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Creating a cutting-edge neurocomputing model with high precision

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Abstract
The prediction of oil prices has a significant impact on the economies of countries, particularly in oil-rich nations like Iraq, and affects the labor market. Prediction techniques are vital tools for extracting knowledge from complex databases, such as oil prices. This study aims to develop a prediction model that accurately determines oil prices based on seven fundamental characteristics, including Date, WTI, GOLD, SP 500, US DOLLAR INDEX, US 10YR BOND, and DJU. The proposed model utilizes advanced neurocomputing techniques that analyze the seven features over a ten-year period. The model comprises three main stages: preprocessing, determining feature importance through computing correlation, entropy, and information gain, and splitting the dataset into training and testing. The first part of the dataset builds the predictor called Hybrid Model to Oil Price based on Neurocomputing Techniques, while the second part evaluates model using three error measures: R2, MSE, and MAE. The model proves its ability to provide accurate predictions with low error rates. Multivariate analysis shows that WTI, GOLD, and US DOLLAR INDEX have a more significant impact on oil prices, with information gain values of WTI = 11.272, GOLD = 11.227, and DJU = 11.614. The Gate Recurrent Unit neurocomputing technique demonstrates its ability to handle datasets with features that behave differently over multiple years and provides accurate predictions with low errors in a short time, withR2 = 0.945, MSE = 0.0505, and MAE = 0.1948. This study provides valuable insights into the prediction of oil prices and highlights the efficacy of advanced neurocomputing techniques for extracting knowledge from complex databases.

Keywords Network of oil · GRU network · Forecasting · Advanced neurocomputing

1 Introduction

Data is a valuable asset that serves as the foundation for various fields in computer science. It can be generated from different sources and analyzed using various techniques [1]. Data science is an interdisciplinary field that combines data, intelligence, and statistics to extract useful knowledge from data. Intelligent Data Analysis (IDA) [2] involves preparing, mining, and validating data to obtain accurate results. The advantage of IDA is that it can work on real-world problems and produce high-accuracy results. However, the increasing size of data sets in the real world leads to complex calculations that require a lot of time to reach the desired results. Deep learning is a subset of artificial intelligence that combines three types of learning: supervised, unsupervised, and reinforcement. Prediction is a vital principle in designing models that can forecast future events or find unknown variables based on existing data or evidence. Multivariate Analysis (MVA) [3] is a statistical procedure that analyzes data with multiple variables to obtain more accurate conclusions. MVA techniques can be divided into two parts: dependence and interdependence techniques. The fundamental benefit of

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