Project Design Phase-I
Proposed Solution

Date	20 September 2022
Team ID	PNT2022TMID53380
Project Name	Crude Oil Price Prediction

S. No	Parameter	Description
1.	Problem Statement	Crude oil has shaped the face global economy, with nearly two-thirds of the world's electricity generated from crude oil and its by-products. Oil trading involves oil producing countries, oil companies, suppliers of treatment plants, oil trading countries, and theorists. Due to the importance of the commodity to the development of a country, a sharp shift in the value of crude oil can lead to a downfall of a country's economy. Therefore, an accurate crude oil price prediction mechanism is needed to allow researchers and stakeholders to understand and predict future crude oil prices.
2.	Idea / Solution description	In order to predict the crude oil price using historical data, RNN is utilized with Long Short-Term Memory (LSTM). RNN can memorize the previous information and apply it for calculating the current output. LSTM mainly solves the problems of RNNs, such as gradient disappearance and gradient explosion. LSTM constructs a long-term delay between input, output and gradient burst prevention. It has its own memory and can yield accurate predictions of crude oil prices. The effectiveness of the model can be evaluated using the Mean Square Error method over the prediction.
3.	Novelty / Uniqueness	• LSTM performs better compared to other type of deep learning algorithms over time series prediction, including the standard RNN. LSTM leads to more successful runs, and a much faster learning rate. • LSTM can use a batch-normalization layer and dropout layer to optimize the structure of the neural network. This solves two problems, which affect the training capability. One is the problem of gradient disappearance, which makes model convergence difficult. The other is that the tests may fail because of overfitting.
4.	Social Impact / Customer Satisfaction	Predicting the price of crude oil can help Governments, traders and other stakeholders plan accordingly to meet the supply and demand, prevent price fluctuations. If the government can predict prices and take action accordingly, they would be able to regulate oil pricing which helps improve a country's economy.

5.	Business Model (Revenue Model)	• Crude oil price fluctuations have a far-reaching impact on global economies and thus price forecasting can minimize the risks associated with price volatility. • Price forecasts are very important to various stakeholders like governments, public and private enterprises, policymakers, and investors to make an informed decision.
6.	Scalability of the Solution	• PCA, MDS, and LLE methods can be used to reduce the dimensions of a large dataset and run the model. • The accuracy of RNN-LSTM models is improved when the input size is increased.