LITERATURE REVIEW

Crude Oil Price Prediction

Crude oil is fundamental for global growth and stability. The factors influencing crude oil prices and more generally, the oil market, are well known to be dynamic, volatile and evolving. Subsequently, crude oil prediction is a complex and notoriously difficult task. In this paper, we evaluate the Multi-recurrent Network (MRN), a simple yet powerful recurrent neural network, for oil price forecasting at various forecast horizons.

Grasping the future fluctuation characteristics and trend of oil prices form the basis for a deep understanding of the system mechanisms and development trends of related research fields. However, due to the complex features of the oil price, accurate prediction is very difficult to get. In order to improve the accuracy of international crude oil price predictions, a novel hybrid prediction model is proposed, that is improved on existing decomposition ensemble learning techniques by developing the Dynamic Time Warping Fuzzy Clustering method (FCM-DTW) as a new reconstruction rule.

Crude oil price prediction helps to get a better understanding of the global economic situation. Recently, variational mode decomposition (VMD) is introduced into the field of crude oil price forecasting. However, there is a lack of general selection rule for VMD-parameter and the widely adopted one-time decomposition strategy seems not suitable for practical application. Thus, an improved signal-energy based (ISE) rule is proposed as an improvement of the existing signal-energy based (SE) rule for the VMD-parameter selection. The moving-window strategy is put forward as a supplement for the decomposition strategy. Finally, a prediction model (VMD-LSTM-MW model) is built by combining the VMD, the long short-term memory (LSTM) network, and the moving-window strategy. The effectiveness of the ISE rule, the validity of the moving-window strategy, and the superiority of the VMD-LSTM-MW model are demonstrated by conducting monthly and daily crude oil price prediction experiments.

References

1. Gupta, N. and Nigam, S., 2020. Crude oil price prediction using artificial neural network. *Procedia Computer Science*, *170*, pp.642-647.
2. Chiroma, H., Abdulkareem, S. and Herawan, T., 2015. Evolutionary Neural Network model for West Texas Intermediate crude oil price prediction. *Applied Energy*, *142*, pp.266-273.
3. Orojo, O., Tepper, J., McGinnity, T.M. and Mahmud, M., 2019, December. A multi-recurrent network for crude oil price prediction. In *2019 IEEE Symposium Series on Computational Intelligence (SSCI)* (pp. 2940-2945). IEEE.
4. Abdullah, S.N. and Zeng, X., 2010, July. Machine learning approach for crude oil price prediction with Artificial Neural Networks-Quantitative (ANN-Q) model. In *The 2010 International Joint Conference on Neural Networks (IJCNN)* (pp. 1-8). IEEE.

5. Cen, Z. and Wang, J., 2019. Crude oil price prediction model with long short term memory deep learning based on prior knowledge data transfer. *Energy*, *169*, pp.160-171.
6. Xie, W., Yu, L., Xu, S. and Wang, S., 2006, May. A new method for crude oil price forecasting based on support vector machines. In *International conference on computational science* (pp. 444-451). Springer, Berlin, Heidelberg.
7. Chai, J., Wang, Y., Wang, S. and Wang, Y., 2019. A decomposition–integration model with dynamic fuzzy reconstruction for crude oil price prediction and the implications for sustainable development. *Journal of Cleaner Production*, *229*, pp.775-786.
8. Wu, B., Wang, L., Lv, S.X. and Zeng, Y.R., 2021. Effective crude oil price forecasting using new text-based and big-data-driven model. *Measurement*, *168*, p.108468.
9. Kumar, Y.J.N., Preetham, P., Varma, P.K., Rohith, P. and Kumar, P.D., 2020, July. Crude Oil Price Prediction Using Deep Learning. In *2020 Second International Conference on Inventive Research in Computing Applications (ICIRCA)* (pp. 118-123). IEEE.
10. Khashman, A. and Nwulu, N.I., 2011, May. Support vector machines versus back propagation algorithm for oil price prediction. In *International symposium on neural networks* (pp. 530-538). Springer, Berlin, Heidelberg.