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Review On Stock Market Visualizer & Forecaster: A Dash-Based Analysis Tool

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ABSTRACT
In the stock market, it is very difficult to predict share prices because there are no fixed prediction rules, but it gives one of the higher incomes in the market. Although inherently unpredictable, stock prices and other statistical aspects can be imagined to help keen investors carefully choose which companies to invest their earnings in. This simple project data dash library (python) allows us to make live graphs of the financial data of a given company using the tabular data provided by the yfinance-python library. To begin with, we can use a machine learning algorithm to predict future stock prices. The main purpose of this review is to observe studies that use model direction prediction accuracy (also known as hit ratio) or model performance as a benchmark, as other measures of prediction error - namely mean absolute deviation (MAD), root mean square. error (RMSE), mean absolute error (MAE) and mean squared error (MSE) - have been rejected due to the claim that they cannot really show how useful the forecasting model is in terms of economic utility (i.e. in practice).
Keywords: Stock Market, Machine Learning, Dash Python, yfinance, Predictions, ANN (Artificial Neural Networks),

I. INTRODUCTION

Trading shares in the money market is one of the most important speculative exercises. Researchers have already developed various stock research systems that allow them to visualize trends in the value of a stock. Anticipating and projecting important future expenses in light of current financial information and news is of immense benefit to financial professionals. A finance major needs to know if stocks are moving higher or lower over a period of time. To get an accurate result, the application method is machine learning and supervised learning algorithms. The results are tested using different supervised learning algorithms with different properties. Stock investment decisions require time, knowledge and awareness, including historical data, the stock market contains a large amount of information that changes over time. Share prices are influenced by a number of factors that vary from the development of the company itself to the general economic situation. Therefore, managing investment portfolios often requires analyzing stock market data to identify potential correlations between multiple stocks and thus adjust investments based on trends in related stocks. A picture is worth a thousand words and presents information in a visual format that helps people explore deep information from large and complex raw data, especially when individuals' knowledge of the information is limited. Visual representation is one of the most effective ways to help investors get a clear picture of stock market movements and provide a deeper understanding of each stock.

II. LITERATURE REVIEW

A. Statistical Approach

De Faria et al. organized an ANN and an adaptive ESM model to forecast Brazilian stock indices. Their study exhibits the predictive power of ESM and the results of both models showing similar performances, especially the neural network model, which is a multilayer feedforward network of adaptive ESM, is slightly better in RMSE (Root Means Square Error))[1].

Dutta et al. used a unique approach by choosing financial ratios as independent variables in a logistic regression model to analyze the relationship between these ratios and stock returns. Their paper focused on the task of classifying ongoing businesses as good or bad based on their one-year performance [2].

Devi et al. addressed certain aspects that have been neglected in the stock analysis literature, such as the dimensions and expectations of novice investors. They use previous data from four medium-sized Indian cooperation to train an ARIMA model. Model accuracy was assessed

using the Akaike Information Criterion Bayesian Information Criterion (AICBIC) test. Testing the model on individual stocks and the Nifty 50 index showed that the Nifty index is better for novice investors due to its lower error and volatility [3].

Adebiyi A. et al. talk about the comprehensive process of building ARIMA models. To identify the optimal model among all generated ARIMA models, the authors choose criteria such as regression standard error, adjusted R-squared, and Bayesian information criteria. These criteria are best for forecasting the stock prices of Nokia [4].

B. Pattern Recognition

Phetchanchai et al. presented an innovative approach to analyzing financial time series data by looking at the zigzag movement of the data. To detect zigzag movements as a PIP technique, a zigzag-based Mary tree (ZM tree) was chosen to determine those important points. The proposed technique shows better performance in dimensionality reduction than other techniques such as special binary trees [5].

Roberto et al. presented a chart pattern-based trading strategy focusing on the flag pattern. The study extends previous work by introducing two new parameters, stop loss and take profit, which enables dynamic modeling of termination [6].

Chen and Chen proposed a hybrid approach to identify the indexes of Taiwan Stock Weighted Equity Index (TAIEX) and National Association of Securities Dealers Automated Quotations (NASDAQ). The authors created a methodology that combines the advantages of two traditional pattern recognition methods, PIP and pattern matching [7].

Jorge Garcia et al. proposed a robust mechanism for DJIA dynamic trading based on filtered flag pattern detection using pattern matching, depending on Cervello-Royo et al. The authors set up several filters based on the exponential moving averages (EMA) and prices of the observed patterns [8].

Kim et al. developed a Pattern Matching Trading System (PMTS) based on the Dynamic Time Warp (DTW) algorithm to trade the index perspective of the Korea Composite Stock Price Index (KOSPI 200). We take it in the morning between 9:00 and 12:00. with time series data as input to sliding windows, the authors used DTW to match identical patterns [9].

C. Machine Learning

Di Persio and Honchar used three different recurrent neural network models, namely basic RNN, LSTM, and Gated Recurrent Unit (GRU), on Google's stock price to evaluate which version of RNN performs better. According to the analysis of the results, LSTM outperformed other variants with 72% accuracy over a five-day horizon. The authors also introduced the hidden dynamics of RNN [10].

Harshal Patel et al. used an LSTM network to predict fine prices with OHLC-like characteristics. Their results exhibit the LSTM achieves a Root Mean Square Error (RMSE) of 0.00859 for the daily percentage changes of the test data [11].

Zi-Jia Go`ong et al. presented multi-layer feed forward networks for Chinese stock forecasting. Three component networks were trained using training algorithms such as back propagation and Adam and the bagging method (Efron and Tibshirani 1994). The obtained results show that the Chinese market is moderately predictable and has achieved satisfactory accuracy, precision and recall [12].

Zhang et al. proposed a stock price trend forecasting system that can predict both the stock price movement and the interval between its rise (or fall) with a given forecast duration. They were trained using a random forest model based on the historical data of the Shenzhen growth company market (China) and classifying several stocks into four main categories, viz. up, down, low and unknown stocks according to their closing prices [13].

Mohammad et al. applied a deep learning-based hybrid model composed of two well-known DNN architectures: LSTM and GRU to the S and P 500 time series data set covering approximately 66 years (1950–2016). This approach involved feeding the input data to an LSTM network to generate an initial level of prediction, and then feeding the output of the LSTM layer to the GRU network layer to obtain the final prediction. The network achieved a mean square error (MSE) of 0.00098 in prediction, outperforming previous neural approaches [14].

Powell et al. illustrates a comparison of the K-means of the supervised SVM technique and the unsupervised technique. They perform principal component analysis (PCA) to reduce dimensions or features. These two models have been tested on S and P 500 data and both results give similar performance, with SVM achieves 89.1% and K means 85.6%. They also investigated how different cluster distance measures affected prediction accuracy and the best performance of the Canberra distance measure [15][16].

III. CONCLUSION

In recent years, it has been observed that most people invest in the stock market to make money. At the same time, an investor considers losing all his money a good risk. Data visualization helps traders make decisions quickly and allows them to easily synthesize large complex data. Visualization and stock forecasting with

Dash can provide valuable insights into market trends and potential investment opportunities. Using Dash's interactive and customizable features to enable analysts to create dynamic visualizations that allow them to track stock performance in real-time, analyze historical data and predict future trends.

One of the main benefits of using Dash for stock visualization and forecasting is flexibility. Dash allows users to combine multiple data sources, technical indicators and visualization techniques are used to create comprehensive dashboards tailored to their specific needs. This flexibility allows analysts to use different forecasting models, adjust constraints on the fly and add new data as it becomes available, improving the accuracy and relevance of their forecasts. In addition, Dash's interactivity allows users to explore the data and find correlations between different variables and reveals hidden patterns that may not be immediately apparent with traditional static charts or graphs. This interaction implies a more intuitive understanding of market dynamics and helps shareholders make more informed decisions.

However, it is important to recognize the limitations of stock forecasting, regardless of the tools used. Stock markets are affected by many factors, including economic indicators and investor sentiment, which can be difficult to measure and predict.

Finally, using Dash to visualize and forecast stocks can improve decision making by providing dynamic and interactive insights. to market trends. However, it is very important to approach inventory forecasting with caution, recognize its inherent characteristics, and use it as a substitute for comprehensive market analysis and due diligence.

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