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Gold Prices Prediction Using Random Forest

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Abstract: ***Gold has historically served as one of the precious materials used to fund trading purchases. Gold-reserve holding nations are thought to being prosperous nations. The amount of gold held by the country's reserves reveals the state of its finances. Together with the government organizations, several other persons and companies have bought gold reserves. The value of gold prices are influenced by the performance of the world's leading economies. The change in gold's price has piqued the curiosity of more investors, who are now considering gold investments. Because the gold market is unpredictable, dealing with gold carries a high degree of risk, and its price varies greatly. It is possible to employ a variety of studies to investigate the connection between economic issues and gold prices. The project "Gold price prediction" aims to predict the price of gold using machine learning methodology gold price time series data was gathered from the Kaggle website.70% of the data served as the training set for Randomforest regressor model that were fitted. The statistical index R- squared error was then used to get the accuracy. Based on the R-squared error result, a prediction of future gold prices is made. Here we have taken the number of estimators to get the good accuracy.***

Keywords: ***Timeseries, machine learning, Random forest regressor Method, Forecasting Gold price prediction***

I. INTRODUCTION

Investing in gold has evolved over time in traditional forms such as purchasing jewellery or through modern strategies such as purchasing gold coins and bars (which area unit already accessible in scheduled banks). Gold has historically been used as a form of currency in various parts of the world, including the United States. In recent years, gold has retained its value and has been used to assess a country's monetary strength. Big investors have also been interested in this valuable and have invested heavily in it. Recently, rising world economies such as China, Russia, and India have been large buyers of gold, whereas the United States, South Africa, and Australia have been large sellers of this product. The value of gold is influenced by both Chinese and Indian traditional events. More money is being poured into the purchase of these goods at this time. Small investors recognize this product as a safe investment alternative to alternative investment options that carry inherent investment risks. Internal monetary conditions in the aforementioned countries play a significant role in determining gold spot rates. Gold is another advantage that is being considered as a lovely investment avenue by many investors due to its increasing value and thus the space of usage. Investors' preference for gold as a safe haven will grow as a result of their pessimistic outlook for the developed exchange markets and thus the capital markets. Gold is also regarded as "the plus of ultimate instance," implying that it is the plus that investors put their trust in when the developed world capital markets are unable to provide fascinating profitability. As a result, investors see gold as a tool to hedge against fluctuations in alternative markets. Because gold is valuable, its value should be determined by supply and demand, just like any other commodity. A popular supervised learning machine learning strategy is Random Forest. It may be applied to classification and regression issues in ML. It is founded on the concept of ensemble learning, which is the process of integrating many classifiers to tackle a challenging issue and enhance the performance of the model. As its name suggests, "Random Forest is a classifier that incorporates multiple decision trees on different subsets of the supplied dataset and takes the average to increase the projected accuracy of that dataset." The random forest assesses the prediction from each tree and anticipates the final output based on the majority vote of projections, as opposed to depending on a single decision tree.

II. PROBLEM IDENTIFICATION

Buying gold is the oldest kind of investing activity, so here the problem is to find out the future prices for gold is increasing or decreasing to know a good idea about investment.

III. OBJECTIVES

1) To predict gold prices using Random forest regressor.
2) To study the effect of the number of estimators on the accuracy and time taken for prediction.

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IV. SYSTEM METHODOLOGY

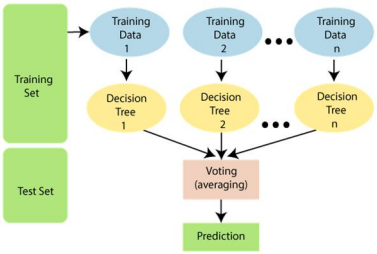


Fig1: Random Forest

V. OVERVIEW OF TECHNOLOGY

A bagging methodology called random forest constructs many decision trees and combines them to increase prediction accuracy. Although merely a bagging classifier, random forest has virtually identical hyperparameters to a decision tree classifier. In a random forest, as the trees grow, extra unpredictability is added to the model that we fit to the training set of data. Our dataset shows that the random forest model has the highest accuracy. The Random Forest method may be used to the stock market to determine a stock's behaviour, and the prediction model can be used to estimate the predicted loss or profit.

VI. SYSTEM SPECIFICATIONS

MacBook Air as a computer system
Apple M1 chip processor
8GB memory
Ventura 13.2.1(macOS)
Anaconda jupyter notebook was used as a software.

VII. DATA AND METHODOLOGY

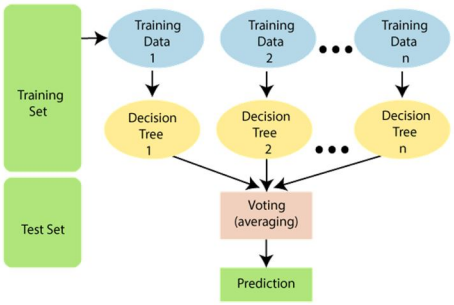
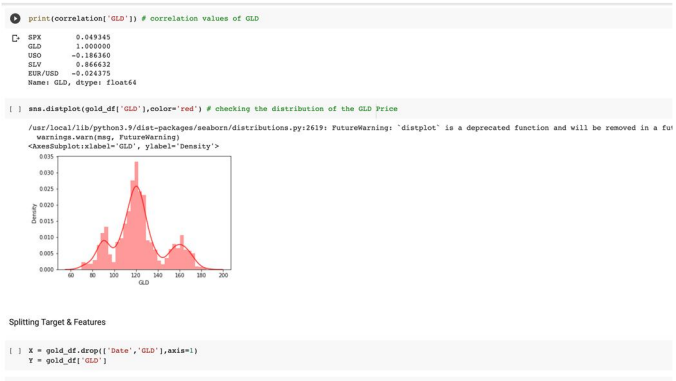


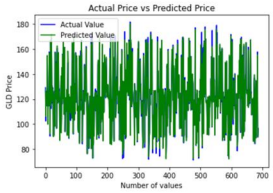
Fig1-Randomforest



Compare the Actual Values and Predicted Values in a Plot

```
In [189]: Y_test = list(Y_test)

In [193]: plt.plot(Y_test, color='Blue', label = 'Actual Value')
          plt.plot(test_data_prediction, color='green', label='Predicted Value')
          plt.title('Actual Price vs Predicted Price')
          plt.xlabel('Number of values')
          plt.ylabel('GLD Price')
          plt.legend()
          plt.show()
```



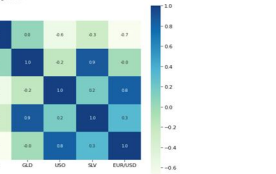
A. Data Correlation

Correlation:

Positive Correlation Negative Correlation

```
correlation = gold_df.corr()

# constructing a heatmap to understand the correlation
plt.figure(figsize = (7,7))
sns.heatmap(correlation, cbar=True, square=True, fmt='.1f',annot=True, annot_kws={'size':8}, cmap='GnBu')
```




```
print(correlation['GLD']) # correlation values of GLD
```

VIII. RESULTS

No of estimators	Execution time	Accuracy
01	0.0154 seconds	0.9669
50	0.3113 seconds	0.98819
150	0.78531 seconds	0.98902
250	1.30339 seconds	0.99096
500	2.59729 seconds	0.99077

Once the code has been run and the model has been trained and tested using the given dataset with good accuracy and here we got the RSE(Relative Squared Error) is 0.99077.

IX. CONCLUSION AND FUTURE SCOPE

This study used machine learning algorithms to properly anticipate gold prices and when to sell and buy them. This study was conducted to clarify gold price forecasts using machine learning in Python.

1) It is determined that machine learning techniques using random forest analysis are quite beneficial in predicting gold prices

2) The model's R-squared is calculated to be 0.99077 percent. R-squared is often between 0% and 100%. A score close to 100 percent implies that the supplied model adequately explains gold prices.

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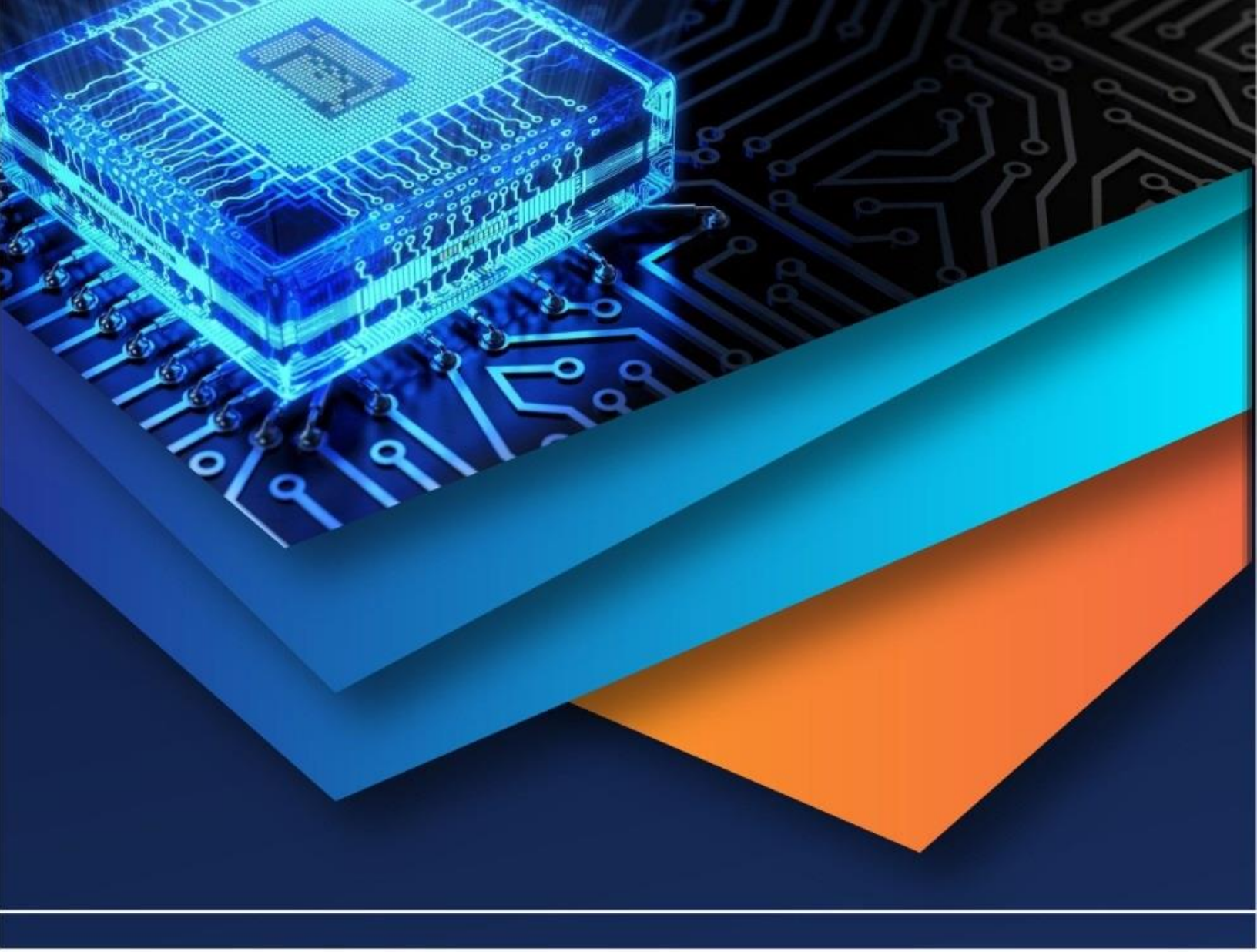

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