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Stock Market Prediction Using FB Prophet Model

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ABSTRACT: The stock market has always been attracting people with its high returns but with it comes challenges and risks. A stock exchange market depicts savings and investments that are advantageous to increase the effectiveness of the national economy. The future stock returns have some predictive relationships with the publicly available information of present and historical stock market indices. FB PROPHET is a statistical model which is known to be efficient for time series forecasting, especially for short-term prediction. In this paper, we propose a model for forecasting the stock market trends based on the technical analysis using historical stock market data and the FB PROPHET model. This model will automate the process of predicting the direction of future stock price indices, thereby, helping the financial specialists choose better timing for purchasing and/or selling stocks. The results are shown in terms of the web application as frontend and using Python programming language. The obtained results reveal that the FB PROPHET model has a strong potential for short-term prediction of stock market trends.

I. INTRODUCTION

Today we live and breathe data. Forecasting the stock exchange data is an important financial subject that involves an assumption that the fundamental information publicly available in the past has some predictive relationships to future stock returns. Stock market forecasting contains uncovering the market trends, planning investment tactics, and identifying the best time to purchase the stocks and which stocks to purchase. A stock exchange or equity business sector is a non-direct, non-parametric framework that is difficult to model with any sensible exactness. It is the mix of speculators who need to purchase or offer or hold a share at a specific time. The prediction will continue to be an exciting locale of research, making scientists in the analytics field always desire to enhance the existing forecasting models. The motivation is that companies and individuals are empowered to make investment decisions to develop viable systems for their future endeavour's.

Stock trend forecasting is considered one of the most difficult tasks to achieve in money-related gauging because of the difficulty in the multifaceted world of the stock market. Many investors in the stock market are finding a technique that could guarantee easy profiting by forecasting the stock trends and minimizing the risk of investing. This motivates the researchers in the domain field to delve into and develop new forecasting models. Time-series data analysis techniques use verifiable information as the premise for evaluating future results. Time series data can be defined as numerical data collected in a sequence over a period at regular intervals. The time-series data can include the values collected at the end of every week, month, quarter, year, etc. The intention is to find if there is any link between the data collected so far and in what way does the data changed. To reduce the risk of investment, the exchange of securities between the seller and buyer is facilitated by the stock exchanges. A stock exchange is an organization or a place where stock traders or investors can deal with stocks. Some of the examples of stock market organizations include NASDAQ, NYSE, BSE, NSE, etc. Python is a programming language for statistical processing.

II. SYSTEM ANALYSIS

A.Problem Statement

A stock exchange market depicts savings and investments that are advantageous to increase the effectiveness of the national economy. The future stock returns have some predictive relationships with the publicly available information of present and historical stock market indices. The investors decide the better time to sell/buy/hold a share in the stock market based on the former relationship. Every investor is interested in predicting future stock prices, whether the

investor may be a long-term investor or a day-trader. This possesses a major challenge to design and develop an effective and efficient predictive model that assists the investors in intake appropriate decisions.

B.Existing Systems

One of the significant financial subjects that have engrossed the researcher's attention for many years is forecasting stock returns. Investors in the stock market have been attempting to discover an answer to estimate the stock trends to decide thebetter timing to buy or sell or hold a share. Forecasting the stock trends have been done both on qualitative analysis and quantitative analysis. There are many statistical models available for forecasting stock trends and choosing an appropriate model for a forecasting application depends on the format of the data.

C.Proposed Study

In this work, we propose a prediction model for the time series stock market data. This model will automate the process of change of stock price indices based on technical analysis and helps financial specialists to choose the better timing for purchasing and selling stocks. Data mining techniques are used to develop the prediction model and Python programming language is used for the visualization of results.

III. IMPLEMENTATION

Data mining can be interpreted as a knowledge discovery process. Data mining techniques are devised to address the problems by providing a reliable model with data mining features. To construct a model that investigates the stock patterns by utilizing the past stock exchange trends; the FB PROPHET package has been used.

The system architecture is a model that defines the behavior of a system in the conceptual model. The huge systems are decomposed into subordinate systems to provide a similar set of services. The beginning layout strategy of perceiving these sub-systems and building up a structure for sub-systems control and cooperation is called architecture design. As shown above, Fig. 3.1 includes major steps to implement the system and each step is explained below.

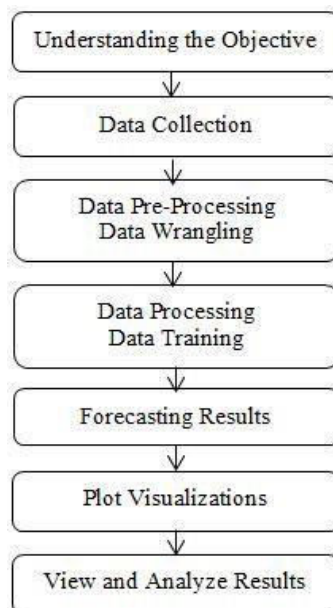The complete architecture of the system is shown below.

Fig 1. System architecture

A.Understanding the Objective

The first step in developing a project is to understand the objective which involves an understanding of the intent and essentials of a system. This comprehension is used as a problem description and a preparatory system to accomplish the expectations. The objective of our project is neither to build a system that makes billions nor to waste billions too. But the objective is to develop a system that finds the direction of change of stock price indices based on the co-relations between stock prices and helps the investors in the stock market in deciding whether to buy/sell/hold stock by providing the results in terms of visualizations.

B.Data Collection

Once the understanding of the objective is over, the next step is to collect the data. Data collection involves the understanding of initial observations of the data to identify the useful subsets from hypotheses of the hidden information. Here we use a Python script to collect the data from Yahoo finance.

C.Data Pre-processing: Data Wrangling

The data pre-processing stage involves all the activities to prepare the final dataset from the preparatory raw information. The data preparation tasks can be performed several times as there is no specific order. These tasks include the selection of a record, table, attribute, and cleaning of data for modeling tools. In our methodology, the input data will be converted into a combined value vector list or differentiated value vector list. So, for this purpose, we use $c\{base\}$ which refers to

the combined values vector or list

D.Data Processing: Data Training

In technical analysis, investors use the autoregressive and moving average models to forecast the stock trends. The major steps involved here are identification, parameter estimation, and forecasting. These steps are repeated until an appropriate model is identified for prediction. To process the data, we use the FB PROPHET model.

We have used Prophet because of two main advantages:

1. Prophet makes it much more straightforward to create a reasonable, accurate forecast. The forecast package includes many different forecasting techniques (ARIMA, exponential smoothing, etc), each with its strengths, weaknesses, and tuning parameters. We have found that choosing the wrong model or parameters can often yield poor results, and it is unlikely that even experienced analysts can choose the correct model and parameters efficiently given this array of choices.

2. Prophet forecasts are customizable in ways that are intuitive to non-experts. There are smoothing parameters for seasonality that allow you to adjust how close to fit historical cycles, as well as smoothing parameters for trends that allow you to adjust how aggressively to follow historical trend changes. For growth curves, you can manually specify "capacities" or the upper limit of the growth curve, allowing you to inject your prior information about how your forecast will grow (or decline). Finally, you can specify irregular holidays to models like the dates of the Super Bowl, Thanksgiving, and Black Friday..

At its core, the Prophet procedure is an additive regression model with four main components:

• A piecewise linear or logistic growth curve trend. Prophet automatically detects changes in trends by selecting changepoints from the data.
• A yearly seasonal component modeled using the Fourier series.
• A weekly seasonal component using dummy variables.

E.Forecasting Results

The process of making predictions of the future by relying upon past and present data is known as forecasting. Various prediction techniques are used by the stock analysts to evaluate the future stock trends value. Prediction also offers a significant standard for organizations that have a long-term perception of actions. We use the 'forecast' package for predicting future stock trends based on the analysis of past trends. This 'forecast' package provides several forecasting functions for displaying the time-series predictions along with exponential smoothing and space models.

F.Plot Visualizations

Data visualization is a graphical representation of numerical data. In our methodology, after forecasting the stock market trends we visualize the results for short-term investment assistance in terms of line charts, candlesticks charts, bar charts, and histograms. Here x-axis shows the time in terms of year/months/days and the y-axis shows the stock price values.

G.View and Analysed Results

Once after plotting the results in terms of visualizations we can find out the correlations to get the short-term predictions. In the next section, we provide some of the screenshots by which the investor can analyze and predict the future stock trends of a company at a specific time. So, the investors in the stock market can use this as assistance to sell/buy/hold a share.
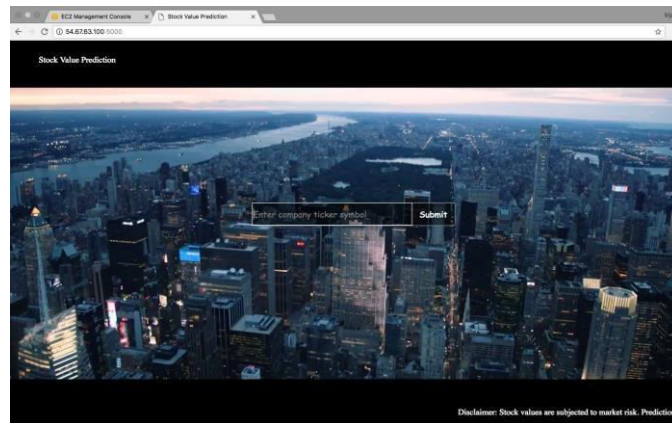
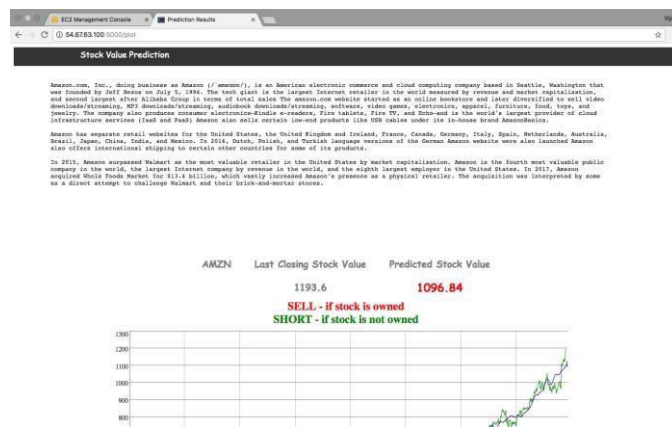H.SCREENSHOTS

Fig 2. Home Page

Fig 3. The Prediction with the Company's Wiki Entry Gist

Fig 4. The Predicted Stock Price for tomorrow. The figure also shows the plot of the actual stock price against the predictions

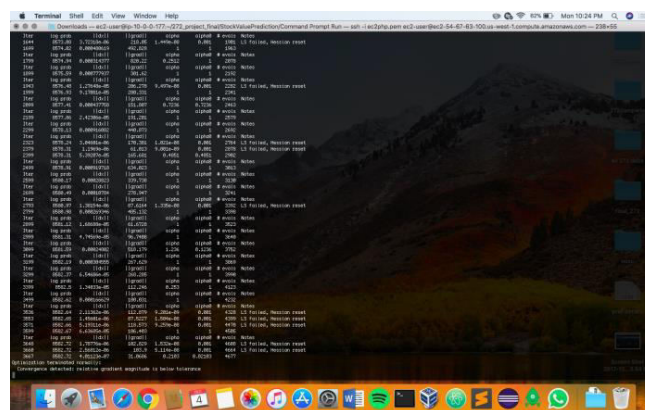Fig 5. Snippets of the Top 10 news about the company

Fig 6. Backend Processing of Data in Prophet

IV. CONCLUSION

In this paper, we tried to develop a prediction model for forecasting the stock market trends based on technical analysis using historical time series stock market data and data mining techniques. The experimental results obtained demonstrated the potential of the PROPHET model to predict the stock price indices on a short-term basis. This could guide the investors in the stock market to make profitable investment decisions on whether to buy/sell/hold a share.

With the results obtained PROPHET model can compete reasonably well with emerging forecasting techniques in short-term prediction.

REFERENCES

[1] https://research.fb.com/prophet-forecasting-at-scale/

[2] Banerjee, D., "Forecasting of Indian stock market using time- series PROPHET model", 2nd IEEE International Conference on Business and Information Management (ICBIM), January 2014, pp. 131-135.

[3] Li Bing, Chan, K. C. C., C. Our, "Public sentiment analysis in Twitter data for prediction of a company's stock price movements", 11th IEEE International Conference on e-Business Engineering (ICEBE), November 2014, pp. 232-239.

[4] Tao Xing, Yuan Sun, Qian Wang, Guo Yu, "The analysis and prediction of stock prices", IEEE International Conference on Granular Computing (GrC), December 2013, pp. 368–373.

[5] L. M. Patnaik, "Forecasting stock time-series using data approximation and pattern sequence similarity", International Journal of Information Processing (IJIP), September 2013, pp. 90-100.

[6] Ayodele A. Adebiyi, Aderemi O. Adewumi, Charles K. Ayo, "Stock price prediction using the PROPHET model", 16th IEEE International Conference on Computer Modelling and Simulation (UKSim), March 2014, pp. 106 -112.

[7] Qasem A. Al-radaideh, Adel Abu Asaf, EmanAlnagi, "Predicting stock prices using data mining techniques", The International Arab Conference on Information Technology 2013.

[8] Li Zhe; "Research on China's stock exchange markets: problems and improvements", International Conference on Education and Management Technology, 2010. pp 465-469.

[9] Hazem M. El-Bakry, and Wael A. Awad, "Fast forecasting of stock market prices by using new high speed time delay neural networks", International Journal of Computer and Information Engineering, February 2010, pp. 138-144.

[10] Han, J., Kamber, M., Jian P., "Data mining concepts and techniques". San Francisco, CA: Morgan Kaufmann Publishers, 2011.

[11] Enke, D., Thawornwong, S., "The use of data mining and neural networks for forecasting stock market returns", Expert Systems with Applications, 2005, pp. 927-940.

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