. Artificial intelligence methods include multi-layer perceptron, convolutional neural network, naive Bayes network, back propagation network, single-layer LSTM, support vector machine, recurrent neural network, etc. They used Long short-term memory network (LSTM).

Predicting the stock price of reliance sector. Stock price prediction using deep learning. Prediction accuracy is high because of deep learning handle huge amount of data.

4.1 DEEP LEARNING

Deep learning is a subset of machine learning, which is essentially a neural network with three or more layers. These neural networks attempt to simulate the behavior of the human brain—albeit far from matching its ability allowing it to —learn‖ from large amounts of data.

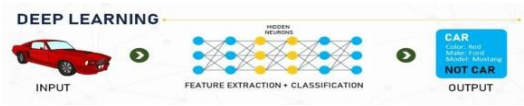

Fig.1 Deep learning

5.MODULE

Input module

Recurrent neural network + LSTM

There are three gates to protect and control the cell states.

Output module

5.1 INPUT MODULE

The dataset includes the historical daily prices and volume information for reliance sector.This is a series of data points indexed in time order or a time series.Our goal was to predicted the opening price for any given date after training**.**

Index	Date	High	Low	Open	Close	Volume	Adj Close
0	18-11-2015	465.65	454.975	463.8	456	5.14277e+06	436.671
1	19-11-2015	469.35	458.625	459.45	467.375	5.56975e+06	447.564
2	20-11-2015	476.4	462.775	467	473.425	5.16793e+06	453.357
3	23-11-2015	478.95	473.1	475	476.875	4.80003e+06	456.661
4	24-11-2015	485.8	475.525	476.5	483.85	6.76889e+06	463.341
5	26-11-2015	495.975	484.125	485.5	494.325	1.08832e+07	473.372
6	27-11-2015	496.25	487.05	494.5	489.525	4.97939e+06	468.775
7	30-11-2015	492.2	481.15	489.25	483.55	1.36781e+07	463.053
8	01-12-2015	489.4	480.625	482	482.95	5.93465e+06	462.479

Fig,2 Dataset

5.2 Recurrent Nerual Network

A recurrent neural network is a type of artificial neural network commonly used in speech recognition and natural language processing. Recurrent neural networks recognize data's sequential characteristics and use patterns to predict the next likely scenario.

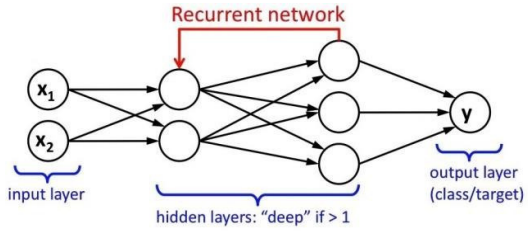

Fig.3 RNN Process

5.2.1 LONG SHORT TERM MEMORY

LSTMs are explicitly designed to avoid the long-term dependency problems.Remembering information for long periods of time is practically their default behavior, not something they struggle to learn.

1. Forget gate
2. Input gate

3. Output gate

LSTM(How it works ?)

First, forget gate looks at h_t-1 and x_t outputs a number between 0 and 1. 1 represents "keep the information" and O represents "remove the information".

Second, input gate decides which values will be updated, in order to do that a tanh layer creates a vector of C_t(bar). Combining these two, create an update to the state.

Third, It's time to update the old cell C_t-1 to C_t

5.3 OUTPUT MODULE

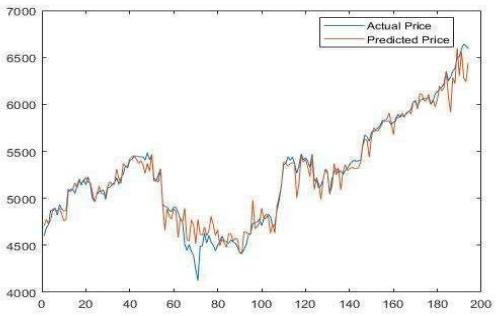

Fig.5 Prediction visualization

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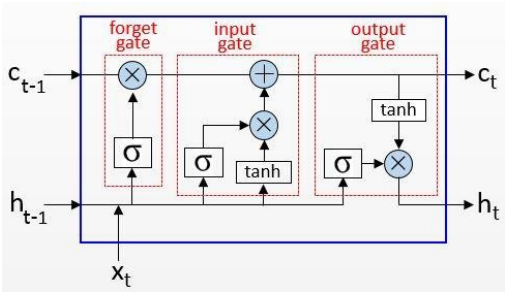

Fig.4 Process of LSTM

Fourth, output will based on our cell state. a sigmoid layer will decides what parts of the cell state we're going to output.

Fig.5 Prediction visualization

7. CONCLUSION

It completely meets the requirement, thereby yielding positive results. Use of recently introduced deep learning techniques in the prediction of stocks have yielded promising results and thereby marked the use of them in profitable exchange schemes.It has led to the conclusion that it is possible to predict

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