LITERATURE SURVEY

CRUDE OIL PRICE PREDICTION

A various methodologies that are all used are discussed as follows:

Xueyan Mei[1]: Since the crude oil market can make an impact to global economics, it is important to develop some effective approaches to forecast crude oil price and its volatility. In this paper, the goal is to predict the tendency of crude oil future price from ten selected features that potentially affect the crude oil price. Currently, the most popular and robust prediction methods are based on machine learning, such as artificial neural networks, support vector machine, and logistic regression, which are classifiers trained from the training data and used to make predictions for the new data. However, the representations of the data are also crucial to the performance of the classifier training. In this paper, we use non-negative matrix factorization techniques to capture the intrinsic features of the crude oil data, which leads to a part-based dictionary learning problem. Support vector machine (SVM) is trained on the data encoded by the elements from the dictionary in order to predict the tendency of crude oil future price. The experiment shows that the proposed framework is useful for crude oil market prediction.

Adnan Khashman[2]: The price of crude oil is tied to major economic activities in all nations of the world, as a change in the price of crude oil invariably affects the cost of other goods and services. This has made the prediction of crude oil price a top priority for researchers and scientists alike. In this paper we present an intelligent system that predicts the price of crude oil. This system is based on Support Vector Machines. Support Vector Machines are supervised learners founded upon the principle of statistical learning theory. Our system utilized as its input key economic indicators which affect the price of crude oil and has as its output the price of crude oil. Data for our system was obtained from the West Texas Intermediate (WTI) dataset spanning 24 years and experimental results obtained were very promising as it proved that support vector machines could be used with a high degree of accuracy in predicting crude oil price.

Chengyuan Zhang[3]: Volatility of international crude oil prices is influenced by various external factors on different time scales. User search data (USD) which reflects investor attentions has been widely researched and proved to be associated with crude oil price change at different frequency bands. In this paper, a novel hybrid approach that utilizes bivariate empirical mode decomposition (BEMD) with user search data and machine learning is developed for crude oil price forecasting. First, BEMD is adopted to simultaneously decomposed the crude oil price data and USD into a finite set of components. Forecasting results are analyzed with various evaluation criteria and verified robustness. Results show that the proposed approach statistically outperforms traditional forecasting machine learning techniques and similar counterparts (with USD or EMD-based method) in terms of prediction accuracy.

Jiayu Yi[4]: To study the characteristics of crude oil price fluctuations and analyze the impacts of external events, this paper first employs the CEEMD method to decompose the crude oil historical prices into different components and extracts a market fluctuation, a shock from extreme events, and a long-term trend. And we find that when determining the crude oil prices, the shock from extreme events has become the most important factor. we establish the models based on VAR, SVM, and structural breaks to predict the crude oil prices, finding that the CEEMD- VAR-SVM model with structural breaks performs best compared to other models we establish.

Lubna A. Gabralla[5]: Oil is the lifeblood of the global economy. Recently, oil prices have witnessed fluctuations and the prediction of oil prices has become a challenge for researchers. The aim of this research is to design a model that is able to predict the prices of crude oil with good accuracy. We used the daily data from 1999 to 2012 with 14 input factors to predict the price of West Texas Intermediate (WTI), which is a well-known benchmark. We propose an ensemble of Adaptive Neuro-Fuzzy Inference System using a Particle Swarm Optimization algorithm for oil price prediction and the empirical results illustrate high performance and accurate results.

Yukun Bao[6]: Accurate prediction on crude oil price in a long time horizon has been appealing both for academia and practitioners. Recursive strategy and direct strategy are two mainstream modeling schemas widely used for multi-step-ahead prediction in the context of time series modeling. In this paper, a comparative study has been conducted to justify these two strategies in multi-step-ahead prediction for crude oil price with Support Vector Regression (SVR). The experimental results show the direct strategy has more consistent performance than recursive one in the various experimental setting.

Lean Yu[7]: In this study, a Al-agent-based trapezoidal fuzzy ensemble forecasting model is proposed for crude oil price prediction. In the proposed ensemble model, some single AI models are first used as predictors for crude oil price prediction. Then these single prediction results produced by the single Al-based predictors are fuzzified into some fuzzy prediction representations. Subsequently, these fuzzified representations are fused into a fuzzy consensus, i.e., aggregated fuzzy prediction. Finally, the aggregated prediction is defuzzified into a crisp value as the final prediction results. For testing purposes, two typical crude oil price prediction experiments are presented.

Kaijian He[8]: The prediction of crude oil price remains a challenging issue due to its complicated data generating process. Aside from the long perceived nonlinear data feature issue, recent empirical evidence suggests that the mixture of data characteristics in the time scale domain is another important data feature to be incorporated in the modeling process. This paper proposes a novel Morphological Component Analysis based hybrid methodology for modeling the multi scale heterogeneous data generating process. The superior performance of the proposed model is attributed to the separation of the underlying distinct data features and the identification of appropriate model specifications for them. Meanwhile, the proposed methodology offers additional insights into the underlying data generating process and their economic viability.

Shangkun Deng[9]: Crude oil price direction forecasting presents an extremely challenging task that attracts considerable attention from academic scholars, individual investors and institutional investors. In this research, we proposed an integration method by adopting the Multi-Class Support Vector Machine (MCSVM) and the Non-Dominated Sorting Genetic Algorithm II (NSGA-II) for forecasting and trading simulation in two well-known crude oil markets. Firstly, the proposed approach applied the MCSVM to train a multi-class classification model, and it adopted the NSGA-II to optimize the threshold values of trading rules. Then, the trained MCSVM model was used to forecast the movement direction and magnitude levels. Next, the proposed method forecasted the direction of crude oil price movements one week later and executed trading simulation according to the direction and magnitude level predictions. Finally, after a testing period lasted for four years, the performances of the proposed approach were gauged in terms of direction prediction correctness and investment yields. Experimental results demonstrated that the proposed approach produced outstanding results not only on hit ratio and accumulated return but also return-risk ratio. It indicates that the proposed approach can provide beneficial suggestions for individual investors, institutional investors, as well as for government officers engaged in energy investment policies making.

Robert Gunawan[10]: Commodities are the important factors in Indonesian economy. Being one of the biggest crude palm oil producers, the importance of knowing future crude palm oil price will bring significant impact to Indonesian economy. This paper describes an attempt to predict daily commodity prices, especially crude palm oil by employing neural network. First of all, this paper will explain how to construct dataset for learning and testing and how to build neural network model. There are several experiments to find what configuration of neural network should be selected to make the prediction more accurate, including testing two kinds of network topology named joint network and separated network. Proposed neural network model using joint network topology and regular normalization in momentum of 0.75 and learning rate of 0.05 is proven to be best model with minimum of 50000 iterations. Our proposed model has MAPE of 2.10 percent and RMSPE of 2.61 percent when tested using given experimental schemas.

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