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Crude Oil Price Prediction Using Artificial Intelligence

LITERATURE SURVEY

crude oil price forecasting has attracted tremendous attention from scholars and policymakers due to its significant effect on the global economy.

Besides supply and demand, crude oil prices are largely influenced by various factors, such as economic development, financial markets, conflicts, wars, and political events. Most previous research treats crude oil price forecasting as a time series or econometric variable prediction problem. Although recently there have been researches considering the effects of real-time news events, most of these works mainly use raw news headlines or topic models to extract text features without profoundly exploring the event information. In this study, a novel crude oil price forecasting framework, AGESL, is proposed to deal with this problem. In our approach, an open domain event extraction algorithm is utilized to extract underlying related events, and a text sentiment analysis algorithm is used to extract sentiment from massive news. Then a deep neural network integrating the news event features, sentimental features, and historical price features is built to predict future crude oil prices. Empirical experiments are performed on West Texas Intermediate (WTI) crude oil price data, and the results show that our approach obtains superior performance compared with several benchmark method.

Crude oil plays a significant role in the global economy, for nearly one-third of the world’s energy consumption comes from it. Also, oscillations in oil prices significantly affect the economy of oil-exporting and oil-importing nations [1], [2]. Accurate oil price forecasting would help policymakers adopt proper policy and make appropriate decisions regarding energy resources. However, crude oil price prediction has been a challenging problem in forecasting research because oil prices are affected by many factors. Except for the fundamental market factors, such as supply, demand, and inventory, oil price fluctuation is strongly influenced by economic development, conflicts, wars, and breaking news [3]. For example, oil producers were paying buyers to take the commodity off their hands over fears that storage capacity could run out in May 2020, and WTI oil price even turned negative for the first time in history on 20 April 2020. Another recent example is that crude oil price movements have exhibited a stronger correlation with the severe degree of the COVID-19 pandemic [4]–[7]. The challenge is characterizing and modeling such nonlinear and nonquantitative factors because most of such information is contained in raw texts.

References :

The proposed AGESL approach outperforms all other benchmarks. It achieves the highest DS, the lowest RMSE, and MAPE among all models. Compared with all the other benchmark models, it averagely achieves better accuracy in terms of lift 14.62% on RMSE, 17.00% on MAPE, and 12.50% on DS. Even Compared with the suboptimal LSTMEvent, the RMSE, MAPE, and DS of AGESL obtain a lift of 1.62%, 2.72%, and 4.73%, respectively. It demonstrates that a hybrid framework integrating the advantages of its subcomponents is more capable of crude oil price forecasting.