

Literature Survey

Crude Oil Price Prediction

Oil demand is inelastic, therefore the rise in price is good news for producers because they will see an increase in their revenue. Oil importers, however, will experience increased costs of purchasing oil. Because oil is the largest traded commodity, the effects are quite significant. A rising oil price can even shift economic/political power from oil importers to oil exporters. The crude oil price movements are subject to diverse influencing factors. This Guided Project mainly focuses on applying Neural Networks to predict the Crude Oil Price. This decision helps us to buy crude oil at the proper time. Time series analysis is the best option for this kind of prediction because we are using the Previous history of crude oil prices to predict future crude oil. So we would be implementing RNN(Recurrent Neural Network) with LSTM(Long Short Term Memory) to achieve the task.

Lets look into some of the existing solutions:

Using Deep Learning:

By utilising Long Short-Term Memory (LSTM) based on a recurrent neural network, the significant crude oil price is evaluated and modelled. The exhibition of the proposed model is assessed by utilizing the valuable information in the WTI unrefined petroleum markets. The exploratory results show that the proposed model achieves increments in the expected precision of results. The data required is collected from the official website of FEDERAL-RESERVE -BANK -OF -ST. LOUIS.

Artificial Neural Network:

They proposed a contemporary and innovative method of predicting crude oil prices using the artificial neural network (ANN). The main advantage of this approach of ANN is that it continuously captures the unstable pattern of the crude oil prices which have been incorporated by finding out the optimal lag and number of the delay effect that controls the prices of crude oil. Variation of lag in a period of time has been done for the most optimum and close results, we then have validated our results by evaluating the root mean square error and the results obtained using the proposed model have significantly outperformed.

Based on Stream Learning:

They proposed a novel approach for crude oil price prediction based on a new machine learning paradigm called stream learning. The main advantage of our stream learning approach is that the prediction model can capture the changing pattern of oil prices since the model is continuously updated whenever new oil price data are available, with very small constant overhead. To evaluate the forecasting ability of our streaming learning model, we compare it with three other popular oil price prediction models. The experiment results show that our stream learning model achieves the highest accuracy in terms of both mean squared prediction error and directional accuracy ratio over a variety of forecast time horizons.

WTI OIL PRICE PREDICTION MODELING AND FORECASTING:

This work examines two different Bayesian approaches to model short term oil price return for past decades and forecast it. We first built the multivariable linear regression model based on relevant explanatory variables. Then we build the univariate time series model using ARIMA models, followed by ARCH and GARCH models. Both methods are followed by required procedures and econometrics tests. The forecasting powers of time series approach perform better than linear regression and even structural models, yet linear approach is very relevant for knowing incapability of each variable to oil price.

Using Support Vector Regression (SVR) with grid search – cross validation algorithm:

The Algorithm to determine the optimal parameters in the model using the SVR is a grid search algorithm. This algorithm divides the range of parameters to be optimized into the grid and across all points to get the optimal parameters. In its application the grid search algorithm should be guided by a number of performance metrics, usually measured by cross-validation on the training data. Therefore, it is advisable to try some variations pair hyperplane parameters on SVR. Based on analysis calculation of accuracy and the prediction error using the training data generating R^2 99.10868% while the value of MAPE by 1.789873%. The data testing generates R^2 96.1639% while the value of MAPE by 1.942517%. This indicates to the data of testing using a linear kernel or accuracy of prediction accuracy results are quite large. Best model using the SVR has been formed can be used as a predictive model of crude oil prices.