Technical Analysis and Predictive Modelling of Financial Markets

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Introduction

Today, investing has become the new trend when it comes to the new generation. Recent times have heavily emphasized on the advantages of having passive incomes and backup other than your salaries.

In this new world every novice investor looks at the financial markets as the opportunity to earn. One of the problems with young investors is a lack of experience. In order to some what make up for the lack of experience we have tried to create a GUI (Graphical User Interface) to give the novice investor the basic parameter of Stock Markets on the go

The Project is divided into three parts: Technical analysis, Predictive modelling and website for the end user.

Technical Analysis is important in investing/ trading as it shows the sentiment in the market and also of any particular company by its price ant the volume traded. Moving averages crossovers helps as one of the major indicator for any short/long term investment

Predictive Modelling is used to understand where the stock will reach in terms of price if there is no abnormal change in the market. This provides the actual transaction guide while the technical analysis provides you with the tools to make the actual change.

Materials and Methods:

The general methodology in technical analysis and predictive modelling is data visualization and machine learning. It has been done using Python programming and the output are to be displayed on a website.

We have used Long Short-Term Memory (LSTM) as our main model to predict the prices as in our testing that proved to be the most accurate.

LSTM, have been determined to be the most effective solution for practically all of the sequence prediction challenges where information travels through cell state mechanism.

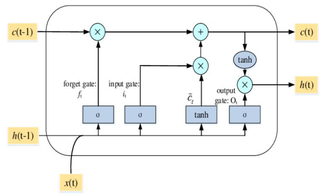

Fig 1. LSTM Architecture

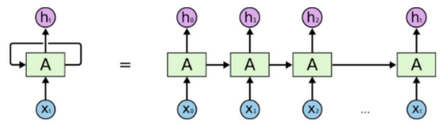

Fig 2. LSTM Neural Network Representation

Observations and Graphs Obtained

Technical Analysis:

1) Candlestick patterns-

Trading patterns are identified using candlesticks.

Fig 3. Representation of an actual candlestick pattern for a certain period of time.

2) Moving averages

The analysis of moving averages can be used to pin out the suitable moment to make buy and sell calls.

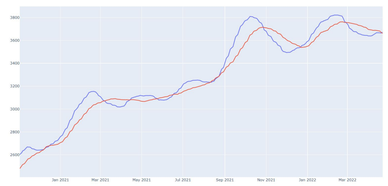

Fig 4. Representation of Long Term Moving Average of a Company

3) Volumes-

If a stock's trading volume indicates that there is purchasing pressure or relieve indicating whether you should buy or sell.

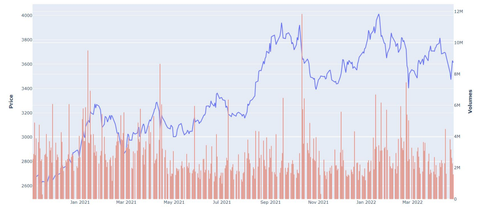

Fig 4. Actual Representation of Close Price and Moving Volumes of a Company

Predictive Modelling

30 days prediction trace with the different optimizers i.e adam, rmsprop and sgd

Fig 5. Choosing the best Optimiser for the Prediction

Adam is a preferred choice for sparse data and also here turns out to be the best, having least loss.

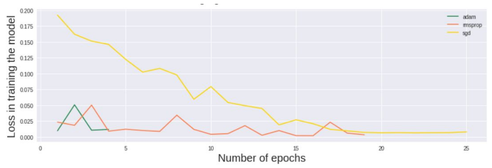

Fig 6. Efficiency of Optimisers wrt loss and no. of epochs

The trained predicted and actual values traces for one the selected company for a five year time frame.

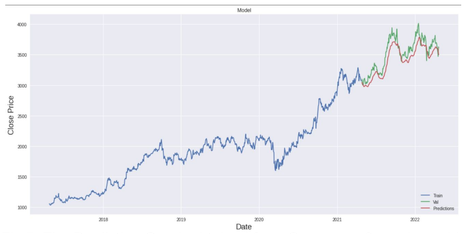

Fig 7. The Prediction Graph obtained for a Company after using said Optimiser and Architecture

Results

The final outputs and graphs were then embedded in a HTML file and then put on the website which the end user can use and work around investing in his own portfolio.

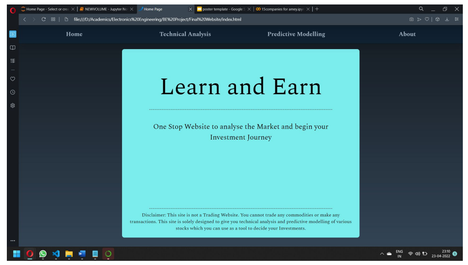

Fig 6. Home Page of the Website

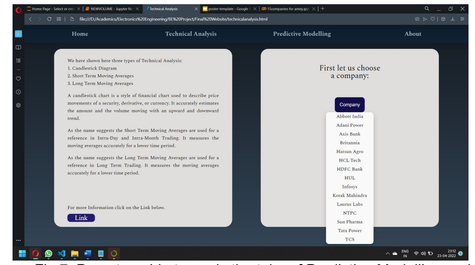

Fig 7. Page to guide towards the tabs of Predictive Modelling and Technical Analysis

Conclusions

The main objective of this endeavour was to create a space for the novice investor to begin his journey into investing by beginning with the basics and not getting bombarded with extra information that tends to confuse the general populace. Obtaining some amount of data from the stock market and giving it to the novice investor is done through Python programming. Technical Analysis teaches us the basics and some of the more important parameters to look out for in a company. Whereas the predictive modelling algorithm provides you with the information on the actual pricing of the stocks. The website is an easy to use and a quick stop for getting the most important information without any clutter.

Dated: 25th March 2022