CRUDE OIL PRICE PREDICTION

IBM NALAIYA THIRAN

PROJECT REPORT

SUBMITTED BY

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ABSTRACT

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 have significantly outperformed

1. INTRODUCTION

1.1 Project Overview

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 have significantly outperformed. We have used HTML, Javascript.CSS, Python, Flask.

1.2 Purpose

Crude oil is one of the most important commodities in the world, accounting for one-third of global energy consumption. It is a starting material for most of the products that we use in everyday life, ranging from transportation fuels to plastics. Crude oil price fluctuations have a far reaching impact on global economies and thus price forecasting can assist in minimizing the risks associated with volatility in oil prices. Price forecasts are very important to various stakeholders: governments, public and private enterprises, policymakers, and investors. According to economic theory, the price of crude oil should be easily predictable from the equilibrium between demand and supply, wherein demand forecasts are usually made from GDP, exchange rates and domestic prices, and supply is predicted from past production data and reserve data. Predicting demand for oil is usually straightforward, however supply is heavily affected by political activity such as cartelization by OPEC to regulate prices, technological advances leading to the extraction of higher amounts of oil, and wars and other conflicts which can affect supply unpredictably.

2.LITERATURE SURVEY

2.1. EXISTING PROBLEM

I. CRUDE OIL PRICE PREDICTION USING ARTIFICIAL NEURAL NETWORK.

" Nalini Gupta, Shobhit Nigam* School of Liberal Studies, Pandit Deendayal Petroleum University, Gandhinagar, India"

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 have significantly outperformed.

II. CRUDE OIL PRICE PREDICTION USING ARTIFICIAL NEURAL NETWORK QUANTATIVE (ANN-Q) MODEL

"S. N. Abdullah, X. Zeng, School of Computer Science, The University of Manchester, Oxford Road, Manchester, M13 9PL United Kingdom"

The volatility of crude oil market and its chain effects to the world economy augmented the interest and fear of individuals, public and private sectors. Previous statistical and econometric techniques used for prediction, offer good results when dealing with linear data. Nevertheless, crude oil price series deal with high nonlinearity and irregular events. The continuous usage of statistical and econometric techniques for crude oil price prediction might demonstrate demotions to the prediction performance. Machine Learning and

Computational Intelligence approach through combination of historical quantitative data with qualitative data from experts' view and news is a remedy proposed to predict this. This paper will discuss the first part of the research, focusing on to (i) the development of Hierarchical Conceptual (HC) model and (ii) the development of Artificial Neural Networks-Quantitative (ANN-Q) model

III. ARTIFICIAL INTELLIGENCE OF OIL PRICE FORECASTING

"Neha Sehgal1 · Krishan K. Pandeyk Received: 19 September 2014 / Accepted: 8 May 2015 © Springer-Verlag Berlin Heidelberg 2015 "

Artificial intelligent methods are being extensively used for oil price forecasting as an alternate approach to conventional techniques. There has been a whole spectrum of artificial intelligent techniques to overcome the difficulties of complexity and irregularity in oil price series. The potential of AI as a design tool for oil price forecasting has been reviewed in this study. The following price forecasting techniques have been covered: (i) artificial neural network, (ii) support vector machine, (iii) wavelet, (iv) genetic algorithm, and (v) hybrid systems. In order to investigate the state of artificial intelligent models for oil price forecasting, thirtyfive research papers (published during 2001 to 2013) had been reviewed in form of table (for ease of comparison) based on the following parameters: (a) input variables, (b) input variables selection method, (c) data characteristics (d) forecasting accuracy and (e) model architecture. This review reveals procedure of AI methods used in complex oil price related studies. The review further extended above overview into discussions regarding specific shortcomings that are associated with feature selection for designing input vector, and then concluded with future insight on improving the current state-of-the-art technology

IV. Intelligent Prediction of Crude Oil Price Using Support Vector Machines

"Adnan Khashman (Senior Member, SMIEEE) The Intelligent Systems Research Group (ISRG) Near East University Lefkosa, Mersin 10, Turkey E-mail: khashman@ieee.org Nnamdi I. Nwulu (Student Member ,MIEEE) Dept. of Electrical & Electronic Engineering Near East University Lefkosa, Mersin 10, Turkey E-mail: ninwulu@ieee.org"

The price of crude oil is tied to major economic activities in all nations of the world, as a change in the price of crude oil invariably affects the cost of other goods and services. This has made the prediction of crude oil price a top priority for researchers and scientists alike. In this paper we present an intelligent system that predicts the price of crude oil. This system is based on Support Vector Machines. Support Vector Machines are supervised learners founded upon the principle of statistical learning theory. Our system utilized as its input key economic indicators which affect the price of crude oil and has as its output the price of crude oil. Data for our system was obtained from the West Texas Intermediate (WTI) dataset spanning 24 years and experimental results obtained were very promising as it proved that support vector machines could be used with a high degree of accuracy in predicting crude oil price

2.2 REFERENCE

1. CRUDE OIL PRICE PREDICTION USING ARTIFICIAL NEURAL NETWORK
   http://creativecommons.org/licenses/by-nc-nd/4.0

2. CRUDE OIL PRICE PREDICTION USING ARTIFICIAL NEURAL NETWORK QUANTATIVE (ANN-Q) MODEL
   https://doi.org/10.1109/IJCNN.2010.5596602

3. ARTIFICIAL INTELLIGENCE OF OIL PRICE FORECASTING
   https://www.researchgate.net/publication/277921251

4. OIL PRICE PREDICTION USING EML
   https://ieeexplore.ieee.org/document/5738868

2.3. PROBLEM STATEMENT DEFINITION

1. Crude oil price fluctuations have a far-reaching impact on global economies and thus price forecasting can assist in minimizing the risks associated with volatility in oil prices. Price forecasts are very important to various stakeholders: governments, public and private enterprises, policymakers, and investors.

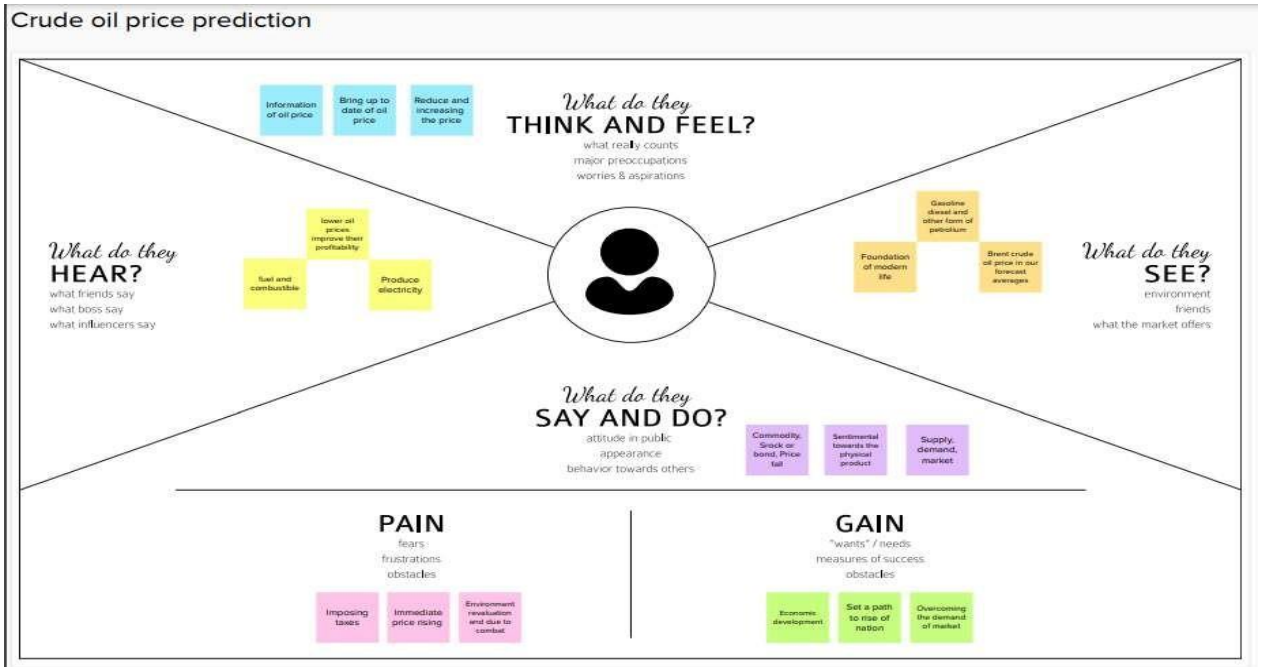
2. Unlike most products, oil prices are not determined entirely by supply, demand, and market sentiment toward the physical product oil futures contracts, which are traded heavily by speculators, play a dominant role in price determination.

3. Natural gas and electricity prices have soared to new records, incentivizing gas-to-oil switching in some countries. Crude oil is one of the most upstream for world nations.

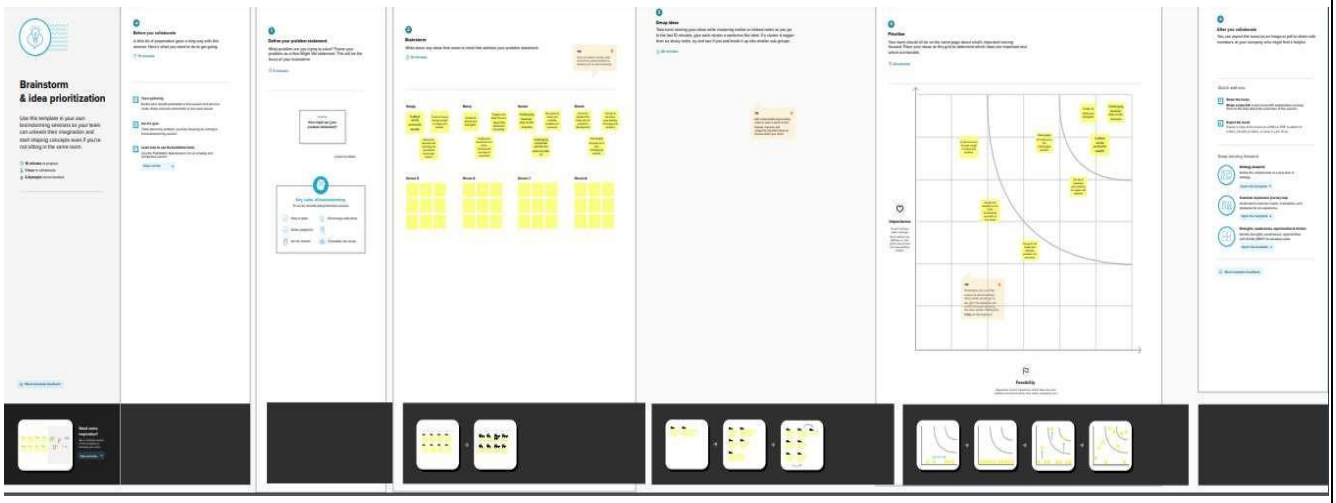
3. IDEATION AND PROPOSED SOLUTION

3.1.

3.2. Empathy Map Canvas



3.3. Ideation and Brainstorming



3.3 Proposed Solution

Project Design Phase-I Proposed Solution Template

Date	03 November 2022
Team ID	PNT2022TMID31004
Project Name	Project - Crude Oil Price Prediction
Maximum Marks	2 Marks

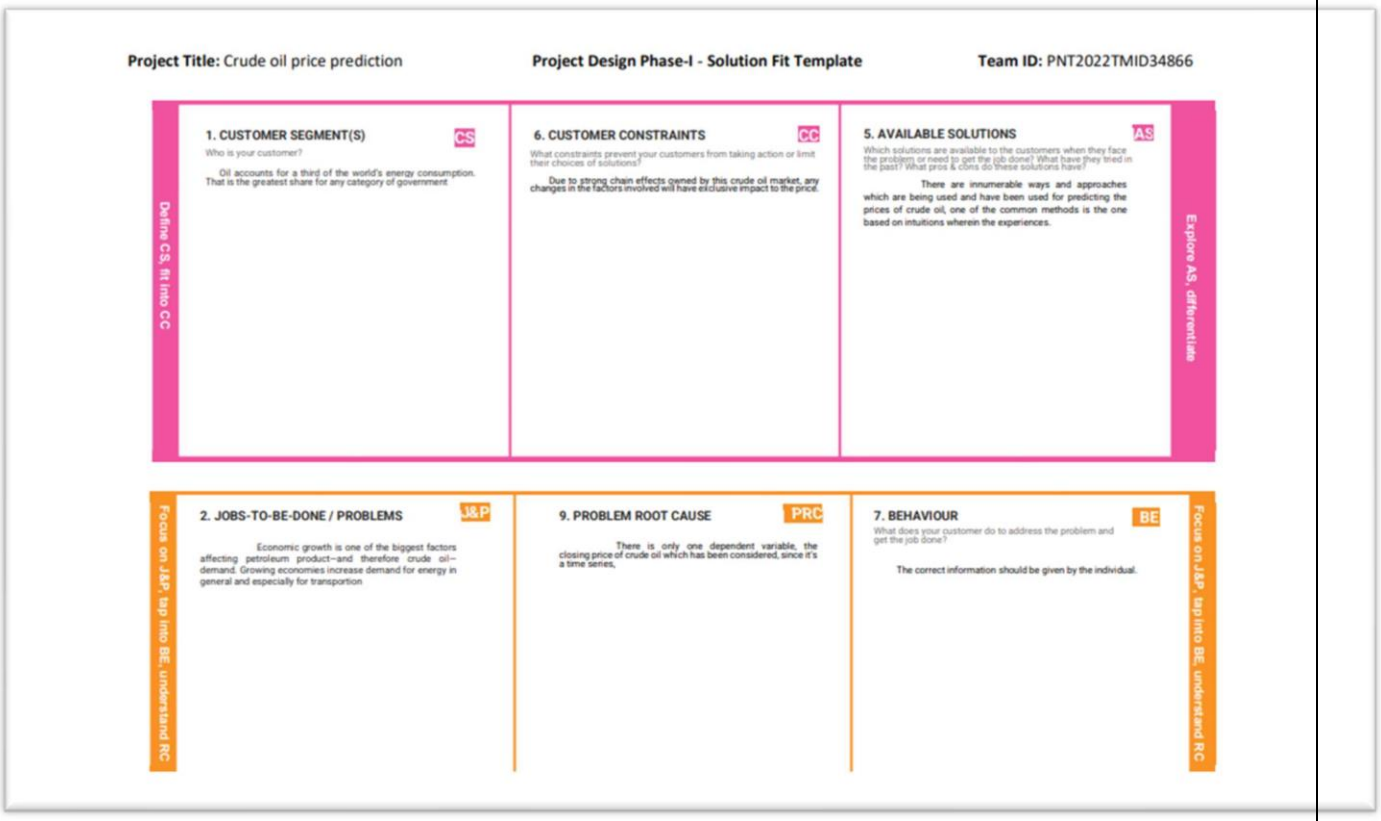
Proposed Solution Template:

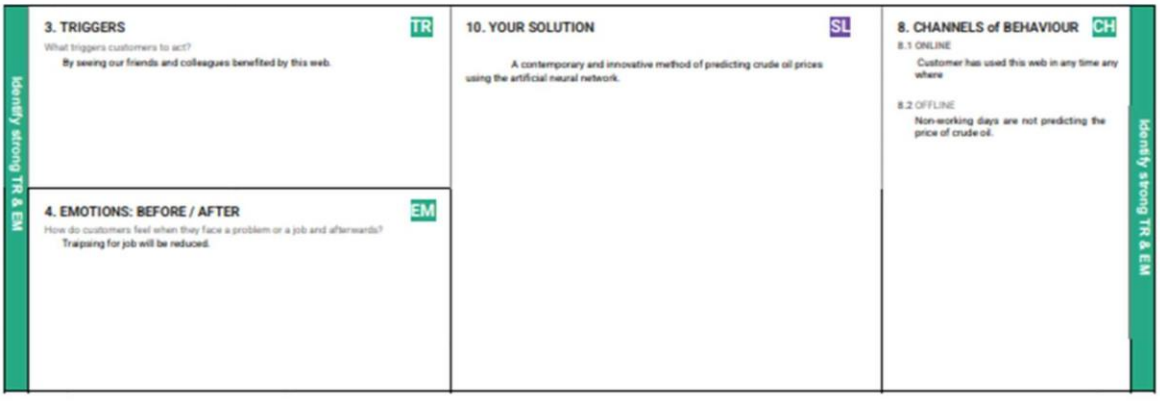
S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Crude oil is the world's leading fuel, and its prices have a big impact on the global environment its forecasts are very useful to governments, the industry is individuals. The continuous usage of statistical and econometric techniques including AI for crude oil price prediction might demonstrate demotions to the prediction performance.

2.	Idea / Solution description	In order to predict future crude oil using historical data on crude oil, RNN is utilised with long short-term memory. The effectiveness of the cost is calculated using the mean squared error. Using the pricing information in the WTO crude oil materials, the proposed model's performance is assessed.

3.	Novelty / Uniqueness	• Crude oil price variations have a significant impact on the world's economies, thus price forecasting can help reduce the risks brought on by this volatility. • For a variety of stakeholders, including governments, public and private businesses, legislators, and investors, price projections are crucial.
4.	Social Impact / Customer Satisfaction	• It is used to predict the future price and use the oil according to the prices. • This price directly influences a variety of items, and its variations have an impact on the capital markets. • In addition to being influenced by economic factors, major events can have an impact on oil prices.
5.	Business Model (Revenue Model)	• It can help decision makers – either firms, private investors, or individuals – when choosing to buy or sell the crude oil • crude oil is one of the most profitable trading commodities for traders. • RNN and LSTM models are used as the benchmark model to predict crude oil prices.
6.	Scalability of the Solution	• PCA, MDS, and LLE methods are used to reduce the dimensions of the data • Improve the accuracy of the RNN and LSTM models.

3.3 **Problem Solution Fit**





4.REQUIREMENT ANALYSIS

4.1Functional requirement

Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	07 November 2022
Team ID	PNT2022TMID31004
Project Name	Project - Crude Oil Price Prediction
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form.
FR-2	User Confirmation	Confirmation via SMS.
FR-3	Fetching input data	Give the model the input data.
FR-4	Generating Results	Prediction of Oil Prices.

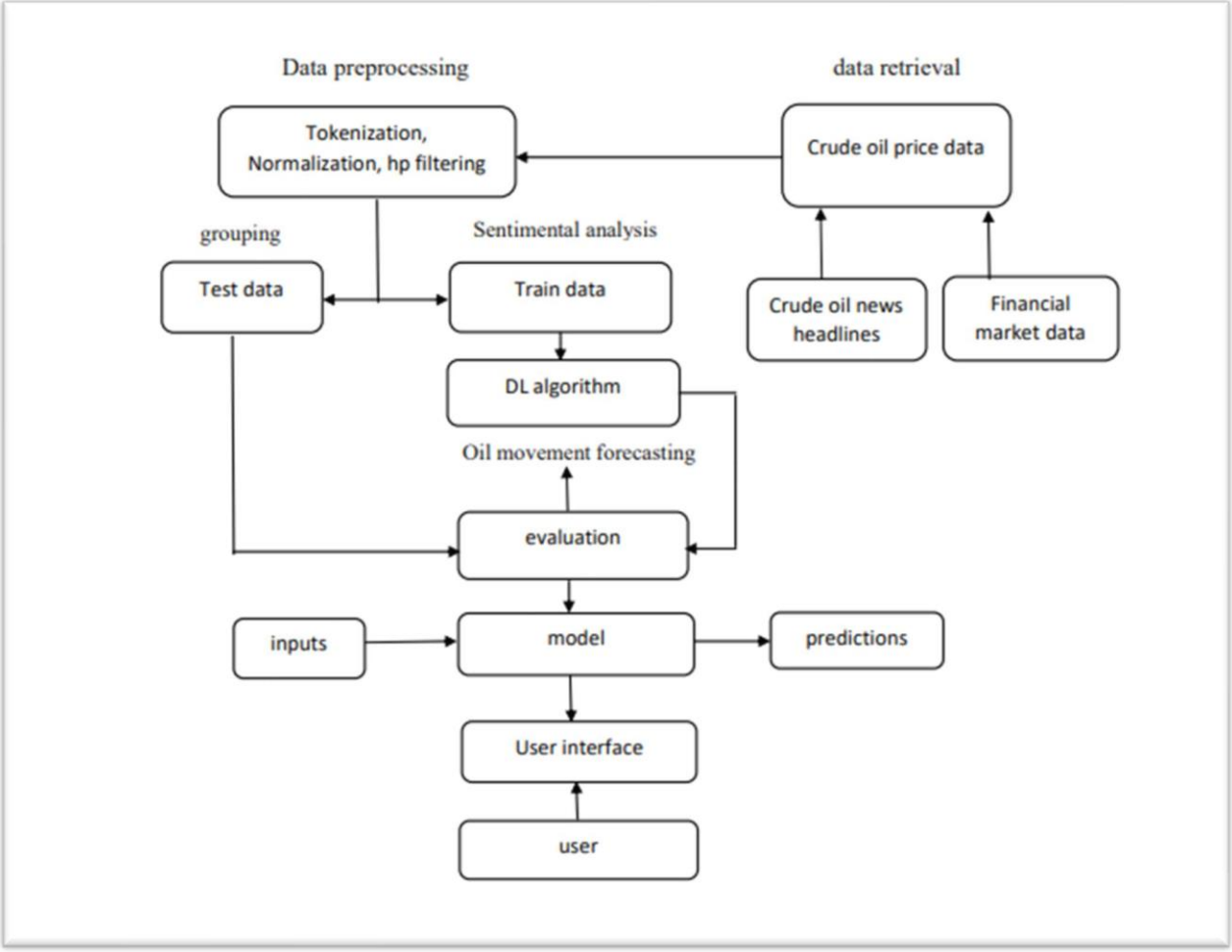
Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

NFR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	user interfaces are easy to use.
NFR-2	**Security**	Sensitive data is protected.
NFR-3	**Reliability**	Because there is very little variance from the prediction, the testing is highly dependable.
NFR-4	**Performance**	Using LSTM networks gives highly performance.
NFR-5	**Availability**	The system tested with 4 datasets and the system operating properly.
NFR-6	**Scalability**	LSTM network model works efficiently for large number of users.

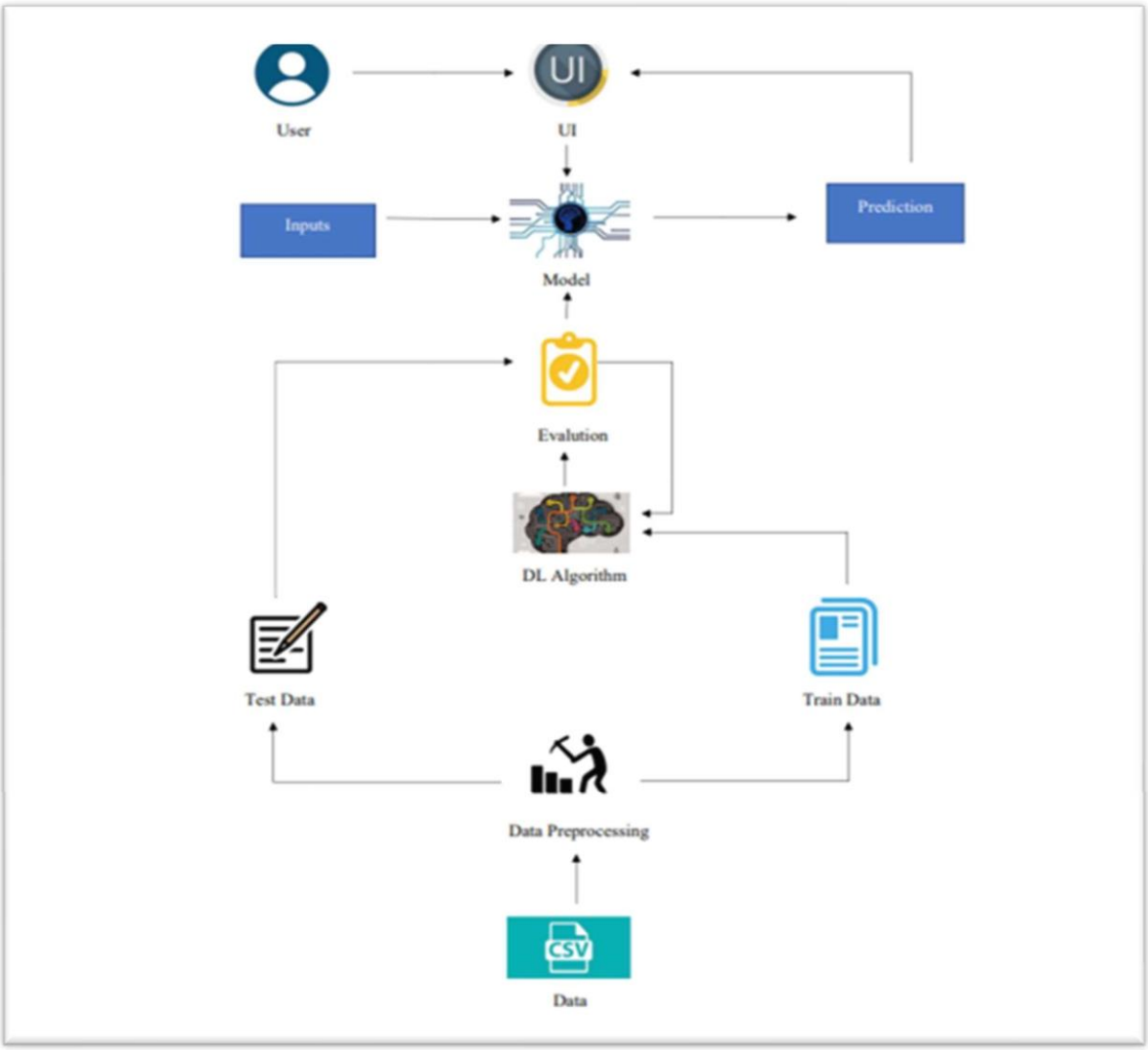
5. PROJECT DESIGN

5.1 Data Flow Diagram



5.1 Solution & Technical Architecture

The Deliverable shall include the architectural diagram as below.

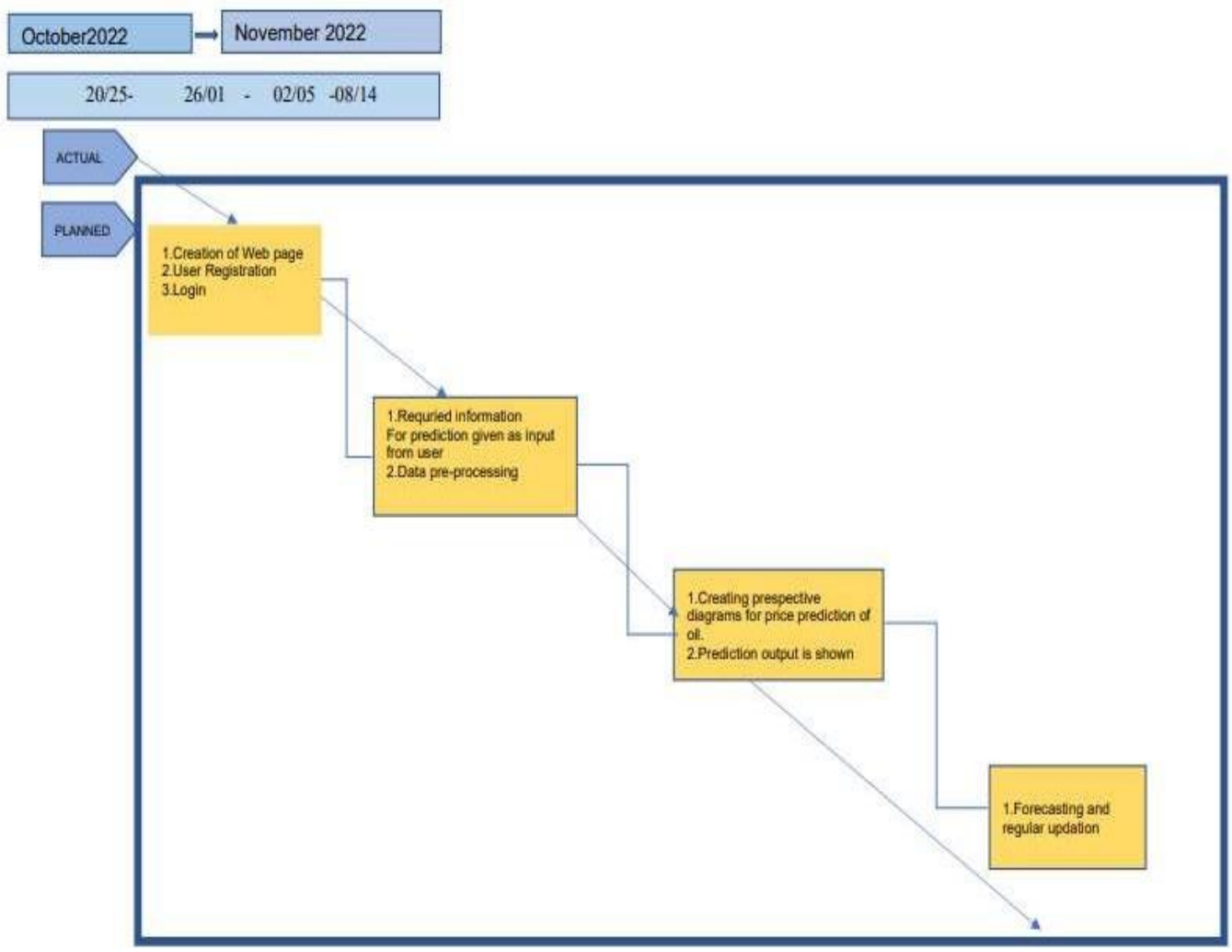


5.2 User Stories

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation



Product Backlog ,Sprint Schedule and Estimation

Use the below template to create product back log and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story/Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	Download Crude Oil Price Dataset	2	Medium	Pavya S
Sprint-1	Data Preprocessing	USN-2	Importing The Dataset into Workspace	1	Low	Sathya s
Sprint-1		USN-3	Handling Missing Data	3	Medium	Sugiya.s
Sprint-1		USN-4	Feature Scaling	3	Low	Neha kumari
Sprint-1		USN-5	Data Visualization	3	Medium	Sathya.S
Sprint-1		USN-6	Splitting Data into Train and Test	4	High	Sathya.S
Sprint-1		USN-7	Creating A Dataset with Sliding Windows	4	High	Sathya.S
Sprint-2	Model Building	USN-8	Importing The Model Building Libraries	1	Medium	Sathya.S
Sprint-2		USN-9	Initializing The Model	1	Medium	Sathya.S
Sprint-2		USN-10	Adding LSTM Layers	2	High	Sugiya.S
Sprint-2		USN-11	Adding Output Layers	3	Medium	Sugiya.S
Sprint-2		USN-12	Configure The Learning Process	4	High	Sugiya.S

Sprint	Functional Requirement (Epic)	User Story Number	User Story/Task	Story Points	Priority	Team Members
Sprint-2		USN-13	Train The Model	2	Medium	Sugiya. S
Sprint-2		USN-14	Model Evaluation	1	Medium	Sathya S
Sprint-2		USN-15	Save The Model	2	Medium	Neha Kumari
Sprint-2		USN-16	Test The Model	3	High	Neha Kumari
Sprint-3	Application Building	USN-17	Create An HTML File	4	Medium	Neha Kumari
Sprint-3		USN-18	Build Python Code	4	High	Neha Kumari
Sprint-3		USN-19	Run The App in Local Browser	4	Medium	Sugiya.S
Sprint-3		USN-20	Showcasing Prediction On UI	4	High	Pavya.S
Sprint-4	Train The Model On IBM	USN-21	Register For IBM Cloud	4	Medium	Sathya.S
Sprint-4		USN-22	Train The ML Model On IBM	8	High	Pavya S
Sprint-4		USN-23	Integrate Flask with Scoring End Point	8	High	Pavya S

6.2 Sprint Delivery Schedule

Project Tracker, Velocity &Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (ason Planned End Date)	
Sprint-1	20	6Days	24Oct2022	29Oct2022	20	
Sprint-2	20	6Days	31Oct2022	05Nov2022	20	
Sprint-3	20	6Days	07Nov2022	12Nov2022	20	
Sprint-4	20	6Days	14Nov2022	19Nov2022	20	

7. CODING & SOLUTIONING

7.1 Feature 1

7.1.1 HTML CODE FOR INDEX PAGE

```
<!doctype html>

<html lang="en">

<head>

<title> Crude Oil Price Prediction</title>

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">

<link
href="https://fonts.googleapis.com/css?family=Lato:300,400,700&display=swap"
rel="stylesheet">

<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/font-
awesome/4.7.0/css/font-awesome.min.css">

<link rel="stylesheet" href="static/css/style.css">

<style

>body

{

background-image:

url("static/images/crudeoilbg.jpg");

background-repeat: no-repeat;
```

```
background-position: 0% 0%;

background-size: 100% 100%;

}

</style>

</head>

<body class="img js-fullheight" >

<section class="ftco-section">

<div class="container">

<div class="row justify-content-center">

<div class="col-md-6 text-center mb-5">

<h2 class="heading-section">Crude Oil Prediction</h2>

</div>

</div>

<div class="row justify-content-center">

<p>
```

Demand for oil is inelastic, therefore the rise in price is good news for producers because theywill 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 guided significant. A rising oil pricecan even shift

economic political power from oil importers to oil exporters. The crude oil price movements aresubject to diverse

influencing factors

</p>

</br></br>

Predict Crude OilPrice

</br></br>

</section>

/’
</body>

</html>

7.1.1 HTML CODE FOR PREDICTION

```
<!doctype html>

<html lang="en">

<head>

<title> Crude Oil Price Prediction</title>

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
<link
href="https://fonts.googleapis.com/css?family=Lato:300,400,700&display=swap"
rel="stylesheet">

<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/font-
awesome/4.7.0/css/font-awesome.min.css">
<link rel="stylesheet" href="static/css/style.css">

<style

>body

{

 background-image:

 url("static/images/oil.jpg");background-

 repeat: no-repeat;

 background-position: 0% 0%;

 background-size: 100% 100%;

}
```

```
</style>

</head>

<body class="img js-fullheight" >

<section class="ftco-section">

<div class="container">

<div class="row justify-content-center">

<div class="col-md-6 text-center mb-5">

<h2 class="heading-section">Crude Oil Prediction</h2>

</div>
</div>

<div class="row justify-content-center">

<div class="col-md-6 col-lg-4">

<div class="login-wrap p-0">

<h3 class="mb-4 text-center">Enter the crude oil price for first 10 days</h3>
<form method="post"  action="predicted" class="signin-form">

<div class="form-group">


<input type="text" class="form-control" id="year" name="year" required>

</div>
```

```
<div class="form-group">
<button type="submit" class="form-control btn btn-primary submit px-3">Submit</button>
</div>
</form>
</br></br>
<div class="social d-flex text-center">
<p class="w-100 text-center">{{showcase}} </p>
</div>
</div>
</div>
</div>
</section>
</body>
</html>
```

7.2 Feature2

7.2.1 FLASK CODE

```
import numpy as np
from flask import Flask,render_template,request
```

```
from tensorflow.python.keras.models import
load_model# This is a sample Python script.


# Press Shift+F10 to execute it or replace it with your code.
# Press Double Shift to search everywhere for classes, files, tool windows,
actions, and settings.app = Flask(_name_,template_folder='templates',
static_url_path='/static')
model =
load_model('predict.h5',)
@app.route('/')
def home():
return
render_template("index.html")
@app.route('/predict')
def home2():
return
render_template("prediction.html")
@app.route('/predicted',methods
=['POST'])def login():
```

```
x_input=str(request.form['year'])

x_input=x_input.split(',')

print(x_input);
for i in range (0, len(x_input)):

x_input[i] = float(x_input[i])

print(x_input)

x_input=np.array(x_input).reshape

(1,-1)temp_input=list(x_input)

temp_input=temp_input[0].tolist()

lst_output=[]

n_steps=

10i=0

while(i<1

):

if(len(temp_input)>10):

x_input=np.array(temp_input[1:])

print("{} day input

{}".format(i,x_input))

x_input=x_input.reshape(1,-1)

x_input=x_input.reshape((1,n_step
```

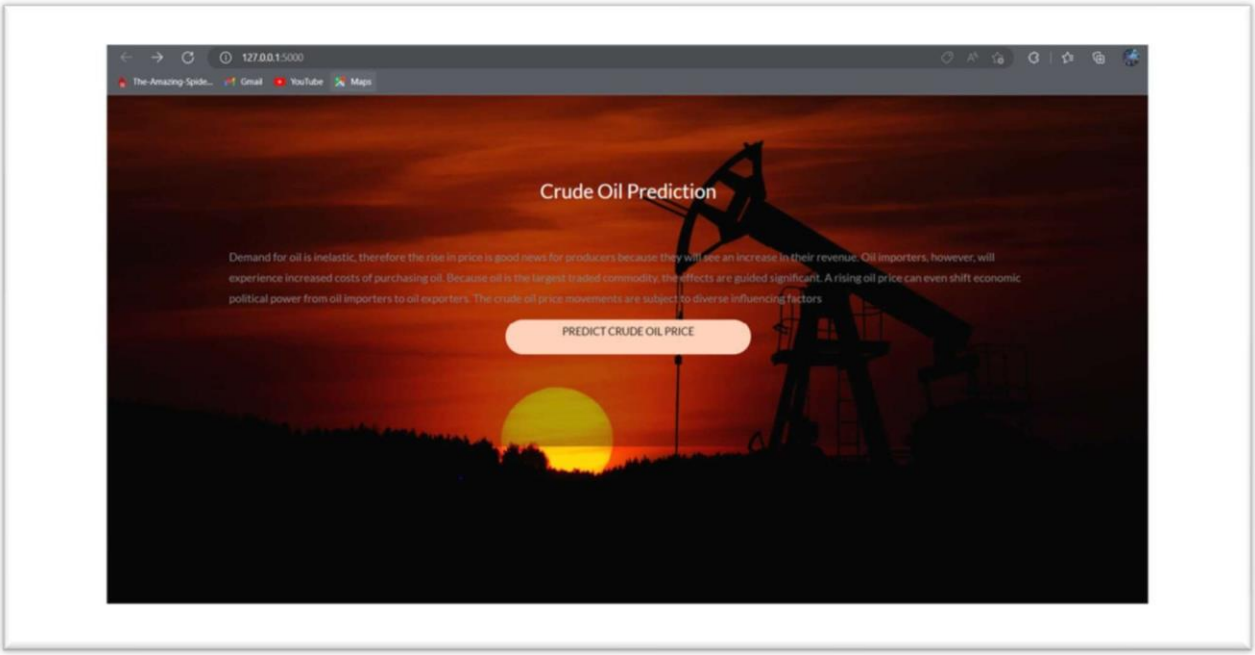
```
    s,1)) yhat = model.predict(x_input,
    verbose=0)
    temp_input.extend(yhat[0].tolist())
    temp_input=temp_input[1:]
    lst_output.extend(yhat.tolist())
    i=i+
    1
    else:
    x_input = x_input.reshape((1,n_steps,1))
yhat = model.predict(x_input,
verbose=0)print(yhat[0])
temp_input.extend(yhat[0].tolist())
print(len(temp_input))
lst_output.extend(yhat.tolist())
    i=i+1
    print(lst_outp
    ut)
    return render_template("prediction.html",showcase = "the next day predicted value is
    :"+str(lst_output))
    # Press the green button in the gutter to run
```

```
the script.if__name___== '_main_':

app.run(debug =

True,port=5000)

lst_output.extend(yhat.tolist(

)) i=i+1

else:

x_input =

x_input.reshape((1,n_steps,1)) yhat

= model.predict(x_input,

verbose=0)print(lst_output)

return render_template("prediction.html",showcase = "the next day predicted value is
:"+str(lst_output))

# Press the green button in the gutter to run

the script.if__name___== '_main_':

app.run(debug = True,port=5000;
```

8. TESTING

8.1 Testcase

Testing is the main purpose to detecting and training the code to execute the given output to certain source to analysis the crude oil price prediction to demanding the purpose of the oil calculation to adapt the situation of the trading ,demands and market prices



8.2 User Acceptance

9. RESULT

9.1 **Performance metrics**

We used two standard performance metrics in the oil price prediction literature for comparing different oil price prediction models. The first metric is Mean to oil price Prediction Error (ANN). ANN of a prediction model measures the average of the squares of the prediction errors. The prediction error is the difference between the true value and the predicted value. Let y1, y2, ..., y n be the true oil prices and 1 y , 2 y , ..., n y be the predicted oil prices under an oil price prediction model, then the ANN of that model is:

$$AV = \frac{\text{SPRINT DURATION}}{\text{VELOCITF}} = \frac{20}{10} = 2$$

10.ADVANTAGE & DISADVANTAGE

10.1 ADVANTAGE

- The crude oil price is an important indicator of the economy Oil is the most used resource in the world.
- This bullish forecast is driven by the belief that OPEC has a limited capacity to increase oil production.
- Full form of OPEC is organization of the petroleum exporting countries Oil has one of the highest energy Density which means that a small amount of oil can produce a large amount of energy.
- The crude oil makes very useful as its high energy density has made is that preferred choice of use as fuel in automobile

10.2 Disadvantage

- Crude oil prices had been suffering amid news that covid-19.
- Inflection rates were rising in China
- Burning oil produces carbon dioxide gas Lower oil prices means less drilling and exploration activity
- Because most of the news oil driving the economic activity is unconventional and has a higher cost per barrel than a conventional source of oil
- An increase in the price of crude oil means that would increase the cost of production goods. the price rise would finally be passed on to consumers resulting in inflation

11 CONCLUSION

Artificial Neural Network is one of the most important ways to predict a lot of reservoir parameters or functions, as well as search for new sites of infill wells, which is an important use of this technique in conjunction with simulators because of their relationship with development operations and production of oil and gas fields. Both Artificial Neural Network and Data Mask technique gave a good and easy way for the preparation and data management in every phase of prediction and optimization technique. The constructed Artificial Neural Network model (FFNN), had good training and validating Results according to the data sets used in both of training and validation steps, and obtained good behavior after many trials and reflecting high confidence to the prediction or simulation stage. Clear and quite improvement appeared with additional cumulative oil production for the production field sector under the current study, especially with the wells M, O and P, among those elected locations of infill wells. This became a good decision maker to which of the well can we implement for the future production plan and development field strategy view point. ANN used and proved to be an effective tool within prediction and optimization process, especially when dealing with developmental ideas of the oil and gas production, from the standpoint of oil reservoir management and field directorate for future strategic planning

12. FUTURE SCOPE

This work indicates that the ANN model is an effective tool for crude oil price prediction and can be efficiently used for short term price forecasting by determining the optimal lags. The proposed model is powerful and highly suggested because investors can use it not only to initiate trades but also as an effective tool to judge various strategies relating. to investments. This work is carried out on the closing price of crude oil; however, there are various other factors which also affect the crude oil prices like change in the prices and quantities (demand and supply), change in the economy and current affairs as shown by the media. The main advantage of this research is in capturing the changing pattern of these prices. In the coming future, fundamental indicators and market trends have been planned to be incorporated into a model which will help the proposed model perform more efficiently.

13 APPENDIX

13.1 Source Code

PAGE HTML CODE FOR INDEX

```
<!doctype html>

<html lang="en">

<head>

<title> Crude Oil Price Prediction</title>

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">

<link
href="https://fonts.googleapis.com/css?family=Lato:300,400,700&display=swap"
rel="stylesheet">
```

```
<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/font-awesome/4.7.0/css/font-awesome.min.css">

<link rel="stylesheet" href="static/css/style.css">

<style>
```

```
body {
background-image:
url("static/images/crudeoilbg.jpg");
background-repeat: no-repeat;
background-position: 0% 0%;
background-size: 100% 100%;
}
</style>
</head>

<body class="img js-fullheight" >
<section class="ftco-section">
<div class="container">
<div class="row justify-content-center">
<div class="col-md-6 text-center mb-5">
<h2 class="heading-section">Crude Oil Prediction</h2>
</div>
</div>
<div class="row justify-content-center">
```

<p>

Demand for oil is inelastic, therefore the rise in price is good news for producers because theywill 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 guided significant. A rising oil pricecan even shift

economic political power from oil importers to oil exporters. The crude oil price movements aresubject to diverse

influencing factors

</p>

</br></br>

Predict Crude OilPrice

</br></br>

</section>

```
</body>

</html>
```

HTML CODE FOR PREDICTION

```
<!doctype html>
```

```
<html lang="en">

<head>

<title> Crude Oil Price Prediction</title>

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">

<link
href="https://fonts.googleapis.com/css?family=Lato:300,400,700&display=swap"
rel="stylesheet">

<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/font-
awesome/4.7.0/css/font-awesome.min.css">

<link rel="stylesheet" href="static/css/style.css">

<style

>body

{

 background-image:

 url("static/images/oil.jpg");background-

 repeat: no-repeat;

 background-position: 0% 0%;

 background-size: 100% 100%;

}
```

```
</style>

</head>

<body class="img js-fullheight" >

<section class="ftco-section">

<div class="container">

<div class="row justify-content-center">
```

```
<div class="col-md-6 text-center mb-5">
<h2 class="heading-section">Crude Oil Prediction</h2>
</div>
</div>
<div class="row justify-content-center">
<div class="col-md-6 col-lg-4">
<div class="login-wrap p-0">
<h3 class="mb-4 text-center">Enter the crude oil price for first 10 days</h3>
<form method="post"  action="predicted" class="signin-form">
<div class="form-group">

<input type="text" class="form-control" id="year" name="year" required>
</div>

<div class="form-group">
<button type="submit" class="form-control btn btn-primary submit px-3">Submit</button>
</div>
</form>
</br></br>
```

```
<div class="social d-flex text-center">

<p class="w-100 text-center">{{showcase}} </p>

</div>
```

```
</div>
</div>
</div>
</div>
</section>
</body>
</html>
```

Feature2

FLASK CODE

```
import numpy as np
from flask import Flask,render_template,request
from tensorflow.python.keras.models import
load_model# This is a sample Python script.


# Press Shift+F10 to execute it or replace it with your code.
# Press Double Shift to search everywhere for classes, files, tool windows,
actions, and settings.app = Flask(_name_,template_folder='templates',
static_url_path='/static')
model =
```

```
load_model('predict.h5',)

@app.route('/')

def home():

return

render_template("index.html")

@app.route('/predict')
```

```
def home2():
return
render_template("prediction.html")
@app.route('/predicted',methods
=['POST'])def login():
x_input=str(request.form['year'])
x_input=x_input.split(',')
print(x_input)
for i in range (0, len(x_input)):
x_input[i] = float(x_input[i])
print(x_input)
x_input=np.array(x_input).reshape
(1,-1)temp_input=list(x_input)
temp_input=temp_input[0].tolist()
lst_output=[]
n_steps=
10i=0
while(i<1
):
```

```
if(len(temp_input)>10):
x_input=np.array(temp_input[1:])
print("{} day input
{}".format(i,x_input))
x_input=x_input.reshape(1,-1)
x_input=x_input.reshape((1,n_step
s,1))
```

```
yhat = model.predict(x_input,
verbose=0)
temp_input.extend(yhat[0].tolist())
temp_input=temp_input[1:]
lst_output.extend(yhat.tolist())
i=i+
1
else:
x_input =
x_input.reshape((1,n_steps,1)) yhat
= model.predict(x_input,
verbose=0)print(yhat[0])
temp_input.extend(yhat[0].tolist())
print(len(temp_input))
lst_output.extend(yhat.tolist())
i=i+1
print(lst_outp
ut)
return render_template("prediction.html",showcase = "the next day predicted value is
```

:"+str(lst_output))

Press the green button in the gutter to run

the script.if__name___== '_main_':

app.run(debug = True,port=5000);

13.2 GitHub & Project Demo Link

GitHub Link

IBM-EPBL/IBM-Project-47833-1660802249

Project Demo Link
https://drive.google.com/file/d/1EZ1Qm0BCcWhpFNdbilz2UCfKJpUqfP8D/view?usp=
sharelink