PROJECT REPORT

CRUDE OIL PRICE PREDICTION

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INTRDUCTION

1.1PROJECT OVERVIEW

Crude oil has an essential role in the world, as this is one of the major products worldwide and thus includes global measurements. The origin of crude oil prediction involves composite supply-demand structures. Volatility of crude oil has a critical effect that affecting economic factors which includes economic increase of the country, unemployment, exchange rate that mostly depends on crude oil export and import. Nowadays machine learning techniques can be implemented in various applications for better conclusion. Machine learning gives powerful computational tools and algorithms that are capable of learning itself, avoid dependencies problem and predict data with long short-term memory. This paper contains LSTM , for the matter of crude oil price prediction. LSTM variants can be used for other task as well other than prediction such as speech, handwriting and polyphonic modelling.

LSTM has proven to be efficient time series model especially ideal for retaining long term memory which can be said that the analysis of nth sample in a sequence of test samples can be influenced by an input which was feed many time steps before, preserving the long term dependencies in the network . In this paper, we have used LSTM based recurrent neural networks for the purpose of crude oil price prediction. Recurrent neural networks (RNN) have been proved to be one of the most powerful models for processing time-series based sequential data.

1.2 PURPOSE

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.

Our 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.

LITERATURE SURVEY

2.1 EXISTING SYSTEM

Before the forecast process starts, some basic assumptions need to be reviewed. Firstly, the crude oil price is heavily influenced by OPEC. According to Forchheimer's dominant-firm model, because of OPEC's production advantage, OPEC has the power to decide the crude oil price; non-OPEC can only follow the price set by OPEC. Secondly, the indicators of crude oil price should be considered.

OPEC should play the role of price leader. As discussed in previous sections, current demand on OPEC's production, last period's demand on OPEC's production, and last period's crude oil price should be the only indicators of crude oil price. Also, markets can respond fully and immediately. Because the forecast model is a dynamic system simulation model, it must be assumed that once a price is given, the market demand and supply can be determined immediately. Before the market achieves equilibrium, excess demand caused by price that is too low or excess supply caused by price that is too high will keep supplier and consumer adjusting their production and consumption behaviours until the market achieves equilibrium.

2.2 REFERENCES

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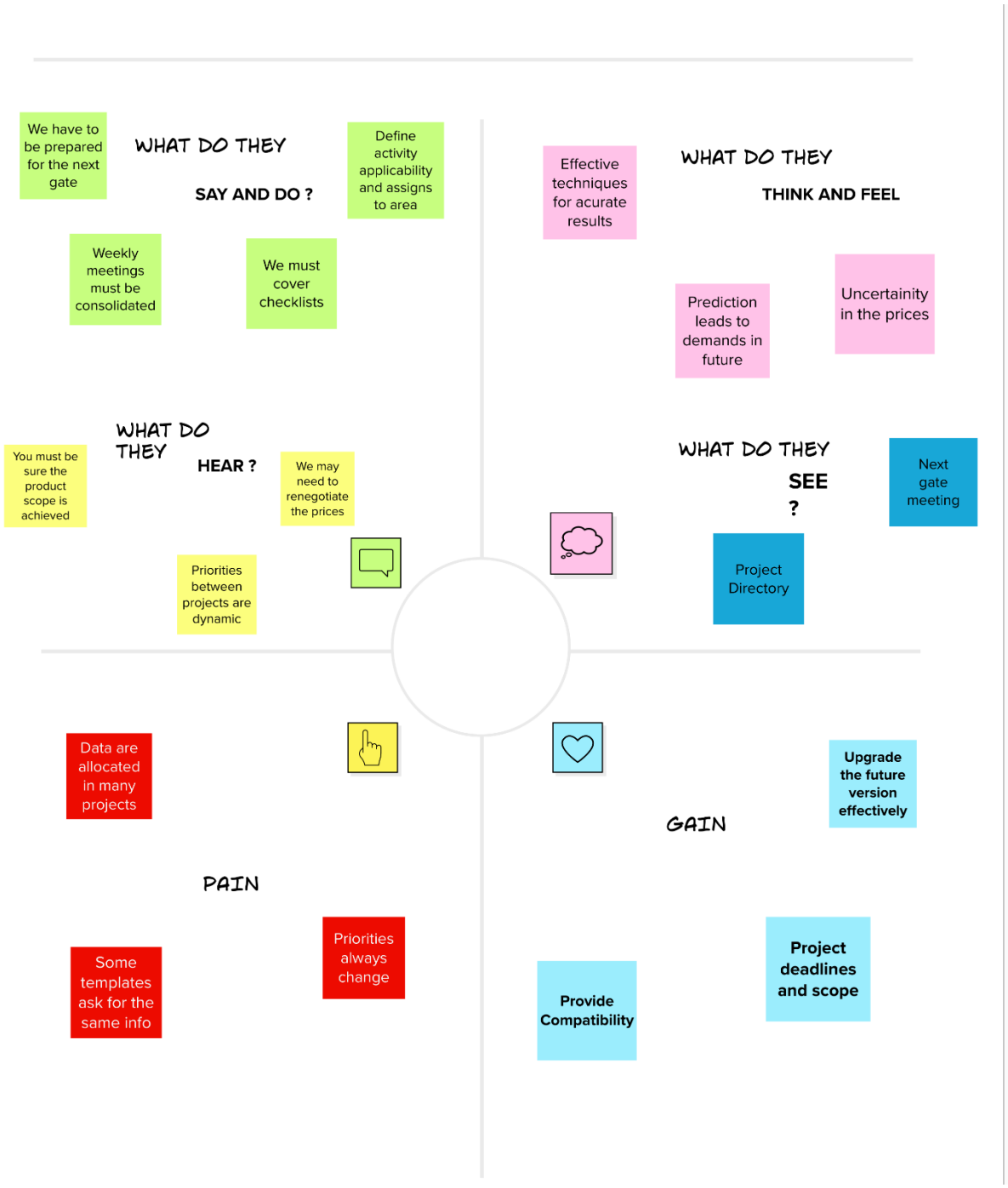
2.3 PROBLEM STATEMENT

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.

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP



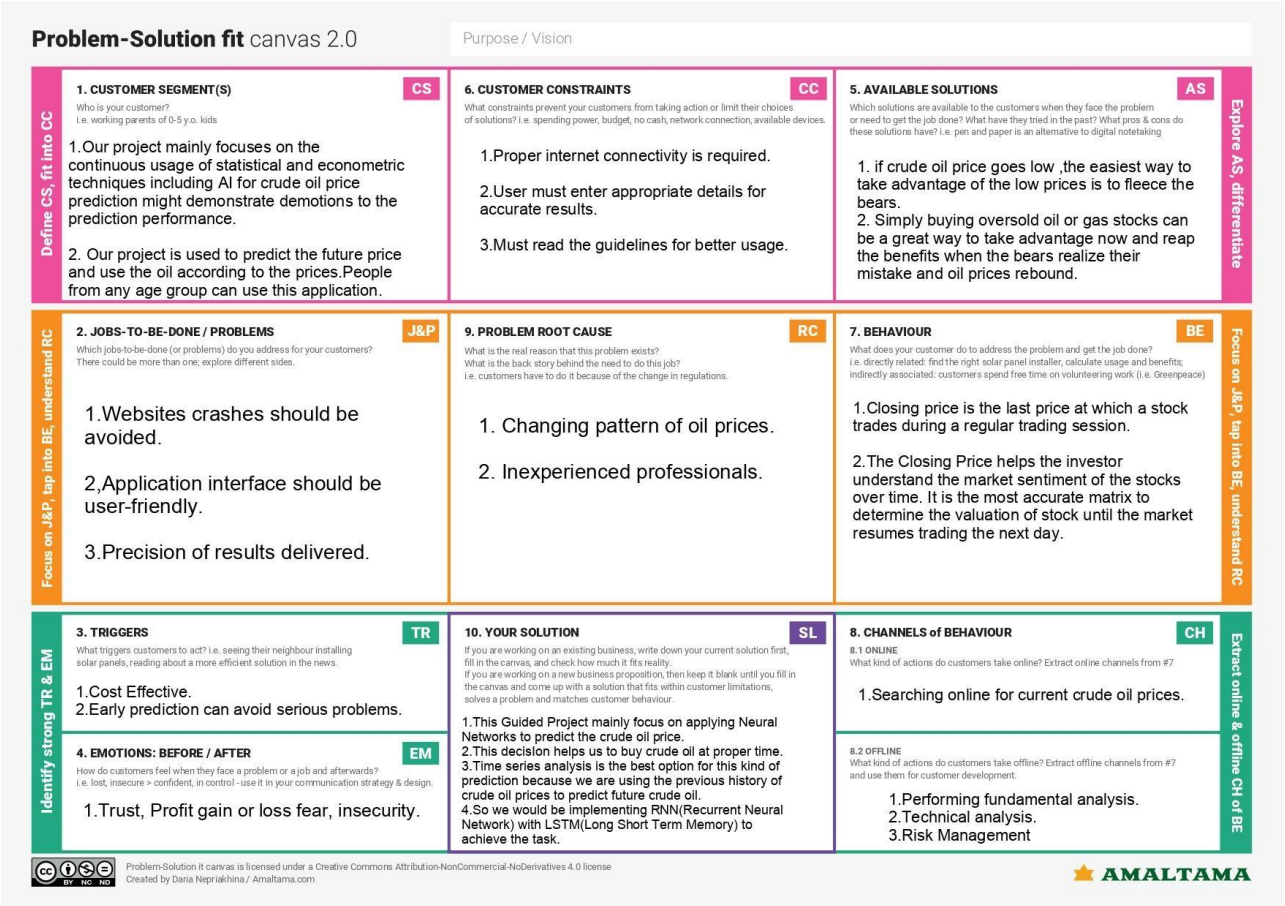
Since the commodity and financial attributes of crude oil will have a long-term or short-term impact on crude oil prices, we propose a de-dimension machine learning model approach to forecast the international crude oil prices.

3.2 IDEATION AND BRAINSTORMING

3.3 PROPOSED SOLUTION

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 and its forecasts are very useful to governments,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	RNN is used with long short term memory to achieve future crude oil using previous history of crude oil.The cost is measured as the mean squared error to determine its Performance of the proposed model is evaluated using the price data in the WTO crude oil materials
3	Novelty / Uniqueness	• Crude oil price fluctuations have a far reaching impact on global economies and thus price forecasting can assist in minimising the risks associated with volatility in oil prices. • Price forecasts are very important to various stakeholders: governments, public and private enterprises, policymakers, and investors.
4	Social Impact / Customer Satisfaction	• It is used to predict the future price and use the oil according to the prices. • This price has direct effects on several goods and products and its fluctuations affect the stock markets. • Oil prices are not only driven by economic variables, but they are also affected by keyevents ..
5	Business Model (Revenue Model)	• It can help decision makers – either firms, private investors, or individuals – when choosing to buy or sell 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 LST Models.

3.3 PROPOSED SOLUTION FIT



REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

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 Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Graph	Showing graph by obtaining the data from the dataset
FR-4	Support	Providing answers for the queries asked by users.
FR-5	News	Information of the oil prices will be updated by admin
FR-6	Notification	Notification will be sent for the users price alert
Fr-7	Database	Information of the User will be stored

4.2 NON FUNCTIONAL REQUIREMENT

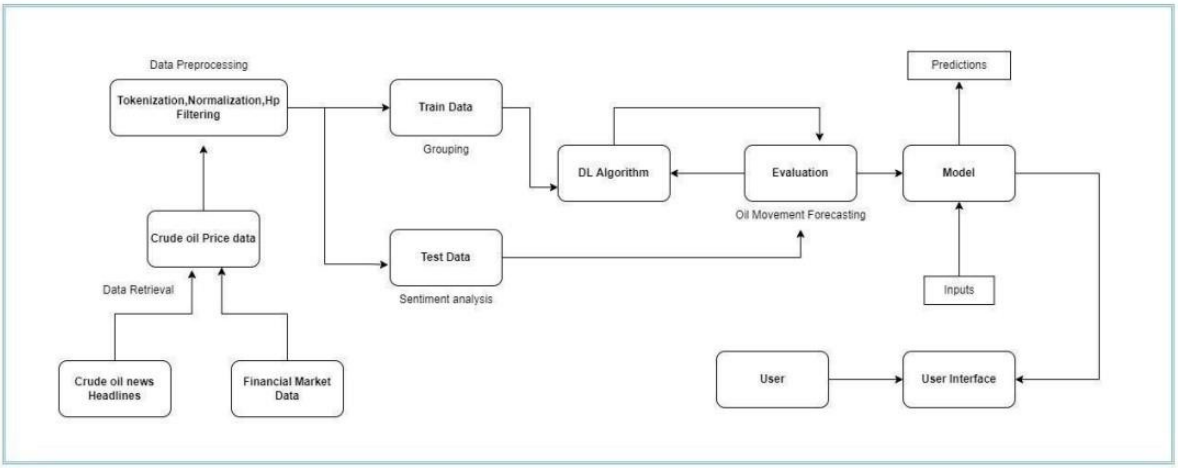
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	It can use by wide variety of client as it is very simple to learn and not complex to proceed.
NFR-2	**Security**	We are using login for the user and the information will be hashed so that it will be very secure to use.
NFR-3	**Reliability**	It will be reliable that it can update with very time period so that the accuracy will be good.
NFR-4	**Performance**	It will be perform fast and secure even at the lower bandwidth.
NFR-5	**Availability**	Prediction will be available for every user but only for premium user news,database and price alert will be alert.
NFR-6	**Scalability**	It is scalable that we are going to use data in kb so that the quite amount of storage is satisfied.

PROJECT DESIGN

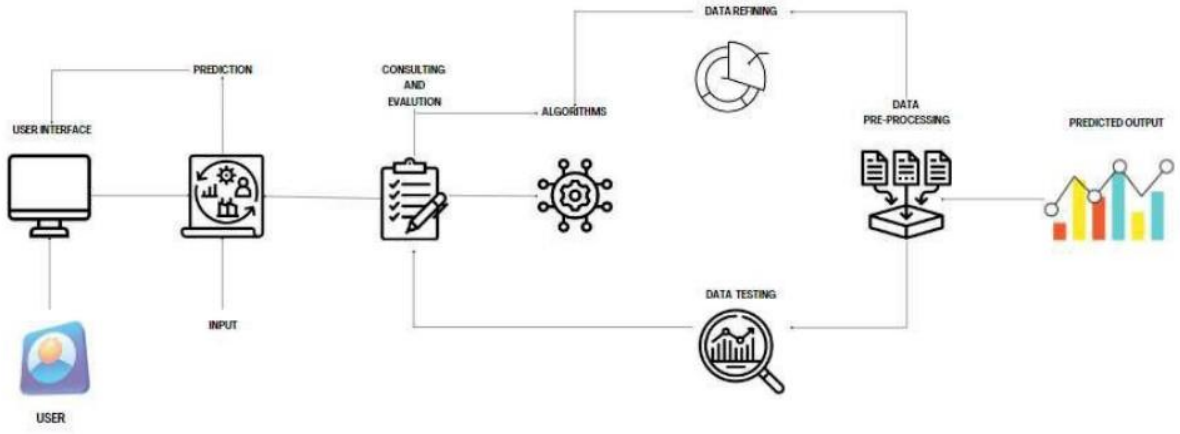
5.1 DATA FLOW DIAGRAM

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.



5.2 SOLUTION & TECHNICAL ARCHITECTURE

- Crude oil price fluctuations are of significant interest to both financial practitioners and market participants.
- However, crude oil price is one of the most complex and difficult to model because fluctuation of the crude oil price is rather irregular, nonlinear, nonstationary, and with high volatility.
- Thus, accurate forecasting of the crude oil price time series is one of the greatest challenges and among the most important issues facing energy economists towards better decisions in several managerial levels.
- For this reason, many researchers have devoted considerable effort to the development of different types of models for crude oil price forecasting.



TECHNICAL ARCHITECTURE

5.3 USER STORIES

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story/ Task	Acceptance criteria	Priority	Release
Customer (Mobile User)	Registration	USN-1	As a user,I can register for the application by entering my email, password,and confirming my password.	I can access my account/ Displays Line gragh / Bar gragh.	High	Sprint-1
		USN-2	As a user,I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user,I can register for the application through Facebook	I can register & accessthe my Account	Low	Sprint-2
		USN-4	As a user,I can register for the application through Gmail	I can register through already logged in gmail account.	Medium	Sprint-1
	Login	USN-5	As a user,I can log into the application by entering email & password	After registration,I can log in by only email & password.	High	Sprint-1
	Line\Bar gragh		After entering the inputs,the model will display predictions in Line\Bar Gragh Format.	I can get the expected prediction in various formats.	High	Sprint-3
Customer (Web user)	Login	USN-1	As the web user,I can login simply by using Gmail or Facebook account.	Already created gmail can be used for Login.	Medium	Sprint-2
Customer Care Executive	Support		The Customer care service will provide solutions for any FAQ and also provide ChatBot.	I can solve the problems arised by Support.	Low	Sprint-3
Administrator	News		Admin will give the recent news of Oil Prices.	Provide the recent oil prices.	High	Sprint-4
	Notification		Admin will notify when the oil prices changes.	Notification by Gmail.	High	Sprint-4
	Access Control		Admin can control the access of users.	Access permission for Users.	High	Sprint-4
	Database		Admin can store the details of users.	Stores User details.	High	Sprint-4

PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

User Type	Functional Requirement (Epic)	User Story Number	User Story/ Task	Acceptance criteria	Priority	Release
Customer (Mobile User)	Registration	USN-1	As a user,I can register for the application by entering my email, password,and confirming my password.	I can access my account/ Displays Line gragh / Bar gragh.	High	Sprint-1
		USN-2	As a user,I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user,I can register for the application through Facebook	I can register & accessthe my Account	Low	Sprint-2
		USN-4	As a user,I can register for the application through Gmail	I can register through already logged in gmail account.	Medium	Sprint-1
	Login	USN-5	As a user,I can log into the application by entering email & password	After registration,I can log in by only email & password.	High	Sprint-1
	Line\Bar gragh		After entering the inputs,the model will display predictions in Line\Bar Gragh Format.	I can get the expected prediction in various formats.	High	Sprint-3
Customer (Web user)	Login	USN-1	As the web user,I can login simply by using Gmail or Facebook account.	Already created gmail can be used for Login.	Medium	Sprint-2
Customer Care Executive	Support		The Customer care service will provide solutions for any FAQ and also provide ChatBot.	I can solve the problems arised by Support.	Low	Sprint-3
Administrator	News		Admin will give the recent news of Oil Prices.	Provide the recent oil prices.	High	Sprint-4
	Notification		Admin will notify when the oil prices changes.	Notification by Gmail.	High	Sprint-4
	Access Control		Admin can control the access of users.	Access permission for Users.	High	Sprint-4
	Database		Admin can store the details of users.	Stores User details.	High	Sprint-4

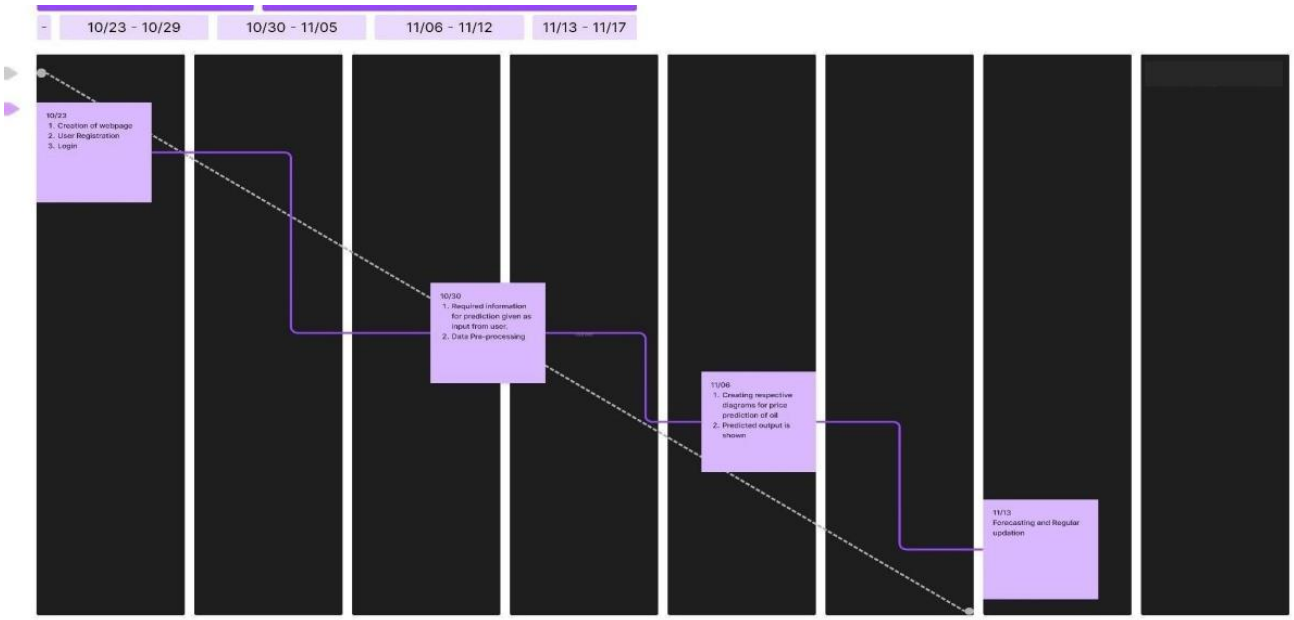
6.2 SPRINT DELIVERY SCHEDULE

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	10	High	ARAVINDH KUMAR M KARTHICKRAJ S DHANUSH KUMAR S FAHAD MUHAIDEEN A
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	10	High	ARAVINDH KUMAR M KARTHICKRAJ S DHANUSH KUMAR S FAHAD MUHAIDEEN A
Sprint-1	Login	USN-3	As a user, I can log into the application by entering email & password.	15	High	ARAVINDH KUMAR M KARTHICKRAJ S DHANUSH KUMAR S FAHAD MUHAIDEEN A
Sprint-2	Input Necessary Details	USN-4	As a user, I can give Input Details to Predict Likeliness of crude oil	15	High	ARAVINDH KUMAR M KARTHICKRAJ S DHANUSH KUMAR S FAHAD MUHAIDEEN A
Sprint-2	Data Pre-processing	USN-5	Transform raw data into suitable format for prediction.	15	High	ARAVINDH KUMAR M KARTHICKRAJ S DHANUSH KUMAR S FAHAD MUHAIDEEN A
Sprint-3	Prediction of Crude Oil Price	USN-6	As a user, I can predict Crude oil using machine learning model.	20	High	ARAVINDH KUMAR M KARTHICKRAJ S DHANUSH KUMAR S FAHAD MUHAIDEEN A

Velocity: Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

6.3 REPORT FROM JIRA



CODING & SOLUTIONING

7.1 FEATURES-1

Flask (web framework): Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries.[2] It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. However, Flask supports extensions that can add application features as if they were implemented in Flask itself. Extensions exist for object-relational mappers, form validation, upload handling, various open authentication technologies and several common framework related tools.

ARTIFICIAL INTELLIGENCE: 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.

7.2 FEATURES-2

The volatility of crude oil price prediction 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 (i) the development of Hierarchical Conceptual (HC) model and (ii) the development of Artificial Neural Networks-Quantitative (ANN-Q) model.

7.3 DATABASE SCHEMA

According to the above literature, we selected 30 variables from supply and demand, inventory, financial market, technical aspects as the initially chosen variables (Hamilton, 2009a; Kilian & Murphy, 2014; Zhang et al., 2017; Wang et al., 2015; Tang et al., 2012), and we choose the real monthly West Texas Intermediate (WTI) crude oil price as the dependent variable. The interval of the data is from January 2000 to December 2017. For data stability, we used the return rate of data. The crude oil production, consumption structure and replacement cost as the related variables measure the supply index. The demand index includes crude oil consumption and global economic development, a measure of real global economic activity. Meanwhile, we select the total OECD petroleum inventory, U.S. crude Oil inventory (total, SPR, and Non-SPR) as the inventory index. In addition, the related variables are selected from speculation, monetary, stock, commodity market as the financial factor index. Finally, we calculated the WTI-Brent spot price spread, actual value of the WTI crack spread and Brent crack spread: actual value as the technical indicators. In Table 1, we describe each variable and its corresponding data sources.

ARTIFICIAL NEURAL NETWORK

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.

DB -1

The West Texas Intermediate (WTI) benchmark for US crude is the world's most actively traded commodity. Crude Oil prices displayed in Trading Economics are based on over-the-counter (OTC) and contract for difference (CFD) financial instruments. Our market prices are intended to provide you with a reference only, rather than as a basis for making trading decisions. Trading Economics does not verify any data and disclaims any obligation.

TESTING

8.1 TEST CASE

The intelligent system has the ability to predict the future depending on dataset and rules relations. Petroleum prediction using computational intelligence techniques aims at enhancing the petroleum industry. Using test cases processes, we are able to discover information, more effective for different classes of and prove strictness prediction results. In the case of crude oil prediction, the prediction results are going to be so conservative that it is often felt useless for decision-making, using test cases and clustering functions of the predicted results and empirical values prove to have more precision and efficiency. In this paper, the computational intelligence technique (Fuzzy), test case and clustering functions are used to achieve overlap Strictness Crude Oil

Prediction System (SCOPS). The dataset sources are extracted from distinct oilfields sources. The proposed prediction intelligent system manipulates petroleum vagueness data, retesting predicted results and reduces system failures to achieve idealistic results.

8.2 USER ACCEPTANCE TEST

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

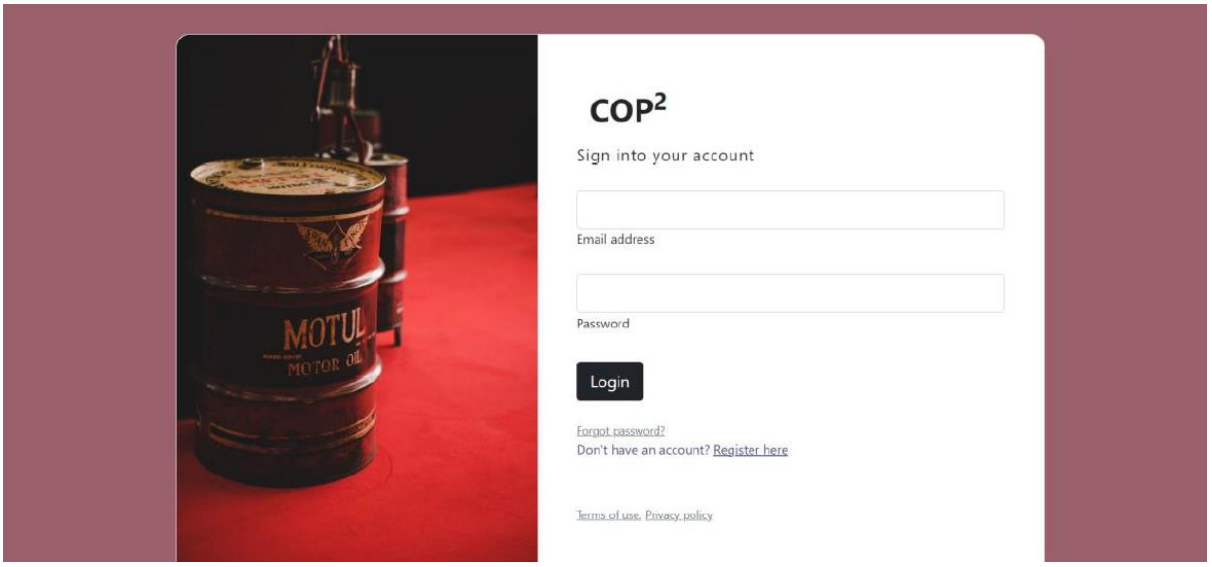
Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	77

RESULTS

9.1 PERFORMANCE METRICS

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.

LOGIN PAGE



REGISTER PAGE

COP^2 SIGN-UP FORM

First name

Last name

Mother's name

Father's name

Address

Gender: Female Male Other

State

City

DOB

Pincode

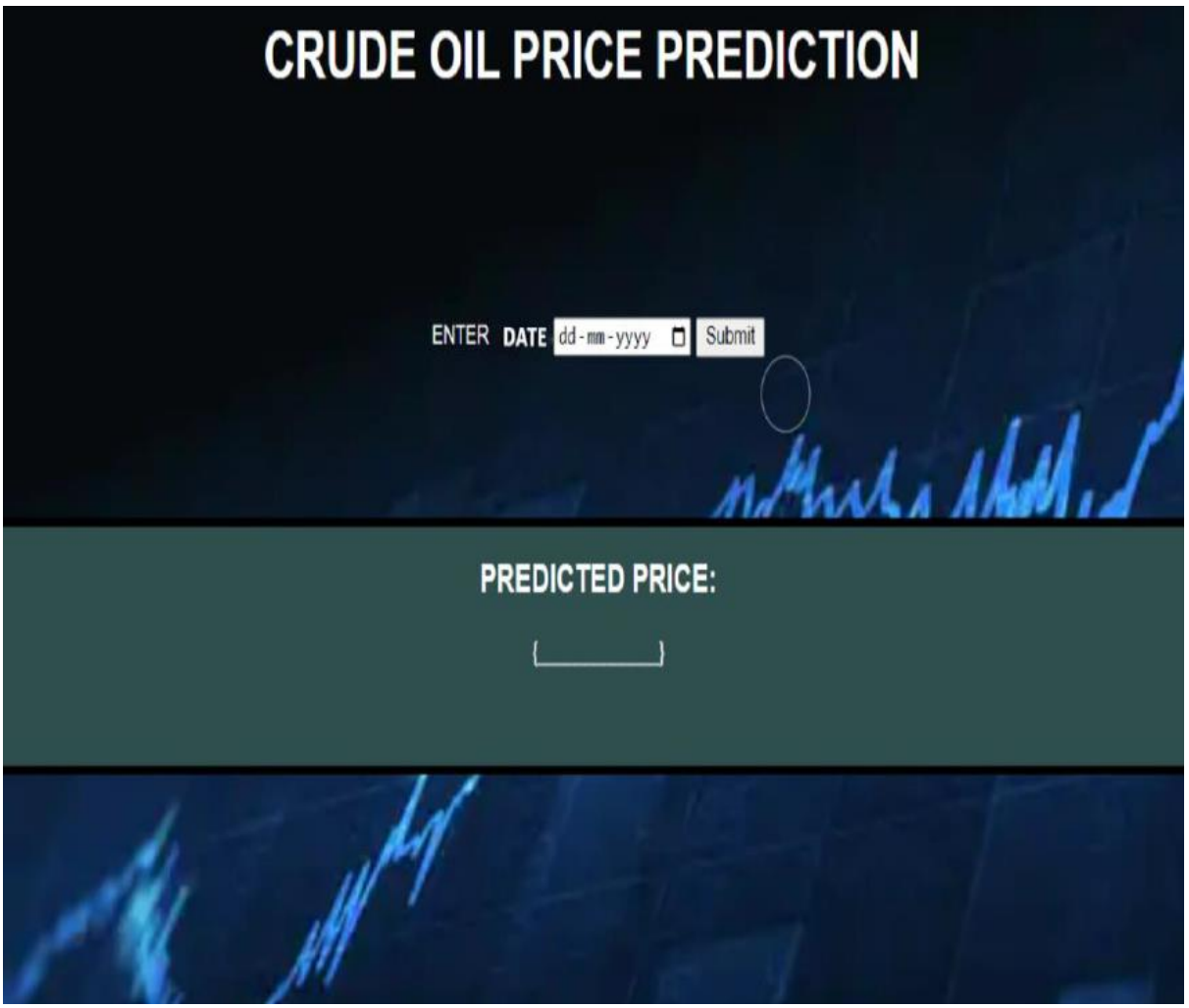
Course

Email ID

Reset all

Submit form

PRICE PREDICTION



ADVANTAGES & DISADVANTAGES

5 Reasons for Today's Volatile Oil Prices

- Oil prices used to have a predictable seasonal swing. They spiked in the spring as oil traders anticipated high demand for summer vacation driving. Once demand peaked, prices dropped in the fall and winter.
- Global supply and prices are also affected greatly by geopolitical conflict and civil unrest.

- Oil prices are more volatile today due to many factors, but five are the most influential.

The Russian Invasion of Ukraine

Russia is the third-largest producer of liquid fuels and petroleum, so when the country invaded Ukraine in late February 2022, it had immediate

10

impact on Brent crude oil futures prices. As the conflict continued, the prices of crude oil settled in out on an upward trajectory, reaching nearly

7

$130/b in early March, and staying well above $100/b into April.

US Oil Supply

The coronavirus pandemic and natural events are still affecting oil demand and supply. The U.S. experienced a drop in production following
Hurricane Ida in September as the storm shut at least nine refineries.

The EIA estimates that U.S. crude oil production will average 12.01 million

11

b/d in 2022 and 12.95 million b/d in 2023.

Diminished OPEC Output

Oil price increases also reflect supply limitations by the Organization of the Petroleum Exporting Countries (OPEC) and OPEC partner countries. In 2020, OPEC cut oil production due to decreased demand during the pandemic. It gradually increased oil output through 2021 and into 2022.
Supply chain disruptions in late 2021 affected global trade as well.

At its most recent meeting in December 2021, OPEC stated it would continue to gradually adjust oil production upward by 0.4 million barrels per

12

day (mb/d) in January 2022.

Natural Gas

Countries in Asia have relied on coal to generate power, but recent shortages have turned them to natural gas. Higher temperatures in parts of Asia and Europe have led to high demand for natural gas to generate power.

COVID-19 has hampered Europe's natural gas production, and a colder-than-expected heating season in early 2021 reduced supplies further.

As a result, natural gas prices soared in 2021 and are expected to remain high in 2022, and affected countries have turned to gas-to-oil switching to

reduce power generation costs.

Global Inventory Draw

As a reduction in oil production continues globally, countries are forced to draw from their stored reserves (not including the strategic petroleum reserves). This steady draw of oil is contributing to the increase in prices, because inventories are decreasing.

DISADVANTAGES

- Oil is a non-renewable source of energy.
- Burning oil produces carbon dioxide gas.
- Burning oil can pollute the air.
- Much of our oil has to be imported and it is becoming more and more expensive as reserves reduce and imports increase.

11.CONCLUSION

We apply the emerging deep learning model to the crude oil price prediction. More specifically we identified two particular deep learning models, i.e. the deep belief network and the recurrent neural network, to be useful in modelling the nonlinear dynamics in the crude oil price movement. We construct a hybrid model that combines the forecasts from the ARMA model as well as the forecasts from the deep learning models. We have conducted empirical studies using the representative WTI crude oil market. We found the introduction of Deep Learning models in the crude oil price models lead to improved forecasting accuracy. Work in this paper implies that there is an exploitable forecasting opportunity in the crude oil price movement. More accurate modelling of the nonlinear dynamics in the crude oil price movement is critical to the further understanding of the determinant underlying the crude oil price movement. In the meantime, we found that the performance of the deep learning model is very sensitive to the parameters. Increasing model complexity with more hidden layers

and hidden neurons may not necessarily lead to higher level of nonlinear modelling accuracy. This performance constraint may be attributed to the limited types of deep learning model attempted. It merits further research in constructing some innovative forecasting models based on different types of deep learning models.

12.FUTURE SCOPE

WTI oil price forecast: 2022 to 2023

Fitch Solutions predicted WTI to average $100/bbl this year, dropping to $81/bbl in 2023. On 12 October, the US Energy Information Administration (EIA) forecast WTI to average $95.74/bbl in 2022, dropping to $88.58 in 2023.

13.APPENDIX

SOURCE CODE

```
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    padding: 0;
}
body{ background:url(cr.jpg);
    background-position: centre;
    background-size: cover;
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div.main{ width: 400px; margin:
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}
h2{ text-align:
    centre; padding:
```

```
    20px; font-family:
    Arial;

} div.register{ background-colour: rgba(0, 0, 0,
0.5); width: 100%; font-size: 20px; border-
radius: 10px; border: 1px solid rgba(255, 255,
255, 0.3); box-shadow: 2px 2px 15px
rgba(0,0,0,0.3); colour:#ff7200
}
form#register{ margin:
    40px;
} label{  font-family:
Arial;          font-size:
18px;
}
input#name{ width: 300px;
    border: 1px solid #ff7200;
    border-radius: 3px;

    outline: 0; padding: 7px;
    background-colour: #000; box-
    shadow: inset 1px 1px 5px
    rgba(0, 0, 0, 0.3);
}
```

```
input#submit{ width:
    240px; height: 40px;
    background: #ff7200;
    border: none; margin-
    top: 30px; font-family:
    Arial; font-size: 18px;
    font-weight: bold;
    border-radius: 10px;
    cursor: pointer; colour:
    #fff; transition: 0.4s
    ease; margin-bottom:
    20px;
}
label,h2{ text-shadow: 1px 1px 5px rgba(0, 0, 0,
    0.3);

}
span{ colour: #000; text-shadow: 1px 1px 5px
    rgba(0, 0, 0, 0.3);
}
```

7.2 FEATURES-2

```
*{ margin: 0;
    padding: 0;
}

.main{ width: 100%;
    background:url(cr.jpg);
    background-position: center;
    background-size: cover;
    height: 100vh;
}
.navbar{
    width: 1200px; height:
    75px; margin: auto;
}
.icon{ width:
    200px;
    float: left;
    height: 70px;
}
.logo{  color:  #ff7200;
    font-size:        35px;
    font-family:    Arial;
    padding-left: 20px;
    float: left;
```

```
    padding-top: 10px;
    margin-top: 5px
}
.menu{ width:
    400px;
    float: left;
    height: 70px;
}
ul{ float: left; display:
    flex; justify-content:
    center; align-items:
    center;
} ul
li{
    list-style: none;
    margin-left: 62px;
    margin-top: 27px;
    font-size: 14px;
} ul li
a{
    text-decoration: none;
    color: #fff; font-family: Arial;
    font-weight:  bold;  transition:
    0.4s ease-in-out;
```

```
} ul li a:hover{
color: #ff7200;
}
.search{
    width: 330px;
    float: left;
    margin-left: 270px;
}
.srch{ font-family: 'Times New
    Roman'; width: 200px; height:
    40px; background: transparent;
    border: 1px solid #ff7200; margin-
    top: 13px;
    color: #fff; border-
    right: none; font-size:
    16px;
    float: left;
    padding: 10px; border-bottom-left-radius:
    5px; border-top-left-radius: 5px;
}
.btn{ width: 100px;
    height: 40px;
    background: #ff7200;
    border: 2px solid
```

```
    #ff7200; margin-top:
    13px;
    color: #fff; font-size: 15px; border-
    bottom-right-radius: 5px; border-
    bottom-right-radius: 5px;
    transition: 0.2s ease; cursor:
    pointer;
}
.btn:hover{ color:
    #000;
}
.btn:focus{ outline:
    none;
}
.srch:focus{ outline:
    none;
}
.content{ width:
    1200px; height:
    auto; margin:
    auto;
    color: #fff;
    position: relative;
}
```

```
.content .par{ padding-left:
    20px; padding-bottom:
    25px;
    font-family:        Arial;
    letter-spacing:    1.2px;
    line-height: 30px;
}
.content h1{ font-family: 'Times New
    Roman'; font-size: 50px; padding-
    left: 20px; margin-top: 9%; letter-
    spacing: 2px;
}
.content .cn{ width:
    160px; height: 40px;
    background: #ff7200;
    border: none; margin-
    bottom: 10px; margin-
    left: 20px; font-size:
    18px; border-radius:
    10px; cursor: pointer;
    transition: .4s ease;

}
```

```
.content .cn a{ text-
    decoration: none; color:
    #000; transition: .3s
    ease;
}
.cn:hover{ background-color:
    #fff;
}
.content span{ color:
    #ff7200; font-size:
    65px
}
.form{ width:
    250px; height:
    380px;
Background:linear-gradient
(totop, rgba(0,0,0,0.8)50%,rgba(0,0,0,0.8)50%); position: absolute; top: -20px;
left: 870px; transform: translate(0%,-5%); border-radius: 10px; padding: 25px;
}
.form h2{ width: 220px;
    font-family: sans-serif;
    text-align: center; color:
    #ff7200; font-size:
    22px; background-
```

```
    color: #fff; border-
    radius: 10px; margin:
    2px; padding: 8px;
}
.form input{ width: 240px; height:
    35px; background: transparent;
    border-bottom: 1px solid #ff7200;
    border-top: none; border-right:
    none; border-left: none; color: #fff;
    font-size: 15px; letter-spacing: 1px;
    margin-top: 30px; font-family: sans-
    serif;
}
.form input:focus{
    outline: none;
}
::placeholder{
    colour:  #fff;  font-
    family: Arial;
}
.btnn{ width: 240px;
    height: 40px;
    background: #ff7200;
    border: none; margin-
```

```
    top: 30px; font-size:
    18px; border-radius:
    10px; cursor: pointer;
    colour: #fff; transition:
    0.4s ease;
}
.btn:hover{ background:
    #fff; colour: #ff7200;
}
.btnn a{ text-decoration:
    none; color: #000; font-
    weight: bold;
}
.form .link{ font-family: Arial, Helvetica,
    sans-serif; font-size: 17px; padding-top:
    20px; text-align: centre;
}
.form .link a{ text-decoration:
    none; colour: #ff7200;

}
.liw{
    padding-top: 15px; padding-
    bottom: 10px; text-align: centre;
}
```

```
.icons a{ text-decoration:
    none; colour: #fff;
}
.icons ion-icon{ color:
    #fff; font-size: 40px;
    padding-left: 60px;
    padding-top: 5px;
    transition: 0.3s ease;
}
.icons ion-icon:hover{
    color: #ff7200;
}
@media screen and (max-width:1200px) {
    /*Normal Screen*/
    .navbar{ width:
        100%; height:
        100px;
    } ul{ margin-left:
    30px;
    } ul
    li{
         margin-left: 60px;
    } ul li
    a{
```

```
    font-size: 1.6vw;
}
.search{ margin-top:
    3px; margin-left:
    290px;
}
.srch{ height:
    40px; width:
    190px; font-size:
    14px;
}
.btn{
    height:40px; width:
    80px;
}
.content{ width:
    100%;
}
.content h1, .content span{ font-size:
    4.5vw;
}
.content .par{ width:
    90%; font-size:
    1.5vw;
```

```
    }
    .content .cn{ width:
        13%; height:
        3.5vw; font-size:
        1.8vw;
    }
    .content a{ font-size:
        1.6vw
    }
}
@media screen and (max-width:1170px) {
    /*Login-box*/
    .main{ padding-left:
        20px; height:
        180vh;
    }
    .form{ margin-left: -
        30px; width:
        250px; height:
        370px;
                                    background: linear-gradient(to top,
rgba(0,0,0,0.8)50%,rgba(0,0,0,0.8)50%);
        position: absolute; top: 420px; left:
```

```
        50px; transform: translate(0%,-5%);
        border-radius: 10px; padding: 25px;
    }
    .form input{ width: 240px;
        height: 35px; background:
        transparent; border-bottom:
        1px solid #ff7200; border-
        top: none; border-right:
        none; border-left: none;
        color: #fff; font-size: 15px;
        letter-spacing: 1px; margin-
        top: 30px; font-family:
        sans-serif;
    }
    .btnn a{ font-size:
        16px;
    }
    .form .link a{ font-
        size: 16px;
    }
}

@media screen and (max-width: 830px){
    /*For tablet*/
```

```
.content{ margin-top:
    120px; width: 80%;
    margin-left: 40px;
}
.content h1, .content span{ font-size:
    6vw;
}
.content .par{ width:
    90%; font-size:
    1.8vw;
}
.content .cn{ width:
    15%; height:
    4.5vw; font-size:
    2vw;
}
.content a{ font-size:
    2vw
}
.logo{ margin-left:
    240px; width:
    100%; margin-top:
    15px; font-size:
    5vw;
```

```
}
.menu{ width:
    100%;
} ul{ margin-top: -
5px; margin-left:
5px;
} ul
li{
      margin-left: 60px;
} ul li
a{
   font-size: 2vw;
}
.search{ margin-top: -
    20px; margin-left:
    60px;
}
.srch{ height:
    30px; width:
    160px; font-size:
    12px;
}
.btn{ height:30px;
    width: 70px;
```

```
}
.main{ padding-left:
    20px; height:
    180vh;
}
.form{ margin-left: -
    30px; width:
    250px; height:
    370px;
                                background: linear-gradient(to top,
rgba(0,0,0,0.8)50%,rgba(0,0,0,0.8)50%);
    position: absolute; top: 430px; left:
    50px; transform: translate(0%,-5%);
    border-radius: 10px; padding: 25px;
}
.form input{
    width: 240px;
    height: 35px;
    background:
    transparent;
    border-bottom:
    1px solid
    #ff7200;
    border-top:
```

```
        none; border-
        right: none;
        border-left:
        none; colour:
        #fff; font-size:
        15px; letter-
        spacing: 1px;
        margin-top:
        30px; font-
        family: sans-
        serif;
    }
    .btnn a{ font-size:
        16px;
    }
    .form .link a{ font-
        size: 16px;
    }
}
@media screen and (max-width: 600px){
    /*IPAD*/

    .content{
```

```
        margin-top: 80px;
        margin-left: 20px;
    }
    .search{ margin-top: -
        40px; margin-left:
        42px;
    }
    .logo{ margin-left:
        180px; font-size:
        4vw;
    } ul{ margin-top: -
    25px; margin-left: -
    5px;
    } ul
    li {
        margin-left: 50px;
    } ul li
    a{
         font-size: 2vw;
    }
}
@media screen and (max-width: 450px){
    /*mobile*/
```

```
    .logo{ margin-left:
        140px; font-size:
        4vw;
    } ul{ margin-top: -
    25px;
    } ul
    li {
        margin-left: 42px;
    } ul li
    a{
        font-size: 2vw;
    }
    .search{ margin-top: -
        40px; margin-left:
        38px;
    }


}
*{ margin: 0;
    padding:
    0;

}
```

```
.main{ width: 100%;
    background:url(cr.jpg);
    background-position: center;
    background-size: cover;
    height: 100vh;
}
.navbar{ width:
    1200px; height:
    75px; margin:
    auto;
}
.icon{ width:
    200px;
    float: left;
    height: 70px;
}
.logo{ color:
    #ff7200; font-
    size: 35px; font-
    family: Arial;
    padding-left:
    20px;
    float: left;
```

```
    padding-top: 10px;
    margin-top: 5px
}
.menu{ width:
    400px;
    float: left;
    height: 70px;
} ul{ float: left; display:
flex;          justify-content:
center; align-items: center;
} ul
li{
    list-style: none;
    margin-left: 62px;
    margin-top: 27px;
    font-size: 14px;
}
ul li a{
    text-decoration: none;
    color: #fff; font-family: Arial;
    font-weight: bold; transition:
    0.4s ease-in-out;
} ul li a:hover{
color: #ff7200;
```

```
}
.search{ width:
    330px;
    float: left;
    margin-left: 270px;
}
.srch{ font-family: 'Times New
    Roman'; width: 200px; height:
    40px; background: transparent;
    border: 1px solid #ff7200; margin-
    top: 13px;
    color: #fff;
    border-right: none;
    font-size: 16px;
    float: left;
    padding: 10px; border-bottom-left-radius:
    5px; border-top-left-radius: 5px;
}
.btn{ width: 100px; height:
    40px; background: #ff7200;
    border: 2px solid #ff7200;
    margin-top: 13px;
    color: #fff; font-size: 15px; border-
    bottom-right-radius: 5px; border-
```

```
    bottom-right-radius: 5px;
    transition: 0.2s ease; cursor:
    pointer;
}
.btn:hover{ color:
    #000;
}
.btn:focus{ outline:
    none;
}
.srch:focus{ outline:
    none;
}
.content{ width:
    1200px; height:
    auto; margin:
    auto;
    color: #fff; position:
    relative;
}
.content .par{ padding-left:
    20px; padding-bottom:
    25px;
```

```
    font-family:        Arial;
    letter-spacing:    1.2px;
    line-height: 30px;
}
.content h1{ font-family: 'Times New
    Roman'; font-size: 50px;

    padding-left: 20px;
    margin-top: 9%;
    letter-spacing: 2px;
}
.content .cn{ width:
    160px; height: 40px;
    background: #ff7200;
    border: none; margin-
    bottom: 10px; margin-
    left: 20px; font-size:
    18px; border-radius:
    10px; cursor: pointer;
    transition: .4s ease;

}
.content .cn a{ text-
    decoration: none; color:
```

```
    #000; transition: .3s

    ease;

}

.cn:hover{ background-
color: #fff;

}

.content span{ color:

    #ff7200; font-size:

    65px

}

.form{ width:

    250px; height:

    380px;

                    background: linear-gradient(to top,
rgba(0,0,0,0.8)50%,rgba(0,0,0,0.8)50%);

    position: absolute; top: -20px; left:

    870px; transform: translate(0%,-5%);

    border-radius: 10px; padding: 25px;

}

.form h2{ width: 220px;

    font-family: sans-serif;

    text-align: center; color:

    #ff7200;
```

```
    font-size: 22px;
    background-color: #fff;
    border-radius: 10px;
    margin: 2px; padding:
    8px;
}
.form input{ width: 240px; height:
    35px; background: transparent;
    border-bottom: 1px solid #ff7200;
    border-top: none; border-right:
    none; border-left: none; color: #fff;
    font-size: 15px; letter-spacing: 1px;
    margin-top: 30px; font-family: sans-
    serif;
}
.form input:focus{
    outline: none;
}
::placeholder{  color:
    #fff;   font-family:
    Arial;
}
.btnn{ width: 240px;
    height: 40px;
```

```
    background: #ff7200;
    border: none; margin-
    top: 30px; font-size:
    18px; border-radius:
    10px; cursor: pointer;
    color: #fff; transition:
    0.4s ease;
}
.btnn:hover{
    background: #fff;
    color: #ff7200;
}
.btnn a{ text-decoration:
    none; color: #000;

    font-weight: bold;
}
.form .link{ font-family: Arial, Helvetica,
    sans-serif; font-size: 17px; padding-top:
    20px; text-align: center;
}
.form .link a{ text-decoration:
    none; color: #ff7200;
}
.liw{
```

```
    padding-top: 15px; padding-
    bottom: 10px; text-align: center;
}
.icons a{ text-decoration:
    none;
    color: #fff;
}
.icons ion-icon{ color:
    #fff; font-size:
    40px; padding-left:
    60px; padding-top:
    5px; transition: 0.3s
    ease;
}
.icons ion-icon:hover{
    color: #ff7200;
}
@media screen and (max-width:1200px) {
    /*Normal Screen*/

    .navbar{ width:
        100%; height:
        100px;
```

```
} ul{ margin-left:
30px;
} ul
li{
    margin-left: 60px;
} ul li
a{
   font-size: 1.6vw;
}
.search{ margin-top:
    3px; margin-left:
    290px;
}
.srch{ height:
    40px; width:
    190px; font-size:
    14px;
}
.btn{ height:40px;
    width: 80px;
}
.content{ width:
    100%;
}
```

```
    .content h1, .content span{ font-size:
        4.5vw;
    }
    .content .par{ width:
        90%; font-size:
        1.5vw;

    }
    .content .cn{ width:
        13%; height:
        3.5vw; font-size:
        1.8vw;
    }
    .content a{ font-size:
        1.6vw
    }
}

@media screen and (max-width:1170px) {
    /*Login-box*/
    .main{ padding-left:
        20px; height:
        180vh;
    }
```

```
.form{ margin-left: -
    30px; width:
    250px; height:
    370px;
                                background: linear-gradient(to top,
rgba(0,0,0,0.8)50%,rgba(0,0,0,0.8)50%);
    position: absolute; top: 420px;
    left: 50px; transform:
    translate(0%,-5%); border-
    radius: 10px; padding: 25px;
}
.form input{ width: 240px; height:
    35px; background: transparent;
    border-bottom: 1px solid #ff7200;
    border-top: none; border-right:
    none; border-left: none; color: #fff;
    font-size: 15px; letter-spacing: 1px;
    margin-top: 30px; font-family: sans-
    serif;
}
.btnn a{ font-size:
    16px;

}
```

```
    .form .link a{ font-
        size: 16px;
    }
}

@media screen and (max-width: 830px){
    /*For tablet*/

    .content{ margin-top:
        120px; width: 80%;
        margin-left: 40px;
    }
    .content h1, .content span{ font-size:
        6vw;
    }
    .content .par{ width:
        90%; font-size:
        1.8vw;
    }
    .content .cn{ width:
        15%; height:
        4.5vw; font-size:
        2vw;
    }
```

```
.content a{ font-size:
    2vw
}
.logo{ margin-left:
    240px; width:
    100%; margin-top:
    15px; font-size:
    5vw;
}
.menu{ width:
    100%;
} ul{ margin-top: -
5px; margin-left:
5px;
} ul
li{
     margin-left: 60px;
} ul li
a{
font-
size:
2vw;

}
```

```
    .search{ margin-top: -
        20px; margin-left:
        60px;
    }
    .srch{ height:
        30px; width:
        160px; font-size:
        12px;
    }
    .btn{ height:30px;
        width: 70px;
    }
    .main{ padding-left:
        20px; height:
        180vh;
    }
    .form{ margin-left: -
        30px; width:
        250px; height:
        370px; background:
         linear-gradient(to
         top,
rgba(0,0,0,0.8)50%,rgba(0,0,0,0.8)50%);
        position: absolute; top: 430px; left:
```

```
        50px; transform: translate(0%,-5%);
        border-radius: 10px; padding: 25px;
    }
    .form input{ width: 240px; height:
        35px; background: transparent;
        border-bottom: 1px solid #ff7200;
        border-top: none; border-right:
        none; border-left: none; color: #fff;
        font-size: 15px; letter-spacing: 1px;
        margin-top: 30px; font-family: sans-
        serif;
    }
    .btnn a{ font-size:
        16px;
    }
    .form .link a{ font-
        size: 16px;
    }
}

@media screen and (max-width: 600px){
    /*IPAD*/
```

```
    .content{ margin-top:
        80px; margin-left:
        20px;
    }
    .search{ margin-top: -
        40px; margin-left:
        42px;
    }
    .logo{ margin-left:
        180px; font-size:
        4vw;
    }
    ul{ margin-top: -25px;
        margin-left: -5px;
    } ul
    li {
        margin-left: 50px;
    } ul li
    a{
        font-size: 2vw;
    }
}

@media screen and (max-width: 450px){
```

```
    /*mobile*/
    .logo{ margin-left:
        140px; font-size:
        4vw;
    } ul{ margin-top: -
    25px;
    } ul
    li {
        margin-left: 42px;
    } ul li
    a{
        font-size: 2vw;
    }
    .search{ margin-top: -
        40px; margin-left:
        38px;
    }

}
```

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-9761-1659073275