Date	: 10 September 2022
Team ID	: PNT2022TMID05981
Project Name	: Crude Oil Price Prediction

NO	AUTHOR	TITLE	METHODOLOGY	ALGORITHM	LIMITATIONS
1.	Lu-Tao Zhao et al. (2020)	Google Index-Driven Oil Price Value-at-Risk Forecasting: A Decomposition Ensemble Approach	A Google index-driven decomposition ensemble model to forecast crude oil price risk is proposed. By constructing an index of investor attention for the market and emergencies combined with a bivariate empirical mode decomposition to analyse the impact of investor attention on oil price fluctuations	• ARIMA • SVR • BPNN • BEMD	Lack of economic meaning, inability to explain the internal factors driving oil prices.
2.	Nalini Gupta et al. (2020)	Crude Oil Price Prediction using Artificial Neural Network	We use the Back-propagation learning algorithm and the error signal is cultivated through the network in the backward direction by changing and managing weights of the network to maximize the performance of the network. The procedure is done until the network is able to provide desired responses.	• ANN	It is evident, the result is shown in the figure, the prediction is accurate till there is a massive and sudden change in the actual data, where it becomes challenging to predict the exact new price with the change, however, the proposed model has efficiently taken into consideration these patterns. Else ways, this also proves the theory that financial markets are unpredictable and change anytime because of known and unknown factors.
3.	Yusheng Huang et al. (2021)	A new crude oil price forecasting model based on variational mode Decomposition	A crude oil price prediction model is proposed by combining the VMD, the LSTM network, with the proposed one-time parameter choosing rule, and the moving-window decomposition strategy. The proposed model demonstrates its superiority to the baseline models.	• VMD • LSTM	The multistep ahead prediction capability of the VMD-LSTM is subpar. An appropriate window size selection strategy needs to be implemented.

4.	Yuan Zhao et al. (2021)	A novel method for online real-time forecasting of crude oil price.	In VMD algorithm, the decomposition number and the penalty parameters are of great concern. Therefore, the maximum information entropy is introduced to excavate the potential and ordered information from the sequence, based on maximum entropy and envelope spectrum.	• VMD • ARMA • SVM	ARMA and SVM models are designed for small samples and short-term prediction. The model's performance in the large samples and long-term predictions are unknown.
5.	Ramesh Bollapragada et al. (2021)	Forecasting the price of crude oil	To forecast the crude oil price, two equations calculating the world demand, and non-OPEC's supply demand are used. All possible predictor variables and their transformation forms are put together. Then, all possible combinations of these variables are used in multiple regression analysis and their explanatory powers were recorded.	• ARMA • MAD	The model cannot predict the price changes caused by factors other than predictor variables that are used in the model.
6.	Zhenda Hu et al. (2021)	Crude oil price prediction using CEEMDAN and LSTM-attention with news sentiment index.	Considering the capability of CEEMDAN on signal pre-processing and the advantages of LSTM on time series prediction, this paper proposes integrating CEEMDAN, LSTM with attention mechanism for forecasting crude oil prices, which follows the "decomposition and ensemble" framework. Finally, the predicted values from each component can be aggregated as the final forecasting results of crude oil prices.	• CEEMDAN • LSTM	The nonlinearity and nonstationary of crude oil prices make it a challenging task for forecasting time series accurately and AI-based models usually cannot achieve satisfactory results when the forecasting is performed on raw crude oil prices.
7.	Makumbonori Bristone et al. (2021)	CPPCNDL: Crude oil price prediction using complex network and deep learning algorithms	The paper proposes mapping the datasets on a network using visibility graph algorithm, extraction of noise from the dataset and determination of the most influential nodes using k-core centrality, finally, LSTM is applied on the extracted datasets to train and test the models. At the end, the prediction of crude oil prices is evaluated with a view to discovering knowledge.	• EMD • SBM • FNN GA-NN	The proposed technique can be extended by considering other factors that affect crude oil price volatilities such as, financial market, economic growth, exchange rate, demand and supply and the weather. And the horizon of the prediction can be widened by considering daily data.

8.	Kexian Zhang et al. (2022)	Forecasting crude oil price using LSTM neural networks.	An LSTM model and other two comparable models, i.e., the ARIMA model and ANN model is implemented. Traditional time-series models have made great progress in the field of research on financial market prediction, especially the ARIMA model. As a nonlinear method in AI, ANNs can deal with nonlinear,	• ARIMA • ANN	Changing the rolling window of the ARIMA model may improve the accuracy. The LSTM model is still a cyclic network, which has a long gradient path. Although adding a long-term memory channel will be helpful, its capacity is still limited. In addition, due to
			discontinuous and high-frequency multidimensional data, and they have been widely used in financial forecasting		LSTM being recursive in nature, it cannot be trained in parallel
9.	Hasraddin Guliyev et al. (2022)	Predicting the changes in the WTI crude oil price dynamics using machine learning models.	A framework for predicting WTI crude oil prices is proposed. For prediction, Logistic Regression, Decision Tree, Random Forest, AdaBoost, and XgBoost. are compared, specially, their performance with DeLong statistical test.	• Logistic Regression • Decision Tree • Random Forest • AdaBoost • XgBoost	Based on the suggested model, different macroeconomics and financial indicators could be used to choose the input variables related to the crude oil marketplace to improve accuracy. Deep Learning could be used for WTI crude oil price prediction to improve the input variable's information extraction
10.	Tayo P. Ogundunmade et al. (2022)	Predicting Crude Oil Price in Nigeria with Machine Learning Models.	The model used was NNETAR. The alternative models were the auto-regressive integrated moving average model, Naïve Bayes, Holtwinter trend model, exponential smoothing model, and neural network autoregressive (NNETAR) model. The prediction criteria adopted for model screening were the root mean square error (RMSE), mean absolute error (MAE) and mean absolute percentage error (MAPE).	• NNETAR	Although the prediction method in this paper has some advantages, there are still some interesting questions waiting to be explored, which can be concluded as follows. The method proposed in this paper is based on the ARMA model and SVM model, so the method aims at small samples and short-term predictions mainly.

REFERENCES

[1] L. -T. Zhao, Z. -Y. Zheng, Y. Fu, Z. -X. Liu and M. -F. Li, "Google Index-Driven Oil Price Value-at-Risk Forecasting: A Decomposition Ensemble Approach," in IEEE Access, vol. 8, pp. 183351-183366, 2020, doi: 10.1109/ACCESS.2020.3028124.

[2] Gupta, N., & Nigam, S. (2020). Crude oil price prediction using artificial neural network. *Procedia Computer Science*, *170*, 642-647.

[3] Huang, Y., & Deng, Y. (2021). A new crude oil price forecasting model based on variational mode decomposition. Knowledge-Based Systems, 213, Article 106669.

[4] Yuan Zhao, Weiguo Zhang, Xue Gong, Chao Wang, A novel method for online real-time forecasting of crude oil price, Applied Energy, Volume 303, 2021, 117588, ISSN 0306-2619.
[5] Bollapragada, R., Mankude, A. & Udayabhanu, V. Forecasting the price of crude oil. Decision 48, 207–231 (2021). https://doi.org/10.1007/s40622021-00279-5
[6] Hu, Zhenda. (2021). Crude oil price prediction using CEEMDAN and LSTM-attention with news sentiment index. Oil & Gas Science and Technology. 76. 28. 10.2516/ogst/2021010.
[7] Makumbonori Bristone, Rajesh Prasadb, Adamu Ali Abubakara, CPPCNDL: Crude oil price prediction using complex network and deep learning algorithms. SWPU, Petroleum. (2021). 6. 353-361.
[8] Kexian Zhang, Min Hong. Forecasting crude oil price using LSTM neural networks. Data Science in Finance and Economics, 2022, 2(3): 163-180. doi: 10.3934/DSFE.2022008
[9] Hasraddin Guliyev, Eldayag Mustafayev, Predicting the changes in the WTI crude oil price dynamics using machine learning models, Resources Policy, Volume 77,2022, 102664, ISSN 0301-4207, https://doi.org/10.1016/j.resourpol.2022.102664.
[10] Zhao, Y., Zhang, W., Gong, X., & Wang, C. (2021). A novel method for online real-time forecasting of crude oil price. *Applied Energy*, *303*, 117588.
[11] Ogundunmade, T. P., Adepoju, A. A., & Allam, A. (2022). Predicting Crude Oil Price in Nigeria with Machine Learning Models. *Mod Econ Manag*, *1*(4).