Crude Oil Price Prediction Using Machine Learning

SmartInternz - Industry Oriented Mini Project

Developed by

KASU RAHUL

MITHINTI VYSHNAVI

BAIREDDY ABHINAVI

MOHAMMED GHULAM ATHAR MOINUDDIN

Under the guidance of

SHASHANK

1.INTRODUCTION

1.1 overview

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.

1.2 Purpose

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.

2.LITERATURE SURVEY

2.1 Existing Problem (OR) Problem Statement

The price of oil fluctuates according to three main factors: current supply, future supply, and expected global demand. Members of OPEC control 40% of the world's oil. Thus, many types of events that impact either the supply of oil or its expected demand (like pandemics) will cause the price of oil to rise or fall.

2. 2 Proposed Solution

Predictive analytics for crude oil price using RNN-LSTM experimental procedure includes five systematic steps as follows:

1. data acquisition
2. data exploration and pre-processing
3. data training
4. test and evaluate model and
5. model improvement.

3. THEORITICAL ANALYSIS

3.1 Block diagram

This 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.

3.2 Hardware / Software Designing

The following is the Hardware required to complete this project:

- Internet connection to download and activate
- Administrator access to install and run Anaconda Navigator
- Minimum 10GB free disk space

account required. Windows 8.1 or 10 (64-bit or 32-bit version) OR Cloud: Get started free, *Cloud

Memory & System Requirements the following minimum hardware requirements: To run Office Excel 2013, your computer needs to meet

- 500 megahertz (MHz)
- 256 megabytes (MB) RAM
- 1.5 gigabytes (GB) available space
- 1024x768 or higher resolution monitor

To complete this project you should have the following software and packages :

1. Anaconda Navigator: [illegible]

To build Deep learning models you must require the following packages:

1. Ten[illegible] ML powered applications the art in ML and developers can easily build and
2. Ker[illegible] API easier and more performant. It supports the following features: [illegible] neural network

- Consistent, simple, and extensible API.
- Minimal structure - easy to achieve the result without any frills.
- It supports multiple platforms and backends.
- It is a user-friendly framework that runs on both CPU and GPU.
- Highly scalability of computation.

If you are using **anaconda navigator**, follow the below steps to download the required packages:

- open anaconda prompt as administrator
- Type “pip install tensorflow” (make sure you are working on python 64 bit)
- Type “pip install flask”.
- Type "pip install keras

The above steps allow you to install Keras and TensorFlow in the anaconda environment.

4. EXPERIMENTAL INVESTIGATIONS

Coming to analysis or investigations on the following Concepts :

1. Supervised and unsupervised learning:
2. Regression Classification and Clustering :
3. Artificial Neural Networks:
4. Recurrent Neural Networks and Long Short – Term Memory:

1. Supervised and unsupervised learning:

➤ Supervised learning is the types of machine learning in which machines are trained using well "labelled" training data, and on basis of that data, machines predict the output. The labelled data means some input data is already tagged with the correct output.

➤ Unsupervised learning is a type of machine learning in which models are trained using unlabeled dataset and are allowed to act on that data without any supervision.

2. Regression Classification and Clustering :

➤ Regression analysis is a statistical method to model the relationship between a dependent (target) and independent (predictor) variables with one or more independent variables. More specifically, Regression analysis helps us to understand how the value of the dependent variable is changing corresponding to an independent variable when other independent variables are held fixed.

➤ Clustering or cluster analysis is a machine learning technique, which groups the un labelled dataset. It can be defined as "A way of grouping the data points into different clusters, consisting of similar data points. The objects with the possible similarities remain in a group that has less or no similarities with another group."

3. Artificial Neural Networks:

➤ The term "Artificial neural network" refers to a biologically inspired sub-field of artificial intelligence modeled after the brain. An Artificial neural network is usually a computational network based on biological neural networks that construct the structure of the human brain. Similar to a human brain has neurons interconnected to each other, artificial neural networks also have neurons that are linked to each other in various layers of the networks. These neurons are known as nodes.

4. Recurrent Neural Networks and Long Short – Term Memory

➤ A recurrent neural network (RNN) is a special type of artificial neural network adapted to work for time series data or data that involves sequences. Ordinary feedforward neural networks are only meant for data points that are independent of each other. However, if we have data in a sequence such that one data point depends upon the previous data point, we need to modify the neural network to incorporate the dependencies between these data points. RNNs have the concept of "memory" that helps them store the states or information of previous inputs to generate the next output of the sequence.

➤ LSTM is a variety of recurrent neural networks (RNNs) that are capable of learning long-term dependencies, especially in sequence prediction problems. LSTM has feedback connections, i.e., it is capable of processing the entire sequence of data.

6. FLOWCHART

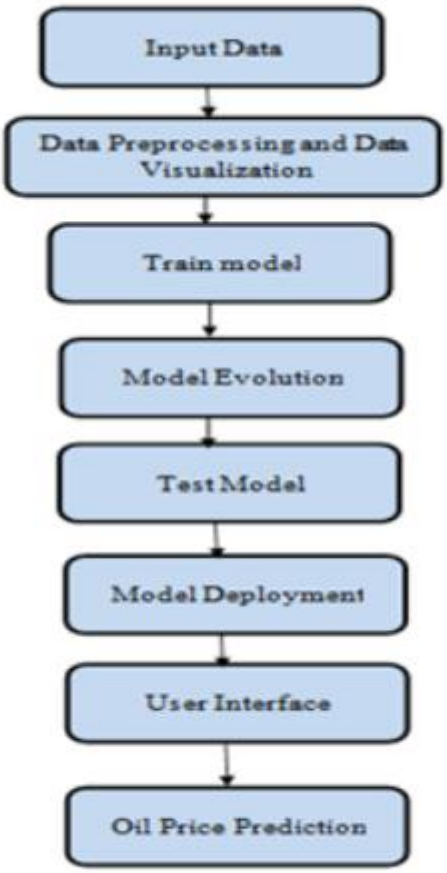
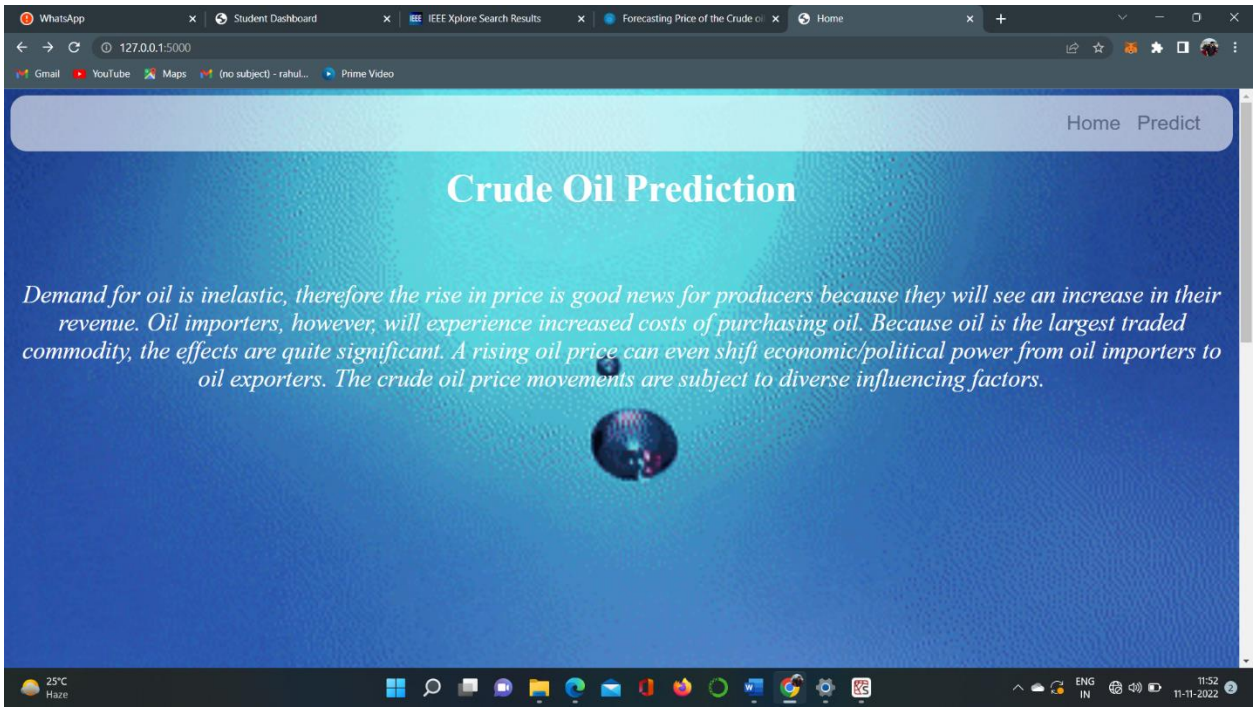
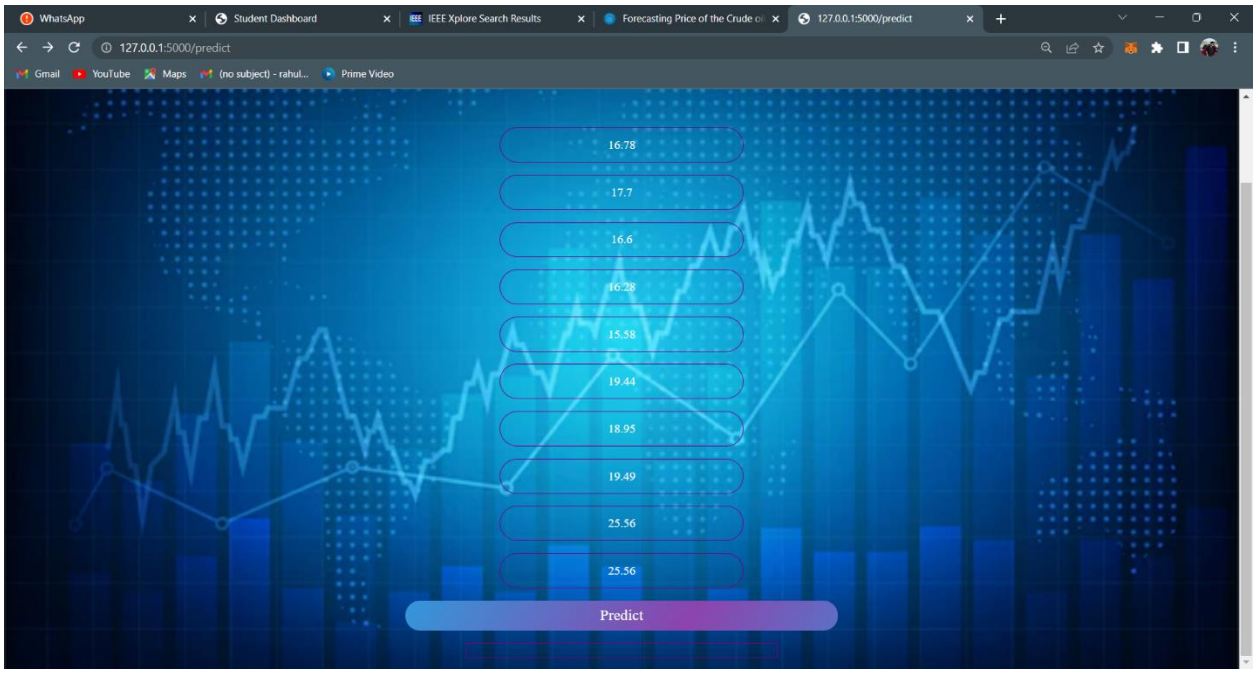


Fig. 3 Dataflow diagram of proposed system

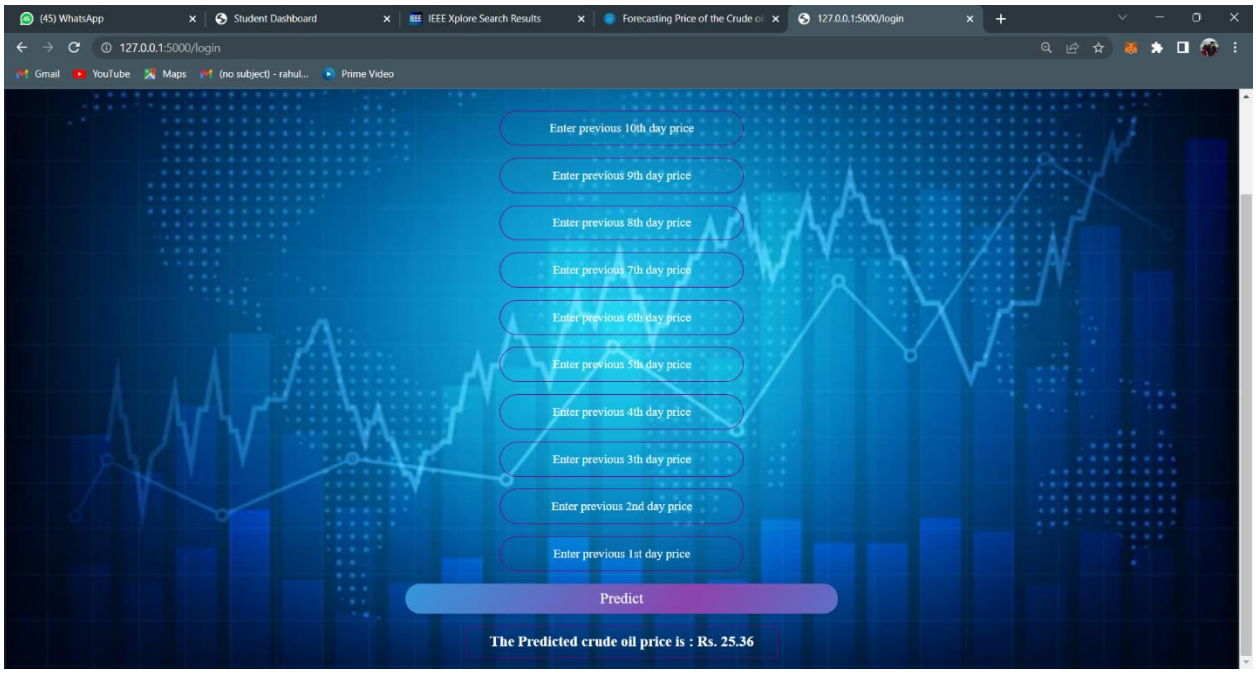
7. RESULT



Home Page Of Crude Oil Price Prediction



Predicting The Values of Crude Oil



Final Result Of the Project

9. CONCLUSION

Prediction of crude oil price is considered a challenging task due to the nature of the supply-demand curve, as well as various factors affecting the price volatility and demand in crude oil. Despite this condition, in the long run, the crude oil supply cost is the most significant factor in determining the crude oil price.

The RNN-LSTM model developed using Python and TensorFlow-Keras library has successfully predicted the crude oil price movement accordingly using machine learning to handle the data analytics task to analyze the upcoming price trends. LSTM focuses on storing the previous data and prediction which is rather encouraging and more approximate. The outcome derived are

relatively encouraging. The results show that large look ups do not necessarily improve the accuracy of the predictions of crude oil prices. Hence it can be concluded, the model with single LSTM model is definitely the most accurate.