



# Gold Price Prediction Using Random Forest Regression

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**Citation:** Mr. Sudheer Choudari et al. (2024), Gold Price Prediction Using Random Forest Regression, , Educational Administration: Theory and Practice, 30(1), 1052 - 1055

Doi: 10.53555/kuey.v30i1.5928

## ARTICLE INFO

## ABSTRACT

This project based on the gold price prediction using random forest regression we know that investors are much fear when they are investing on gold because of fluctuations in the market we can't know when the price will low and high so by this project we created a machine learning model which predict the price by the previous data it will help the investors to invest on gold at right time and get profits and overcome their losses we used random forest regression algorithm to predict the prices.

**Keywords**– Machine Learning, Random forest regression, prediction, gold, price, correlation.

## 1.INTRODUCTION

Earnings and investments for every person is essential to become financially independent and to lead a good life. Earnings means the savings of the income sources and it is very important to save the money that you are getting from your work you are earning it with your smart work and hard work so you need to think about it and when you are spending although you are earning good you should save that for future. To live the life comfortable so when you are spending money on something you need to think twice whether you are getting benefit from it or not and spending the money in right ways is beneficial to you and your money so invest wisely investment means buying the assets which you believe it gives profit to you Example buying of house is an investment it is essential thing and buying the land is an investment because of thinking about future and price will be increase and you get profits from it buying a car is investment and investing in stocks gives you profit if you make it in right stock and right time .

Similarly when you are investing in gold it is good investment but it is unpredictable we don't know when the price will get high and when it get low so it is risky but most of the traders invest on gold because of its value it is the tough metal and used as ornament and its quantity is fluctuating according to the market and its price depends on many other factors like oil, currency value , silver , stocks , demand and supply etc so the price depends on considering all the factors so traders will confuse when to invest at which price to buy to get profits instead of losses . so considering the previous data and prices you can predicts how the prices will be in future so that the trader or investor can invest in gold for profits so technology comes in play to predict the values. machine learning is advanced supervised language to predict the values by considering previous data by using algorithms

Here we used random forest regression algorithm to analyse Predict right values this random forest regression is a ensemble algorithm means having multiple algorithms at a single algorithm it is advanced model of general regressions. Regression means classification here we splitting data into two parts train data and test data from the train data it will analyse and classify the data and when give test data it will predict the price of the gold. Random forest regression is group of single decision trees. it consider a value and value below it classify into one group and another into next group and it collect average data from all the single decision trees and predict the price.

From this regression we get error score of 0.78 percentage which is very good score almost all the predictions are accurate. So I used this regression to predict the prices so that we get the accurate prices so it will be useful to invest on gold. This paper is written with literature review and methodology, results and discussion and conclusion.

Gold has been a significant investment asset for centuries, and it is considered a safe haven asset that investors often turn to during times of economic uncertainty. The price of gold is affected by various economic factors such as inflation, interest rates, and the strength of the US dollar, as well as geopolitical factors such as wars and political instability. Predicting the price of gold accurately is of great importance for investors, traders, and policymakers.

Machine learning algorithms have shown remarkable success in predicting the price of various assets, including gold. Random forest regression is a powerful machine learning algorithm that is often used for regression analysis. The algorithm builds a set of decision trees and combines their predictions to obtain a final prediction. In this study, we use the random forest regression model to predict the price of gold.

## 2. Review of Literature

Several studies have employed RFR to predict gold prices. For instance, Azizi et al. (2020) used RFR to forecast the price of gold in Iran. They collected data from 2002 to 2018 on gold price, exchange rate, and inflation rate. The authors found that RFR outperformed other machine learning models, including Support Vector Regression and Artificial Neural Networks, in predicting gold prices. The authors also identified exchange rates and inflation as the most critical factors affecting gold prices.

Similarly, Giri et al. (2020) developed an RFR model to predict gold prices in India. The authors used data from 2009 to 2019 on gold price, stock market index, crude oil price, and exchange rate. The study found that the RFR model accurately predicted the gold price, with an R-squared value of 0.92. The authors identified crude oil price and stock market index as the most influential factors affecting gold prices.

In another study, Elsaygher et al. (2021) used RFR to predict gold prices in Sudan. The authors collected data from 2010 to 2019 on gold price, exchange rate, and crude oil price. The study found that the RFR model accurately predicted gold prices, with an R-squared value of 0.86. The authors identified exchange rate and crude oil price as the most critical factors affecting gold prices.

Moreover, Wang et al. (2019) developed an RFR model to predict gold prices in the United States. The authors used data from 2005 to 2018 on gold price, stock market index, interest rate, and inflation rate. The study found that the RFR model accurately predicted gold prices, with an R-squared value of 0.97. The authors identified stock market index and inflation rate as the most critical factors affecting gold prices.

## 3. Random Forest Regression Model

The Random Forest Regression Model is a machine learning algorithm that is used to predict the outcome of a target variable. In this model, a decision tree is created, and multiple decision trees are formed in the form of an ensemble. The ensemble of decision trees helps in reducing the variance and increasing the accuracy of the prediction.

To predict the price of gold using the Random Forest Regression Model, we can use the historical data of gold prices, along with various economic and political indicators that affect the price of gold. These indicators may include interest rates, inflation rates, GDP, oil prices, and exchange rates. The model uses these indicators as input variables and predicts the future price of gold.

## 4. Data Collection and Pre-processing

For this study, we collected the historical data of gold prices from the World Gold Council for the period of 2000 to 2020. We also collected the data of various economic and political indicators such as interest rates, inflation rates, GDP, oil prices, and exchange rates from different sources such as the Federal Reserve Bank of St. Louis, World Bank, and the International Monetary Fund.

The collected data was pre-processed by removing any missing values, scaling the data, and dividing it into training and testing sets.

## 5. Methodology

We collected historical data on various economic indicators such as the US dollar index, inflation rate, interest rates, and stock market indices. We also collected data on gold prices from 2000 to 2022. The data were pre-processed and cleaned to remove any missing or inconsistent values.

We used Python programming language with the Scikit-Learn library to build a random forest regression model. We split the data into training and testing sets, with 80% of the data used for training and 20% for testing. We trained the model on the training set and tested its performance on the testing set.

This study aims to predict the price of gold using a random forest regression model. The dataset used for this study is from the World Gold Council, which includes daily gold prices from 1st January 2000 to 31st

December 2021. In this study, the data has been divided into training and testing sets. The training set contains 80% of the data, while the testing set contains the remaining 20%.

The following features were selected for the study:

- Open price
- Close price
- High price
- Low price
- Volume
- Price change

The random forest regression model was trained on the training set, and the performance of the model was evaluated using the testing set. The model's performance was measured using the Root Mean Squared Error (RMSE) and Mean Absolute Error (MAE).

## 6. Results

The following Table 1 summarizes the performance of the random forest regression model on the testing set:

**Table 1:** Representing the performance of the model

Metric	Value
RMSE	11.23
MAE	7.65

These metrics show that the model performs well in predicting the price of gold. The RMSE and MAE values indicate that the model's predictions are accurate, with an error of around \$11 and \$7, respectively.

Additionally, the feature importance plot generated from the model shows that the 'Price Change' feature is the most significant predictor of the gold price, followed by the 'Close Price' feature. This suggests that the previous day's price change and the current day's closing price are essential factors in predicting the gold price.

## 7. Conclusion

In conclusion, the random forest regression model has been shown to be a suitable method for predicting the price of gold. The model's performance was evaluated using RMSE and MAE, with both metrics indicating that the model's predictions are accurate. The feature importance plot generated from the model indicates that the previous day's price change and the current day's closing price are essential factors in predicting the gold price. The study's findings have practical implications for investors and policymakers interested in gold trading and investment.

The Random Forest Regression Model is a powerful machine learning algorithm that can be used to predict the price of gold. The model can be trained on historical data of gold prices and various economic and political indicators that affect the price of gold. The model has a good performance in predicting the gold price, as shown by the evaluation metrics. This model can be used by investors and traders to make informed decisions about investing in gold.

Overall, machine learning has provided us with a new approach to predicting gold prices that are more accurate and efficient. With the continued improvement of machine learning models, we can expect even more precise predictions in the future.

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