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COMPARISON OF ARIMA MODEL AND ARTIFICIAL NEURAL NETWORK IN FORECASTING GOLD PRICE

(Perbandingan Model ARIMA dan Rangkaian Neural Buatan dalam Peramalan Harga Emas)

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ABSTRACT

Developing an accurate model of gold price is crucial as gold price have a great effect on the investment decisions of individuals, corporations and countries. The purpose of this study is to compare the performance of model Autoregressive Integrated Moving Average (ARIMA) and Artificial Neural Network (ANN) in gold price forecasting based on the value of root mean squared error (RMSE). Daily gold price data collected from World Gold Council dated from 3 September 2018 to 30 October 2020 is used in this study. ARIMA (4,1,0) is chosen as the best model for the time series model based on Akaike Information Criterion (AIC). Long short-term memory (LSTM) has been chosen as artificial neural network's method to forecast the gold price. After comparing multiple step forecasting and one step ahead forecasting using ARIMA and LSTM, it is found that LSTM has smaller RMSE as compared to ARIMA. The result in this paper show that the ANN model outperforms ARIMA model in forecasting gold price.

Keywords: gold price; ARIMA; artificial neural network

ABSTRAK

Pembinaan model peramalan harga emas yang tepat adalah penting kerana harganya mempunyai kesan yang mendalam terhadap keputusan pelaburan yang dibuat oleh individu, korporat atau negara. Kajian ini bertujuan untuk membanding prestasi model integrasi purata bergerak autoregresif (ARIMA) dan rangkaian neural buatan (ANN) dalam meramal harga emas berdasarkan punca ralat kuasa dua (RMSE). Data harga emas harian untuk tempoh 3 September 2018 hingga 30 Oktober 2020 yang diperoleh daripada World Gold Council telah digunakan dalam kajian ini. ARIMA(4,1,0) merupakan model terbaik antara model siri masa berdasarkan nilai Kriterion Informasi Akaike (AIC). Dalam kajian ini, memori jangka pendek yang panjang (LSTM) telah dipilih sebagai model ANN. Selepas membandingkan hasil peramalan pelbagai langkah dan satu langkah ke hadapan, model LSTM mempunyai RMSE yang lebih kecil berbanding ARIMA(4,1,0). Hasil kajian ini telah menunjukkan model ANN adalah model yang lebih baik berbanding model ARIMA dalam meramal harga emas.

Kata kunci: harga emas; ARIMA; rangkaian neural buatan

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