CRUDE OIL PRICE PREDICTION

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LITERATURE SURVEY

1)Crude Oil Price Prediction Using LSTM Networks

Authors: Varun Gupta, Ankit Pandey

Crude oil market is an immensely complex and dynamic environment and thus the task of predicting changes in such an environment becomes challenging with regards to its accuracy. A number of approaches have been adopted to take on that challenge and machine learning has been at the core in many of them. There are plenty of examples of algorithms based on machine learning yielding satisfactory results for such type of prediction. In this paper, we have tried to predict crude oil prices using Long Short-Term Memory (LSTM) based recurrent neural networks. We have tried to experiment with different types of models using different epochs, lookbacks and other tuning methods. The results obtained are promising and presented a reasonably accurate prediction for the price of crude oil in near future.

The developed model is trained and evaluated against accuracy matrices to assess the capability of the network to provide an improvement of the accuracy of crude oil price prediction as compared to other strategies. The result obtained from the model shows a promising prediction capability of the RNN-LSTM algorithm for predicting crude oil price movement.

2)Crude Oil Price Prediction using Artificial Neural Network

Authors: Nalini Gupta**,**Shobhit Nigam

Crude oil is amongst the most important resources in today's world, it is the chief fuel and its cost has a direct effect on the global habitat, our economy and oil exploration, exploitation and other activities. Prediction of oil prices has become the need of the hour, it is a boon to many large and small industries, individuals, the government. The evaporative nature of crude oil, its price prediction becomes extremely difficult and it is hard to be precise with the same. Several different factors that affect crude oil prices. We propose 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.

3)Crude Oil Price Prediction using RECURRENT Neural Network

Authors: Norshakirah Aziz,Mohd Hafizul Afifi Abdullah,Ahmad Naqib Zaidi

Prediction of future crude oil price is considered a significant challenge due to the extremely complex, chaotic, and dynamic nature of the market and stakeholder's perception. The crude oil price changes every minute, and millions of shares ownerships are traded everyday. The market price for commodity such as crude oil is influenced by many factors including news, supply-and-demand gap, labour

costs, amount of remaining resources, as well as stakeholders' perception. Therefore, various indicators for technical analysis have been utilized for the purpose of predicting the future crude oil price. Recently, many researchers have turned to machine learning approached to cater to this problem. This study demonstrated the use of RNN-LSTM networks for predicting the crude oil price based on historical data alongside other technical analysis indicators. This study aims to certify the capability of a prediction model built based on the RNN-LSTM network to predict the future price of crude oil. The developed model is trained and evaluated against accuracy matrices to assess the capability of the network to provide an improvement of the accuracy of crude oil price prediction as compared to other strategies. The result obtained from the model shows a promising prediction capability of the RNN-LSTM algorithm for predicting crude oil price movement.

4)Crude Oil Price Prediction using Convolutional Neural Network

Authors: Rayan H. Assaad,Sara Faye

There has been a renewed interest in accurately forecasting the price of crude oil and its fluctuations. That said, this paper aims to study whether the price of crude oil in the United States (US) could be predicted using the stock prices of the top information technology companies. To this end, time-series data was collected and pre-processed as needed, and three architectures of computational neural networks were tested: deep neural networks, long-short term memory (LSTM) neural networks, and a combination of convolutional and LSTM neural networks. The findings suggest that LSTM networks are the best architectures to predict the crude oil price. The outcomes of this paper could potentially help in making the oil price

prediction mechanism a more tractable task and in assisting decision-makers to improve macroeconomic policies, generate enhanced macroeconomic projections, and better assess macroeconomic risks.

5)Crude Oil Price Prediction using stream learning

Author: Shuang Gao,Yalin Lei

Crude oil is the world's leading fuel, and its prices have a big impact on the global environment, economy as well as oil exploration and exploitation activities. Oil price forecasts are very useful to industries, governments and individuals. Although many methods have been developed for predicting oil prices, it remains one of the most challenging forecasting problems due to the high volatility of oil prices. In this paper, we propose 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. Crude oil prices are determined by many factors and have a big impact on the global environment and economy. Although crude oil prices were firm in early 2014, they fell sharply from mid 2014. In January 2016, the U.S. refiner acquisition cost for crude oil imports, as a proxy for world oil price, is only $28.81 per barrel on average, and the West Texas Intermediate (WTI) crude oil spot price, as the benchmark oil price in North America, is only $31.68 per

barrel on average (EIA, 2016). The prices have dropped by more than seventy percent since June 2014.

6)Crude Oil Price Prediction using Blending Ensemble Learning Model

Author: Brain M. Lucey,Peta hajek,Mahmudul Hasan

crude oil is driven by a number of factors with varying frequency, it is difficult to accurately capture its behavior, which in turn leads to challenges in forecasting. Moreover, different mechanisms of fluctuations have been observed at different time series periods. To efficiently capture these diverse fluctuation profiles, we propose to combine heterogenous predictors for predicting the crude oil price. Specifically, a forecasting model is developed using blended ensemble learning is developed that combines various machine learning methods, including linear regression, k-nearest neighbor regression, regression trees, support vector regression, and ridge regression. Brent and WTI crude oil data at various time series frequencies are used to validate the proposed blending ensemble learning approach. To show the effectiveness of the proposed model, its performance is compared with existing individual and ensemble learning methods used for crude oil price prediction, such as lasso regression, bagging lasso regression, boosting, random forest, and support vector regression. We show that our proposed blending ensemble learning model dominates the existing forecasting models in terms of forecasting errors. The proposed model exhibits a good prediction performance for both short- and long-term forecasting horizons, which is beneficial to stakeholders and related industries that depend on this energy source.

7)Crude Oil Price Forecasting Using Supervised GAN

Authors: Zhaojie Luo**,**Jinhui Chen**,**Xiaojing CaiOkayama

This paper proposes a novel approach based on asupervised Generative Adversarial Networks (GANs) model that forecasts the crude oil prices with Adaptive ScalesContinuous Wavelet Transform (AS-CWT). In our study, wefirst confirmed that the possibility of using Continuous WaveletTransform (CWT) to decompose an oil price series into variouscomponents, such as the sequence of days, weeks, months andyears, so that the decomposed new time series can be used asinputs for a deep-learning (DL) training model. Second, we findthat applying the proposed adaptive scales in the CWT methodcan strengthen the dependence of inputs and provide more usefulinformation, which can improve the forecasting performance.Finally, we use the supervised GANs model as a training model,which can provide more accurate forecasts than those of thenaive forecast (NF) model and other nonlinear models, such asNeural Networks (NNs), and Deep Belief Networks (DBNs) whendealing with a limited amount of oil prices data.

Oil price forecasting has many implications for the eco-nomic growth of countries as well as providing useful in-formation that helps international investors to diversify risk.According to BP's Statistical Energy Outlook, crude oil is avital fuel, accounting for 32.9% of global energy consumptionin 2016, and will continue to play an important role until2035. It is generally accepted that the oil price fluctuationshave a significant influence on macroeconomic aggregates,such as the GDP and inflation of oil-exporting and -importingcountries, as one of the most actively traded commodities inthe world [1]. Thus, it is important to focus on improvingthe forecasting accuracy of oil prices for both real economyand financial

markets. However, oil price forecasting is ratherchallenging because the crude oil prices are usually consideredto be a nonlinear and non-stationary tim.

8)Crude oil prediction using a hybrid radial basis function network

Authors: Kumar Chandar S**,**Sumathi Mahadevan S.N.Sivanandam

In the recent years, the crude oil is one of the most important commodities worldwide. This paper discusses the prediction of crude oil using artificial neural networks techniques. The research data used in this study is from 1st Jan 2000-31st April 2014. Normally, Crude oil is related with other commodities. Hence, in this study, the commodities like historical data's of gold prices, Standard & Poor's 500 stock index (S & P 500) index and foreign exchange rate are considered as inputs for the network. A radial basis function is better than the back propagation network in terms of classification and learning speed. When creating a radial basis functions, the factors like number of radial basis neurons, radial layer's spread constant are taken into an account. The spread constant is determined using a bio inspired particle swarm optimization algorithm. A hybrid Radial Basis Function is proposed for forecasting the crude oil prices. The accuracy measures like Mean Square Error, Mean Absolute Error, Sum Square Error and Root Mean Square Error are used to access the performance. From the results, it is clear that hybrid radial basis function outperforms the other models. As the benchmark of oil market, crude oil has a strong impact on the global economic growth, social stability and national security [1]. In the last two decades, the prediction of crude oil either for prices or volatility has attracted extensive attention of scholars.

9)Forecasting Crude Oil Prices: a Deep Learning based Model

AUTHOR: YanhuiChena Kaijian Hebd **,**Geoffrey K.F.Tsoc

With the popularity of the deep learning model in the engineering fields, it has attracted significant research interests in the economic and finance fields. In this paper, we use the deep learning model to capture the unknown complex nonlinear characteristics of the crude oil price movement. We further propose a new hybrid crude oil price forecasting model based on the deep learning model. Using the proposed model, major crude oil price movement is analyzed and modeled. The performance of the proposed model is evaluated using the price data in the WTI crude oil markets. The empirical results show that the proposed model achieves the improved forecasting accuracy. Nowadays, electricity plays a vital role in national economic and social development. Accurate load forecasting can help power companies to secure electricity supply and scheduling and reduce wastes since electricity is difficult to store. In this paper, we propose a novel Deep Neural Network architecture for short term load forecasting. We integrate multiple types of input features by using appropriate neural network components to process each of them. We use Convolutional Neural Network components to extract rich features from historical load sequence and use Recurrent Components to model the implicit dynamics. In addition, we use Dense layers to transform other types of features. Experimental results on a large data set containing hourly loads of a North China city show the superiority of our method. Moreover, the proposed method is quite flexible and can be applied to other time series prediction tasks.

10)CRUDE OIL PRICES PREDICTION USING SVR WITH GRID SEARCH CROSS VALIDATION ALGORITHM

AUTHOR: Dayanithi Sidu,Harini.

Crude oil is the world's leading fuel, and its prices have a big impact on the global environment, economy as well as oil exploration and exploitation activities. Oil price forecasts are very useful to industries, governments and individuals. Although many methods have been developed for predicting oil prices, it remains one of the most challenging forecasting problems due to the high volatility of oil prices forecasting models that predict future events are used in numerous fields such as economics and science because they are useful tools in decision making.

A perfect forecast provides insight into the implications of an action or inaction and serves as a metric to judge one’s ability to influence future events;The world's environment is affected by the oil price falling. With the drop of oil prices, the fuel bills are lowered. As a result, consumers are very likely to use more oil and thus increase the carbon emission. In addition, there is less incentive to develop renewable and clean energy resources. On the other hand, sustained low oil prices could lead to a drop in global oil and gas exploration and exploitation activities.

Fluctuating oil prices also play an important role in the global economy The fall in oil prices would result in a modest boost to global economic activity, although the owners of oil sectors suffer income losses. Recent research from the World B

an shows that for every 30% decline of oil prices, the global GDP (Gross Domestic Product) would be increased by 0.5%. At the same time, the drop of oil prices would reduce the cost of living, and hence the inflation rate would fall. So there is a chance of prediction of the Proper and most approximate prediction in order to fix the situation if any occurs.