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Gold Price Prediction: An Assessment

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Abstract- As the value of gold cannot be blindly rejected, forecasting the future prices of gold has long been an intriguing topic and is extensively studied by researchers from different fields including economics, statistics, and computer science. The motivation for these studies is naturally to predict the future prices so that gold can be bought and sold at profitable positions and reduce the risk of investment. However, there are still a lot of un-tackled questions and room for improvements in these forecasting techniques. This is because there are no optimal models for all forecasting problems. Different question needs a different answer; therefore, more experiments and modeling need to be done in order for researcher to enhance their findings. The target of this paper is to present a critical literature review and an up to date bibliography on gold forecasting techniques over the world. Various forecasting techniques concerning the gold price prediction have been highlighted including basic forecasting approached such as Artificial Neural Networks (ANN), hybrid forecasting approach, Swarm Intelligence approach and so on.
Keywords: Gold Price Forecasting; Swarm Intelligence; Forecasting Techniques

I. INTRODUCTION

Historically, gold is the oldest precious metal known to man and for thousands of years it has been valued as a global currency, a commodity, an investment or simply as an object of beauty. The World Gold Council estimates that all the gold ever mined amounts to 174,100 metric tons in 2009[1]. If this supply were divided equally among the world's population, it would work out to less than one ounce a person, that's how scarce the gold is. Andrea Sella, a professor of chemistry at University College London, said that, the reason gold is precious is precisely because it is so chemically uninteresting [2]. Gold's barely reacts with any other elements and its relative inertness means that we can create an elaborate golden jaguar and be confident that 1,000 years later it can be found in a museum display case, still in the exact pristine condition. But scarcity and stability isn't the only reason to the preciousness of gold. One other quality that makes it the standout is because gold is golden. Most of the other metals are silvery-coloured except for copper which is easily corrodes and turning into green when exposed to moist air. This physical attributes is what makes gold very distinctive and making it successful as a currency due to its undeniable beauty.

Gold proved to be the most effective way to collect cash during the stock exchange crash for example in 1997 and 1998, during the Asian crisis [3]. Many nationalistic Koreans volunteered to give up their gold jewelry to help their country during this difficult period. The nationwide campaign - led by large business groups including Daewoo, Samsung and Hyundai involved ordinary Korean citizens donating their personal gold treasures which have been melted down into ingots ready for sale on the international markets. Hence, it is proven that a. small proportion of a portfolio in gold could be invaluable in moments when cash is essential. Its importance lies in reflecting the expectations of the investors, marking the trends and expectations of growth and decline of the world economies. Regarding the gold investment, many studies suggested it as one of the best investment instruments for diversification. Gold is the ideal diversifier for a stock portfolio, simply because it is among the most negatively correlated assets to stock. Some of the investor believes that investment in gold has been seen as a good hedge or safe haven against stock market movements [4]. This paper will give a review on factors that affecting gold prices and methods that had been developed and tested by researches in order to tackles the influences and predicts the price of gold.

II. PREVIOUS WORK

Xiaohui Yang et. al, Although,2016 and 2017 have risen, the international gold price has been in the doldrums since 2013. The volatility of gold prices

will have a profound effect on the investment decisions of individuals, enterprises and countries. This study focuses on the figure of gold prices from July 2013 to June 2018 according to the World Gold Council, and aims to forecast and analyse daily gold price of USD in the first half of the month of July 2018 through the establishment of ARIMA model. This study also uses AC, PAC, AIC, BIC to estimate the accuracy of models.

Manjula et. al, This article is based on a study conducted to understand the relationship between gold price and selected factors influencing it, namely stock market, crude oil price, rupee dollar exchange rate, inflation and interest rate. Monthly price data for the period January 2000 to December 2018 was used for the study. The data was further split into two periods, period I from January 2000 to October 2011 during which the gold price exhibits a raising trend and period II from November 2011 to December 2018 where the gold price is showing a horizontal trend. Three machine learning algorithms, linear regression, random forest regression and gradient boosting regression were used in analyzing these data. It is found that the correlation between the variables is strong during the period I and weak during period II. While these models show good fit with data during period I, the fitness is not good during the period II. While random forest regression is found to have better prediction accuracy for the entire period, gradient boosting regression is found to give better accuracy for the two periods taken separately.

Kishori et. al, Gold is metal which is important as monetary asset, jewellery, Investment option. As investment option it grabs the attraction of investors by its high escalating prices. But the gold price is not stable It fluctuates regularly due to various reasons. This paper is aimed to forecast the gold price using ARIMA model. For forecasting it uses historic data.

Hafezi et. al, The forecast of fluctuations of prices is the major concern in financial markets. Thus, developing an accurate and robust forecasting decision model is critical for investors. As gold has shown a special capability to smooth inflation fluctuations, governors use gold as a price controlling lever. Thus, more information about future gold price trends will help make the firm decisions. This paper attempts to propose an intelligent model founded by artificial neural networks (ANNs) to project future prices of gold. The proposed intelligent network is equipped with a meta-heuristic algorithm called BAT algorithm to make ANN capable of following fluctuations. The designed model is compared to that of a published scientific paper and other competitive models such as Autoregressive Integrated Moving Average (ARIMA), ANN, Adaptive Neuro-Fuzzy Inference System (ANFIS), Multilayer Perceptron (MLP) Neural Network, Radial Basis Function (RBF) Neural Network and Generalized Regression Neural Networks (GRNN). In order to evaluate model performance, Root Mean Squared Error (RMSE) was employed as an error index. Results show that the proposed BAT-Neural Network (BNN) outperforms both conventional and modern forecasting models.

III. PROBLEM IDENTIFICATION

The problem identification in existing work is as follows:

- Due to flaws of prediction accuracy, justification of gold prediction is not identified suitably.
- Regression method is too complex, it may generate high error rate.
- Prediction accuracy may conflict to gold prediction in between of two periods.

IV. RESEARCH OBJECTIVES

The objectives on the basis of problem identification in existing work are as follows:

- To study various factors on which gold price will depends and various Machine Learning Algorithm, Techniques may be used for price prediction.
- To apply a best suitable Machine Learning techniques.
- To analyze and verify the obtained results

V. CONCLUSION

There is clearly a requirement for accurate gold price forecasting as gold holds a high value in current economics setting. This paper has reviewed the forecasting techniques of gold prices up to 2015. Papers were selected to emphasize the diversity of forecasting methods and the problems that the methodology suffers from. Even though a lot of methods had been proposed for gold price forecasting, several demerits that have been highlighted makes room for experimentation and improvement of these techniques open as there are still no optimal solutions to forecast the gold price.

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