

LITERATURE SURVEY

INTRODUCTION:

Crude oil is one of the major products which includes global measurements. The origin of crude oil prediction errors involves composite supply-demand structures. Scientists have come across unique modes for exploring and forecasting crude oil prices. Studies related to the prediction of prices play an important role in the economic crisis. One of the features of the imperfection of all the methodologies was that the upcoming movement of oil price was derived from the prior data. Machine learning strategies came into existence for oil price prediction which can be defined by ANN. In recent times, many studies have given more focus on the Convolutional neural network which is a neural network based on deep learning concepts.

WORKS OF LITERATURE:

The first research about forecasting the oil market is proposed by Amano (1987). The author used a small-scale econometric model for oil market prediction. Huntington (1994) utilized a sophisticated econometric model for predicting oil prices in the 1980s. Then slowly many came into the forecasting, year after year, and then in 2006 Sadorsky applied multiple univariate and multivariate statistical models such as GARCH, TGARCH, AR, and BIGARCH to daily forecast volatility in petroleum futures price returns. As a result of the application of linear techniques, a significant error has been demonstrated between actual and predicted oil prices. With these models, several exogenous variables have been employed to predict oil price, however; inventory, supply, and demand are the most used factors. Supply and demand are relatively inelastic to price changes, subsequently, an inventory adjustment can be slow to happen which explains the major part of the difference between real and forecasted prices, especially in the short run (Hamilton, 2008). On the other hand, traditional statistical and econometric techniques are usually able to capture only linear processes in data time series (Weigend and Gershenfeld, 1994). However, the oil prices behavior is characterized by a high non-linearity and irregularity.

Therefore, the mentioned models are not the appropriate choice to forecast the oil price. Then many more models were introduced later in 2015 Nguyen, Shirai, and Velcin attempted to extract topics and the sentiment of the market simultaneously based on a joint sentiment/topic model. As a deep learning technique, the convolutional neural network has been used widely in the fields of image classification, speech recognition, and sentence modeling (Abdel-Hamid, Mohamed, Jiang, & Penn, 2012; Krizhevsky et al., 2012). In applications related to this paper, the CNN model has also been used for sentiment analysis in several studies, such as those by Dos Santos and Gatti(2014), Poria, Cambria, and Gelbukh (2015), and Severyn and Moschitti (2015).

In 2018 tested many forecasting models and combinations of models to determine what combination of individual models is beneficial for forecasting performance. He used the no-change benchmark (denoted RW in his paper), AR and ARMA models (AR and ARMA), the Futures model (Futures), forecasts based on crude oil inventories (Inventories OECD), a VAR model of the global oil market (VAR CLI), and a non-oil industrial raw materials real-time forecast (CRB Index), and watched price movements with oil sensitive stocks (Oil Stock). In all, he found that

individually, the Futures model had the most gains in lowering the MSPE ratio and was substantially better than the no-change benchmark. However, he found that a combination consisting of four models, Futures, Inventories OECD, VAR CLI, and CRB Index showed lower MSPE ratios than the best individual models and therefore concluded that the combination would be the most reliable in forecasting crude oil prices.

An et al. (2019) used a machine learning approach to predict oil prices. Their results stated that the price of oil was most affected by the US Federal Reserve rates and the US dollar index and that factors such as instability in the Middle East had little to no effect on the prices of oil through their machine learning-based model. Al-Fattah (2019) used a hybrid approach of artificial intelligence with a genetic algorithm (GA), artificial neural network (ANN), and a data mining time series (DMTS) to construct a GANNATS model to forecast the prices of West Texas Intermediate crude oil. He found that his model closely matched the historical data of WTI futures price volatility and demonstrated capability in predicting the direction of crude oil price movements.

However, with the increasing data volume and influence factors complex, traditional models failed in predicting accurately. The machine learning forecasting method presents its superiority and mostly outperforms traditional approaches when tested with empirical results, especially in dealing with nonlinear problems and short-term prediction. Empirical results of the proposed method proved the effectiveness and robustness statistically. Xiong et al., 2013 developed an integrated model EMD-FNN-SBN, which is the empirical mode decomposition (EMD) based on the feed-forward neural network (FNN) modeling framework incorporating the slope-based method (SBM). The results indicate this model using the (multiple-input multiple-output) MIMO strategy is the best in prediction accuracy.

Venezuela has the cheapest price, just \$0.02 per liter, followed by Libya (\$0.03) and Iran (\$0.05). Among the top ten cheapest, five countries are located in Asia, four in Africa, and one in South America. Hong Kong has the most expensive price at \$3.03, followed by Norway. Qatar is among the top 10 richest economies but has low gasoline prices below \$1. Even developed countries USA and Australia have a price below \$1.5. Prices are high in European nations as only three countries have less than one dollar. Azerbaijan has the lowest rate in Europe. The other three having below \$1 are Russia and Belarus. 44 out of 47 European countries have a price above \$1. This figure is 24 out of 39 in Asia, 33 out of 42 in Africa, 22 out of 24 in North America, 8 out of 12 in South America, and 4 out of 4 in Oceania.

The price of crude oil was 63.98 dollars in the year 2020 and got decreased to 39.32 dollars in the year 2021. Variations in prices have a major role in economic crises.