SI.NO	TITLE	PAGE NO

1. INTRODUCTION

1.1. PROJECT OVERVIEW

Crude oil, a pale yellowish-black naturally occurring liquid, resides in the top layer of brine. Fractional distillation classifies it into several consumable fuel categories. The most significant source of energy currently available on earth is crude oil. It is the main fuel in the globe. Nearly one-third of the world's energy is produced by petroleum. Additionally, refined crude oil is used to make petroleum products. Worms will spread over the world as a result of rising environmental usage. Up to 95 million barrels of petroleum are utilized every day around the globe. You need to know a lot about crude oil in order to predict it with any degree of accuracy. For countries that export crude oil as well as those that import it, being able to predict the price of crude oil is essential in a range of economic, political, and industrial circumstances. As a vital strategic resource, crude oil has grown to be a significant part of the world economy. You can easily predict tomorrow's oil price using the price forecasting method. The government helps set fuel prices for the next day. This approach also benefits the population. People will notice our country's economy. This approach makes it possible to forecast crude oil prices automatically. The international economy is significantly impacted by the price of crude oil. More than any other commodity in recent years, oil prices have varied. Price projections for oil are exceedingly challenging due to the commodity's tremendous volatility and dependence on numerous outside factors. LSTM based on a recurrent neural network has shown better results in predicting prices that have high volatility. The crucial prices of crude oil are assessed and modeled using this approach.

1.2. PURPOSE

The most valuable resource in the planet is crude oil. It is the main fuel, and its price directly affects the environment, our economy, oil exploration, and other activities. Because crude oil is a vapor, it is very difficult to anticipate its price with any degree of accuracy. We suggest a modern and cutting-edge approach to forecasting crude oil prices that makes use of artificial intelligence (AI). This AI strategy's key benefit is that it consistently captures the volatile trend of crude oil prices. Individuals, the public sector, and the corporate sector are more interested and fearful due to the volatility of the crude oil market and its ripple effects on the global economy. When dealing with linear data, previous statistical and econometric techniques for prediction produce good results. However, there is significant nonlinearity and irregularity in crude oil price series. Continuous use of statistical and economic methods for predicting crude oil prices may show declines in prediction accuracy. A solution is suggested to predict this using machine learning and computational intelligence methods that combine qualitative data from expert opinion and news with historical quantitative data.

2. LITERATURE SURVEY

TITLE: A Oil Prices and the Natural Gas Liquids Markets.

AUTHOR: Ali Jadidzadeh, Apostolos Serletis.

YEAR OF PUBLICATION: 2022

This paper investigates the impact of oil market structural shocks on the prices of natural gas liquids (NGLs), including ethane, propane, normal butane, isobutene, and natural gasoline, over the period from January 1985 to April 2020. To identify the structural demand and supply shocks in the crude oil market, we use a vector auto regression model and assume that the innovations to the real price of crude oil are predetermined with respect to the local NGLs markets. Our results show that, in the long run, more than 55% of the variation in the real price of NGLs is explained by the structural shocks in the global crude oil market. We also find that, unlike oil supply shocks, demand-side shocks have permanent and persistent impacts on NGLs' real prices and should be of main concern to investors aiming to develop gas wells and NGLs producing technologies.

TITLE: Oil And Stock Markets Volatility During Pandemic Times.

AUTHOR: Tahir Mumtaz Awan, Muhammad Shoaib Khan, Inzamam Ul Haq, Sarwat Kazmi.

YEAR OF PUBLICATION: 2021

This review aims to produce insight into the volatilities trio (COVID-19 crisis, stock markets, and crude oil volatility). The understanding of risk trends in stock markets of G7 economies and crude oil as a hedge are two vital concerns for investors, researchers, and portfolio managers around the globe. During the pandemic times, globally among others oil and stock markets are severely getting affected. Considering the main purpose and role of G7 countries to resolve global issues focusing on economic concerns, this review is planned. The published work in journals of repute was selected on the term mechanism (COVID-19 and stock markets or COVID-19 and oil prices) was conducted which resulted in 29 articles in total.

TITLE: Nexus between Crude Oil Prices, Clean Energy Investments.

AUTHOR: Caner Ozdurak.

YEAR OF PUBLICATION: 2021

In this study, we examine the nexus between crude oil prices, clean energy investments, technology companies, and energy democracy. Our dataset incorporates four variables which are S & P Global Clean Energy Index (SP Clean), Brent crude oil futures (Brent), CBOE Volatility Index (VIX), and NASDAQ 100 Technology Sector (DXNT) daily prices between 2009 and 2021. The novelty of our study is that we included technology development and market fear as important factors and assess their impact on clean energy investments. DCC-GARCH models are utilized to analyze the spillover impact of market fear, oil prices, and technology company stock returns to clean energy investments. According to our findings when oil prices decrease, the volatility index usually responds by increasing which means that the market is afraid of oil price surges. Renewable investments also tend to decrease in that period following the oil price trend. Moreover, a positive relationship between technology stocks and renewable energy stock returns also exists.

TITLE: Analysis Of Capital Asset Pricing Model On Crude Oil.

AUTHOR: Tolulope Latunde, Lukman Shina Akinola, Damilola Deborah Dare.

YEAR OF PUBLICATION: 2020

Capital asset pricing model (CAPM) is one of the widely used asset pricing models in modern securities theory. This mathematical model can help investors understand the relationship between expected returns and investment risk. To help energy commodity investors (especially Deutsche Bank) make the best decisions in investment management, this paper uses the CAPM and some statistical tools (variance, covariance and mean) to study risks on the expected return of investing in four common Deutsche Bank (DB) crude oil assets (DB crude oil double short, SZO-DB crude oil short order, OLO-DB crude oil short position, DBO-Invesco DB Petroleum Fund). The result reveals that DTO-DB Crude oil Double Short has the highest beta risk and highest expected return. And the higher the risk, the higher the expected return, and vice versa, that is, the risk is directly proportional to the expected return.

TITLE: Impact Of COVID-19 On Energy Prices And Main Macro Economic Indicators-Evidence From China's Energy Market.

AUTHOR: Yilin Wu, Shiyu Ma

YEAR OF PUBLICATION: 2021

With the COVID-19 pandemic sweeping the world, the development of China's energy industry has been hampered. Although previous studies have shown the global influence of COVID-19 on energy prices and macroeconomic indicators, very few of them examined the impact on China independently, considering the special role of China in this pandemic and economy. In this study, we investigate the impact of the pandemic on several major China energy prices using the ARIMA-GARCH model. Combined with the Value-at-Risk (VaR) theory, we further explore the market risk, which indicates an increase in the tail risk of energy price volatility and the dramatic turbulence in energy markets. In addition, a Vector Autoregressive (VAR) model is developed to analyze how the main macroeconomic indicators are affected when energy prices fluctuate. According to the model results, energy price fluctuations caused by the COVID-19 have a negative impact on economic growth and inflation, with a higher contribution to the latter changes. Based on the modeling analysis results, this paper makes constructive suggestions on how to stabilize energy prices and recover the economic development in the context of the COVID-19 pandemic.

2.1. EXISTING PROBLEM

The current system predicts the monthly WTI crude oil price for each barrel in USD using machine learning and computational intelligence methods through the usage of HC and ANN-Q models. The outcome of the simulation analysis verifies the efficiency of the HC model's data selection method. A thorough list of important characteristics that influence how volatile the crude oil price market is successfully extracted by the HC model. Effective and accurate data selection also aids in carefully considering the mix of input variables for the ANN model. Data represented in One- step Returns function had successfully proved to cleanse and uniform the data from errors and noises hence, the crisp prediction result. The goal of this study's current phase is to integrate the qualitative and quantitative components of prediction. Investors can better comprehend the connection between expected returns and investment risk using this mathematical model.

2.2. REFERENCE

[1] Varun Gupta, Ankit Gupta ; Crude Oil Price Prediction Using LSTM Networks World Academy of Science, Engineering and Technology International Journal of Computer and Information Engineering Vol:12, No:3,2018.

[2] Text Based Crude Oil Price Forecasting; A Deep Learning Approach Xuerong Li(a) Wei Shang (b)(a) Shouyang Wang(a)(b) (a)School of Economics and Management, University of Chinese Academy of Sciences, Beijing 100190, China (b) Academy of Mathematics and System Science, Chinese Academy of Sciences, Beijing 100190, China. IEEE(2018).

[3] A Decision Tree Approach To Oil Price Prediction; Nnamdi I. Nwulu Department of Electrical & Electronic Engineering Science University of Johannesburg Johannes burg, South Africannwulu@uj.ac.za.IEEE(2017).

[4] Long Short Memory Networks For Automatic Generation Of Conversation; Tomohiro Fujita Wenjun Bai Changqin Quan Department of Computational Science Graduate School of System Informatics, Kobe University Kobe,Japan@cs11.cs.kobe-u.ac.jp, quanchqin@gold.kobe-u.ac.jp.IEEE(2017).

2.3. PROBLEM STATEMENT DEFINITION

For all nations, crude oil is a crucial fuel supply. Accurate oil price forecasts provide significant economic and social benefits. It is, however, very challenging to make precise predictions because the price of crude oil is very nonlinear and affected by a variety of factors. In March 2018, Shanghai crude oil futures were formally launched. For China's domestic production strategy, it is crucial to correctly forecast the price of Shanghai crude oil futures. Because there is a dearth of pricing information due to the quick listing period, predicting the price of Shanghai crude oil futures is much more challenging. This study suggests employing Long Short-Term Memory Network (LSTM) based on transfer learning to forecast the price of crude oil in Shanghai as a means of resolving this issue. The core concept is to employ Brent crude oil for initial network training and Shanghai crude oil for final network fine-tuning, taking advantage of the correlation between Brent crude oil and Shanghai crude oil. The empirical findings demonstrate the robust generalizability and high prediction accuracy of the transfer learning-based LSTM model. Factors That Affect: 1. Supply The availability of oil is a factor in supply and demand. OPEC member nations have traditionally controlled supply. But now, the United States is contributing more to supplies as a result of increasing output from its shale formations. So the supply will be high if major oil producing nations are pushing out a lot of petroleum. Just consider what occurred in 2014. According to Tamar Essner, senior energy director at Nasdaq IR Solutions, "Saudi Arabia made the decision that they were not going to scale back production, they were going to continue to produce at record high levels". The United States and other producers across the world "had fairly robust output at the same period." As producers pumped more oil than the world could use, oil prices fell drastically. Because OPEC refused to reduce its production, the wild fall in oil prices was heavily attributed to them. However, OPEC claimed that American shale drillers should first limit their production because they were to fault for producing too much. Arab OPEC countries imposed an embargo on the United States in 1973 in retaliation for U.S support of Israel during the Yom Kippur War. After the embargo, the oil supply in the U.S. was so scarce and the demand was so high, it drove the price of crude to the point that gas stations began rationing gasoline. The amount of oil that is required at any particular time, on the other hand, determines demand. Frequently, that demand is for things like transportation, heat, and energy. Oil will be in higher demand when a region

experiences more economic growth. People have been utilizing more energy as a result of the recovery in global economies following the financial crisis, according to Essner. The market response to renewable energy is another matter that needs to be addressed. Public policy will have an impact on a lot of this, but in the end, renewable energy can only replace hydrocarbons if it is economically viable, according to Essner. Consumers won't voluntarily switch to renewable energy sources because they are currently more expensive than hydrocarbons.

3. IDEATION & PROPOSED SOLUTIONS

3.1. EMPATHY MAP CANVAS

The basic empathy map, which aids in identifying and describing the user's wants and pain locations, is expanded upon in an empathy map canvas. Additionally, this data is useful for enhancing user experience. Real user insights are crucial for creating effective canvases because they help paint a true image of how people feel about the product. This gives information on the most frequently used features and how they are used. And with this information, teams are better equipped to make the changes that will benefit users and add value to the product.

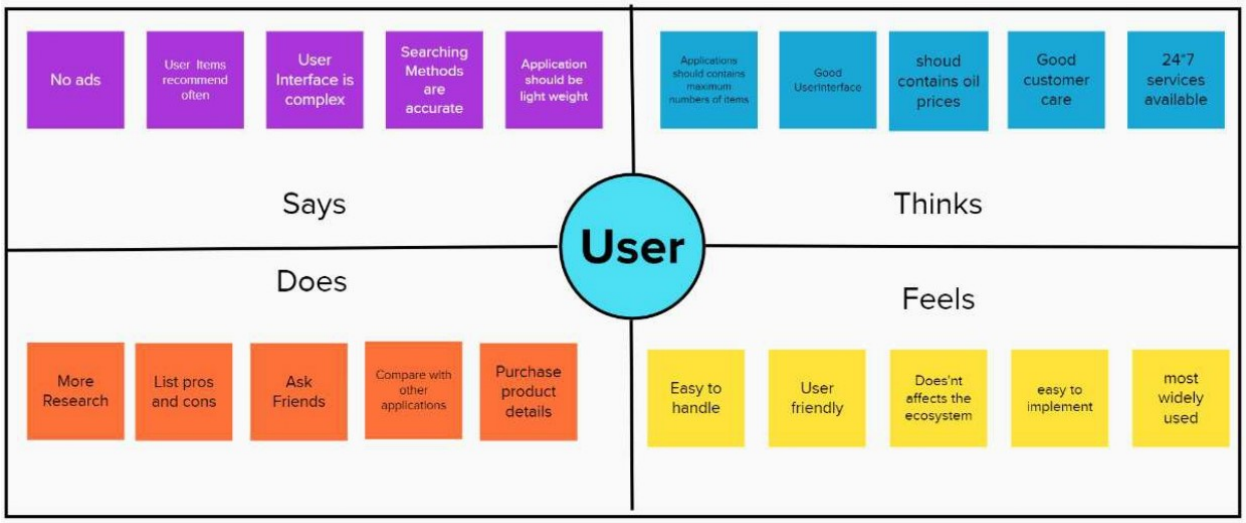
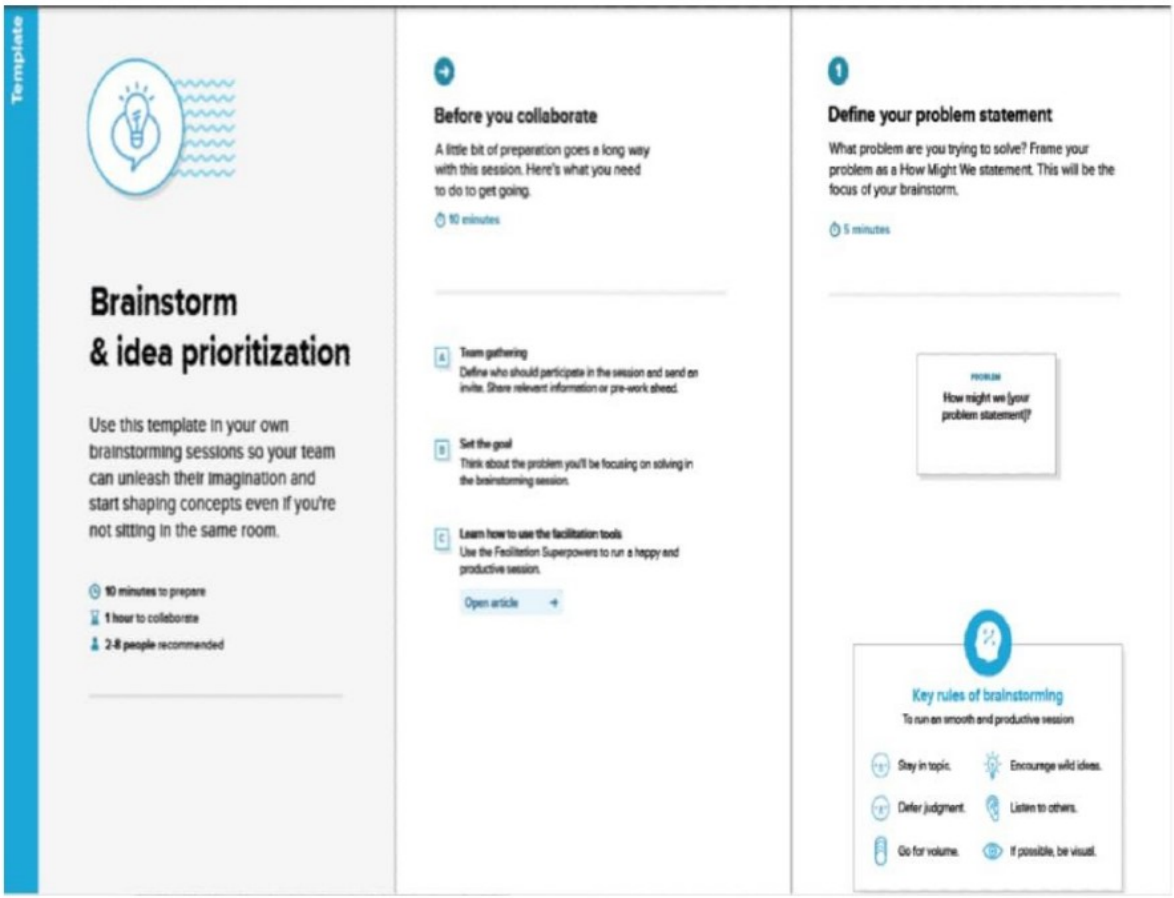


FIGURE 3.1

3.2. IDEATION AND BRAINSTORMING

Ideation is the process through which you come up with ideas and solutions using exercises like sketching, prototyping, brain-storming, writing in the head, coming up with the worst-case scenario, and a variety of other ideation approaches. The third step of the Design Thinking process is also known as ideation. The process of originating, developing, and sharing ideas is known as ideation. It's crucial to remember that these concepts don't necessarily have to be original. You can brainstorm solutions to particular issues, consider fresh approaches to putting a plan into action, or even gather input and assess concepts. As you can see, ideation is more than just a single brainstorming session or the development of ideas. In fact, we can divide ideation in these three stages: generation, selection, and development. To paint a clearer picture, we've illustrated below the ideation process. In this diagram represented as the four types of ideas in nutritional dietary assessment.



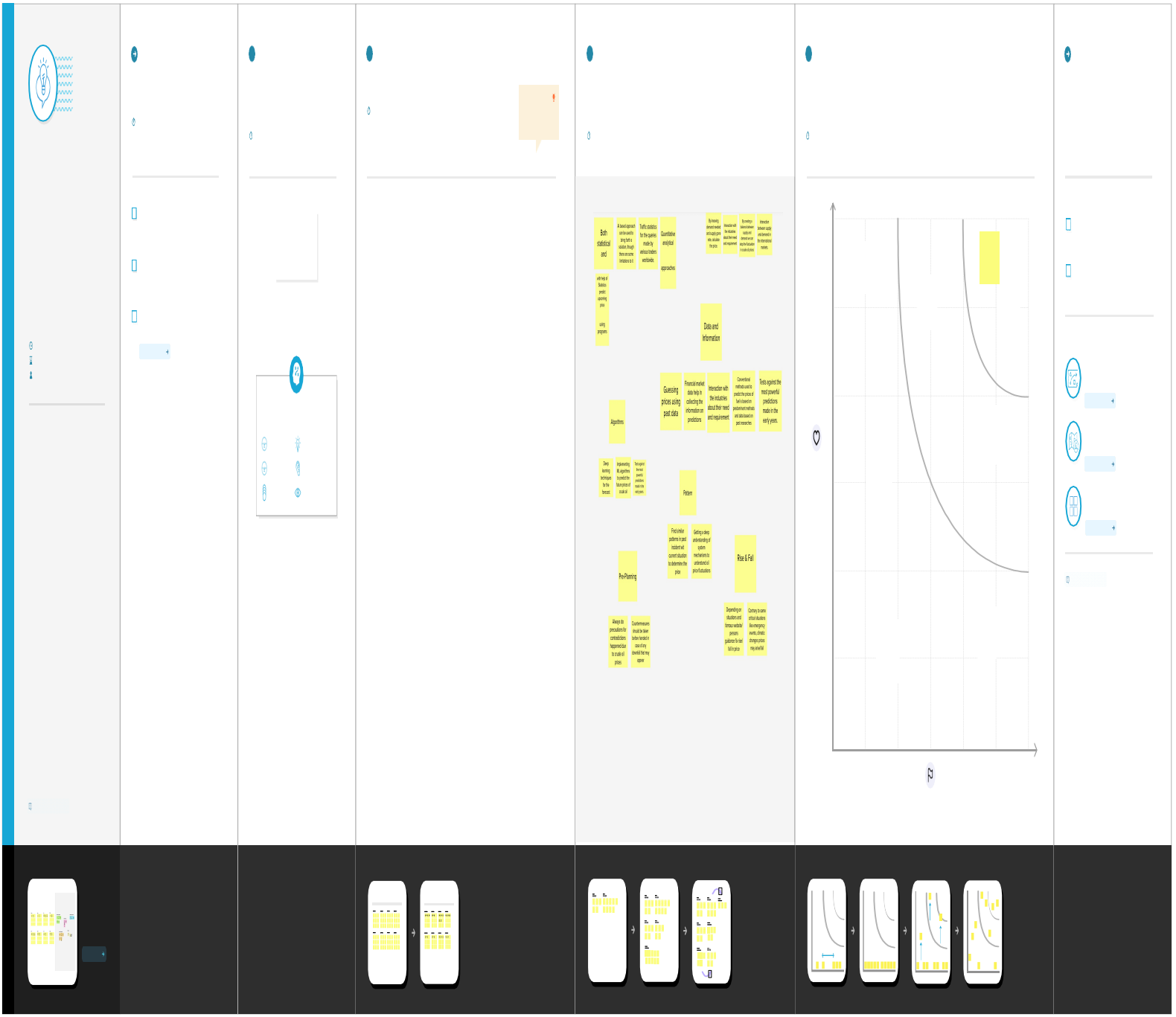

Both statistical and
Quantitative and/or
approaches
Data and Information
Guessing prices using past data
Financial market data help in collecting the information on predictions
Interaction with the industries about their need and requirement
Algorithms
Pattern
Pre-Planning
Rise & Fall

FIGURE 3.2

3.3. PROPOSED SOLUTION

S.NO	PARAMETER	DESCRIPTION
1	Problem Statement (Problem tobe 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 it's effectiveness. The performance of the proposed model is evaluated using the price data in the WTOcrude oil materials.
3	. Novelty / Uniqueness	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.
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 stockmarkets. Oil prices are not only driven by economic variables, but they are also affected by key events.
5	Business Model (RevenueModel)	It can help decision makers – either firms, private investors, or individuals – when choosing to buyor 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 the Crude oil prices.
6	Scalability of the Solution	PCA, MDS and LLE methods are used to reduce the dimensions ofthe data Improve the accuracy of the RNN and LSTM models.

3.4. PROBLEM SOLUTION FIT

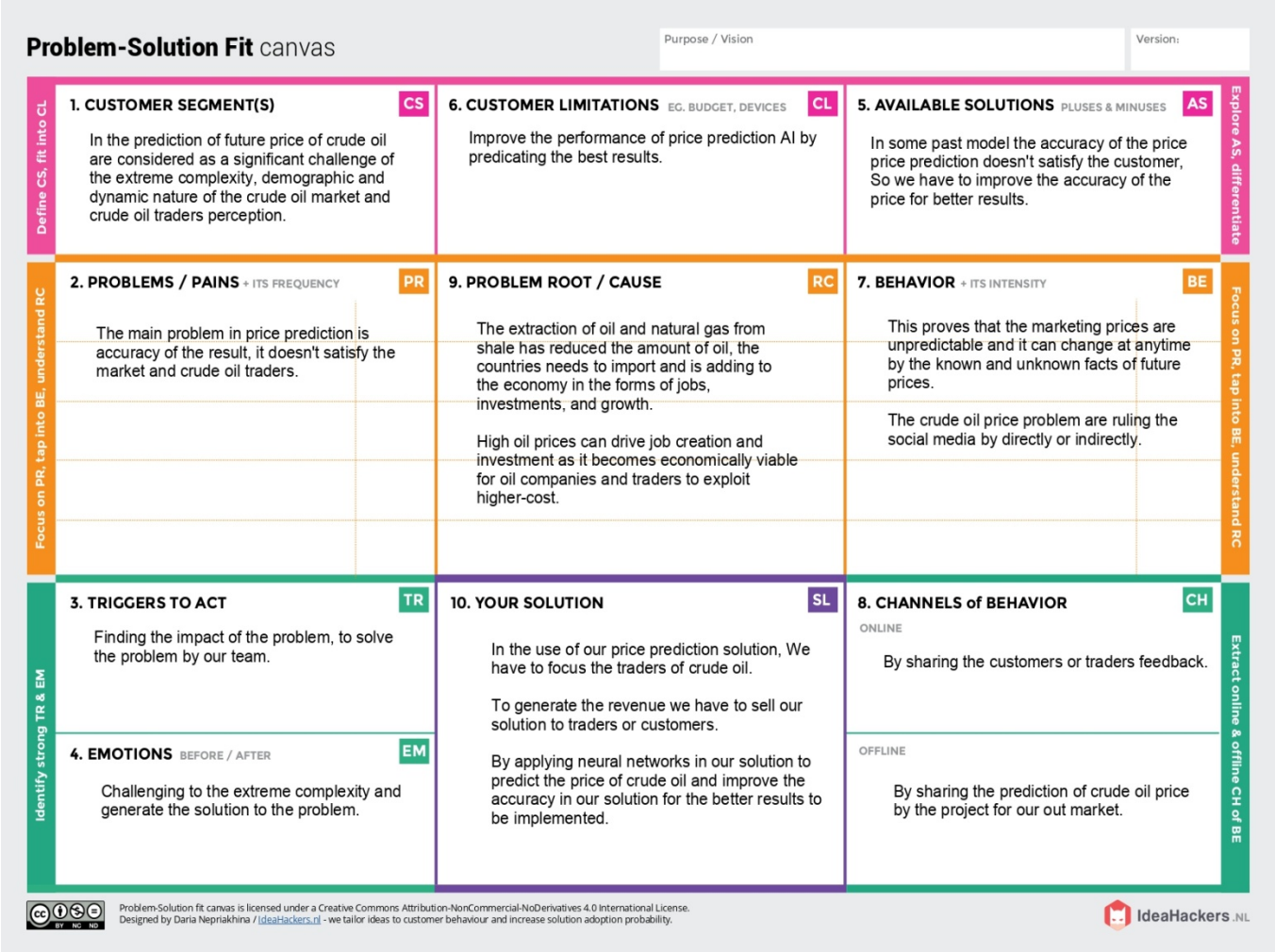


FIGURE 3.4

4. REQUIREMENT ANALYSIS

Determining user expectations for a new or modified product is the process known as requirements analysis, sometimes known as requirements engineering. These characteristics, also known as criteria, must be precise, pertinent, and quantitative. Such specifications are sometimes referred to as functional requirements in software engineering. Project management includes requirements analysis as a key component. In order to resolve disagreement or ambiguity in requirements as needed by different users or groups of users, eliminate feature creep, and document every step of the project development process from beginning to end, requirements analysis requires continuous communication with system users. Instead of attempting to shape user expectations to match the requirements, effort should be focused on ensuring that the end system or product adheres to client needs. Teamwork is essential for requirements analysis, which calls for knowledge of hardware, software, and human factors engineering as well as interpersonal skills..

4.1. FUNCTIONAL REQUIREMENTS

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	**Authentication**	● Verifying the identity of the user (ie)checking the email and password is correct.
FR-4	**Authorization levels**	● User has been properly identified and authenticated. authorization levels determine the extent of system rights that the user has access to.
FR-5	**Historical data management**	● Historical data to forecast future performance of the company. ● Historical data includes your company's financial statements, client invoices and any information you believe has relative predictive value to the future success of your company.

4.2. NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	● 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.
NFR-2	**Reliability**	● Price forecasts are very important to various stakeholders, governments, public and private enterprises, policymakers, and investors.
NFR-3	**Performance**	● Using the LSTM model the accuracy of crude oil price prediction is increased.
NFR-4	**Availability**	● Crude oil is not in infinite supply. After all, it took millions of years to "brew". Estimates vary, but if our current consumption continues apace, we may well see a time in the near future when it is completely exhausted. ● Oil reserves are found all over the world. The top oil producing countries are Saudi Arabia, Russia, the United States, Iran, and China.
NFR-5	**Scalability**	● Hydrodynamic conditions in oilfield operations is suggested. ● Modern refineries typically use a high number of sensors that generate an enormous amount of data. ● Sustainable Solution for Crude Oil using concentrated Solar Power Technology.

5. PROJECT DESIGN

5.1. DATA FLOW DIAGRAMS

A two-dimensional diagram demonstrates how data is handled and moved inside a system. Each data source is identified, along with how it interacts with other data sources to produce a common result, in the graphical representation. To create a data flow diagram, a person has to know what the external inputs and outputs are, how they link to one another, and how to visually depict these connections and the outcomes they produce. Teams involved in business development and design might use this type of graphic to identify or improve particular areas of the data processing process.

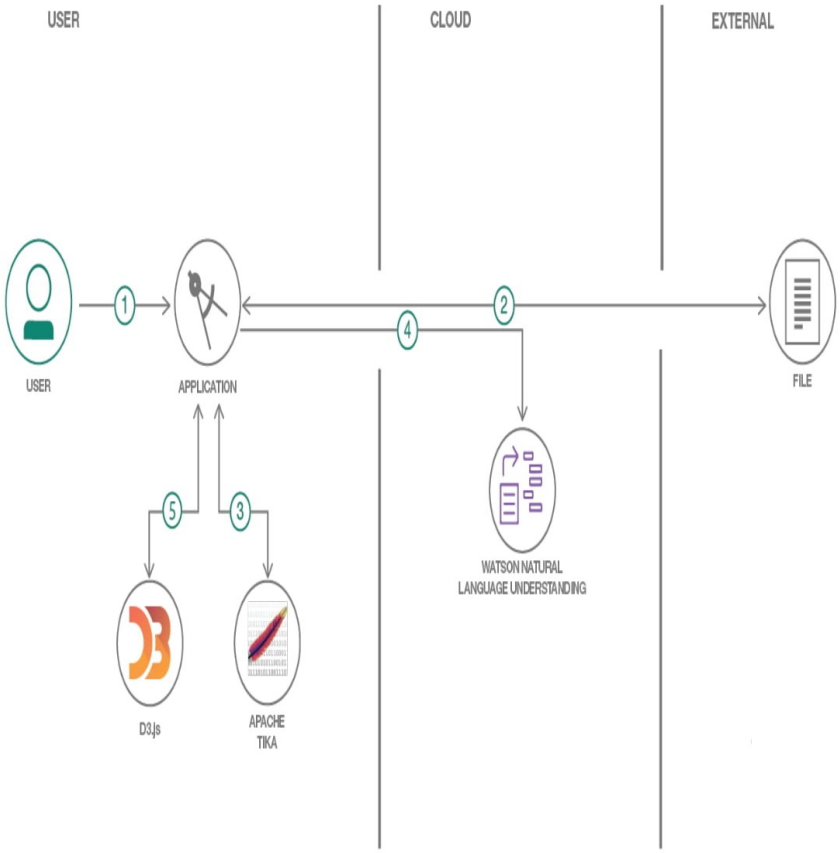


FIGURE 5.1

5.2 SOLUTION ARCHITECTURE

Solution architecture makes it easier to visualize how various business, informational, and technological components come together in a given solution. Therefore, a solution architecture diagram should represent the aforementioned three essential components in a form that is helpful to engineers as well as business stakeholders. A solution architecture diagram could actually be a collection of diagrams outlining different layers of the architecture, depending on how complicated the deployment is. The diagram relates the information that you gather on the environment to both physical and logical choices for your architecture in an easily understood manner.

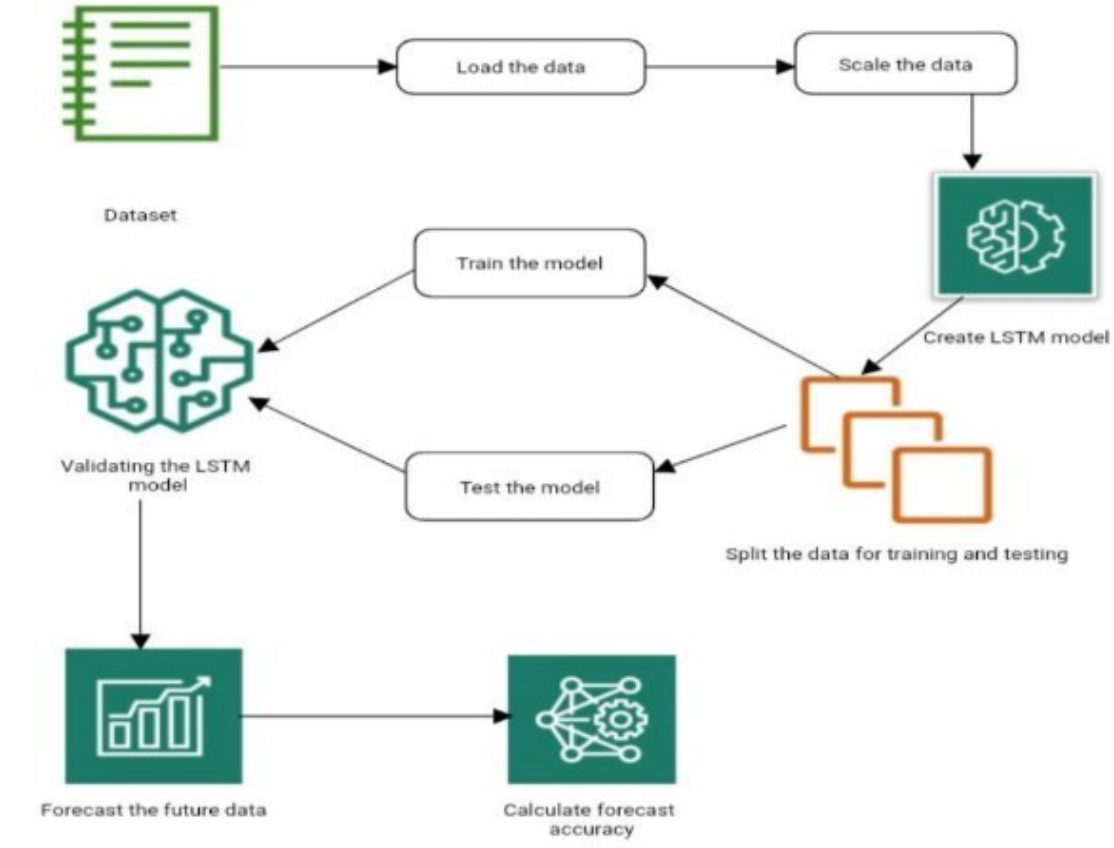


FIGURE 5.2.1

TECHNICAL ARCHITECTURE

Technical architecture makes it easier to visualize how different technological, informational, and business elements work together to provide a particular solution. Therefore, the three aforementioned crucial elements should be represented in a solution architecture diagram in a way that benefits both engineers and business stakeholders. Depending on how complex the deployment is, a solution architecture diagram may actually be a set of diagrams illustrating various architectural layers. The figure makes it clear how the information you receive about the environment connects to the choices you make for your design, both physically and logically.

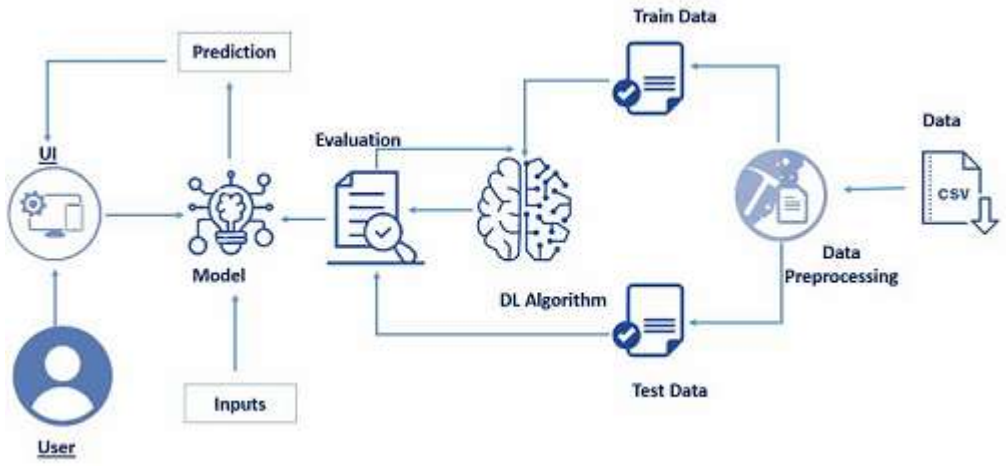


FIGURE 5.2.2

5.3 USER STORIES

The smallest piece of work in an agile system is a user story. It is a final objective, not a feature, as seen through the eyes of a software user. A user story is a casual, all-inclusive description of a software feature written from the viewpoint of the client or end user. A user story's objective is to describe how a piece of work will provide the customer with a specific value. Note that "customers" don't have to be external end users in the traditional sense they can also be internal customers or colleagues within your organization who depend on your team. User stories are a few sentences in simple language that outline the desired outcome. They don't go into detail. Requirements are added later, once agreed upon by the team.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Application	USN-1	You can download the crude oil price by opening the Google Play Store app directly as a user.	I can access own decisions.	High	Sprint-1
	Available Products	USN-2	Users of the application may instantly update the energy and oil prices while using it because there are so many different products in the crude oil price app.	I can receive the data once click then confirm	High	Sprint-1
	Additional Features	USN-3	Users can read the most recent news and see oil price charts. Major Energy Quotes User View The user may use many colour schemes.	I can view then read the price prediction.	High	Sprint-2
	Expectations	USN-4	User Can Convert Currency And Exchange Rates	I can expect	Medium	Sprint-1
	Login	USN-5	Log in as a user without using your email address, username, or password.		High	Sprint-1
Customer (Web user)			I can see the price of crude oil as a consumer.	I can view the price directly	High	Sprint-1
Customer Care Executive			I am the user and I executive the pricing history.	I can accept the terms	medium	Sprint-1
Administrator			As a manager, it anticipates the results.	Show the result	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

Planning - Planning is figuring out what materials and resources will be required to satisfy current and future demand. Making ensuring you have the resources and supplies you need on hand to complete your orders on time requires completion of this stage. This component deals with the "what" and "how" of each project: specifically, what needs to be done and how it will be done.

Scheduling - The time of the utilization of specific organizational resources is determined by scheduling. In manufacturing, scheduling entails creating schedules for personnel, machinery, and supplies. By allocating the proper resources to finish the production plan within a certain time frame, it addresses the "when" of a project. Your facility will be able to cut expenses, boost productivity, and deliver goods on time if you create efficient production schedules. It is crucial to have a production plan that is in line with the resource and material scheduling process in order to develop precise and realistic production plans that enable manufacturers to respond swiftly to changes. The bigger the divergence, the larger the cost.

6.1 SPRINT PLANNING AND ESTIMATION

Planning:

The team decides what it will develop and how it will build it during the sprint planning phase. After breaking user stories down into tasks and performing task-level estimation, the team commits to the Sprint target. The Product Owner, Scrum Master, and Team coordinate sprint planning. Each project in Scrum is divided into sprints, which are time chunks that are typically 2-4 weeks long. The Scrum Team, Scrum Product Manager, and Scrum Master gather for a sprint planning meeting to decide which backlog items will be tackled during the following sprint.

Estimation:

During the Sprint Planning Meeting, the entire team estimates in Scrum projects. The goal of the estimation would be to priorities the User Stories for the Sprint and assess the team's capacity to complete them inside the Sprint's Time Box. The prioritized User Stories are moved

to the top of the Product Backlog by the Product Owner, who also makes sure they are clear and can be estimated. The Scrum Team will take care to choose the User Stories for the Sprint based on the size of the Product Increment and the effort necessary for the same, as the Scrum Team as a whole is accountable for the delivery of the product increment. The size of the Product Increment is estimated in terms of User Story Points. Once the size is determined, the effort is estimated by means of the past data, i.e., effort per User Story Point called Productivity.

SPRINT	FUNCTIONAL REQUIREMENT	USER STORY	USER STORY / TASK	STORY POINTS	PRIORITY	MEMBERS
1	Registration	1	Register for the Application	2	High	2
2	Confirmation	2	Receiving Confirmation Mail	1	Medium	2
2	Login	3	Log in into the application	2	High	2
1	Enquiry	4	Enter the range of dates	2	Medium	2
1	Visualize	5	Visualize the Trend	2	High	2
1	Endowment	6	See the result	2	High	2
2	Utilization	7	Log Out	1	Medium	2

6.2 SPRINT DELIVERY SCHEDULE

Sprints are time-limited events, thus it's important to cut down on wastage during planning and production. And this is the very situation in which sprint scheduling comes into play. If you're not familiar, a sprint schedule is a written summary of the entire sprint planning process. It's one of the initial steps in the agile sprint planning process, and it calls for sufficient investigation, preparation, and coordination. When there are too many schedules created by a team, problems can arise. Conflict can result from this, and projects may get derailed in the middle of their cycles. One schedule makes sense to make sure everything proceeds as planned.

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	03 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	10 Oct 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	17 Oct 2022

6.3 Reports from JIRA

A burn down chart plots the amount of work remaining to perform against the amount of time. In agile software development approaches like Scrum, it is frequently employed. Burn down charts, however, can be used for any project that makes observable progress over time. A burn down chart typically has time along the horizontal axis and the amount of unfinished work on the vertical axis. When estimating when all of the work will be finished, it is helpful. The Development Team updates the Sprint Burn Down and plans the day's remaining tasks at the Daily Scrum.

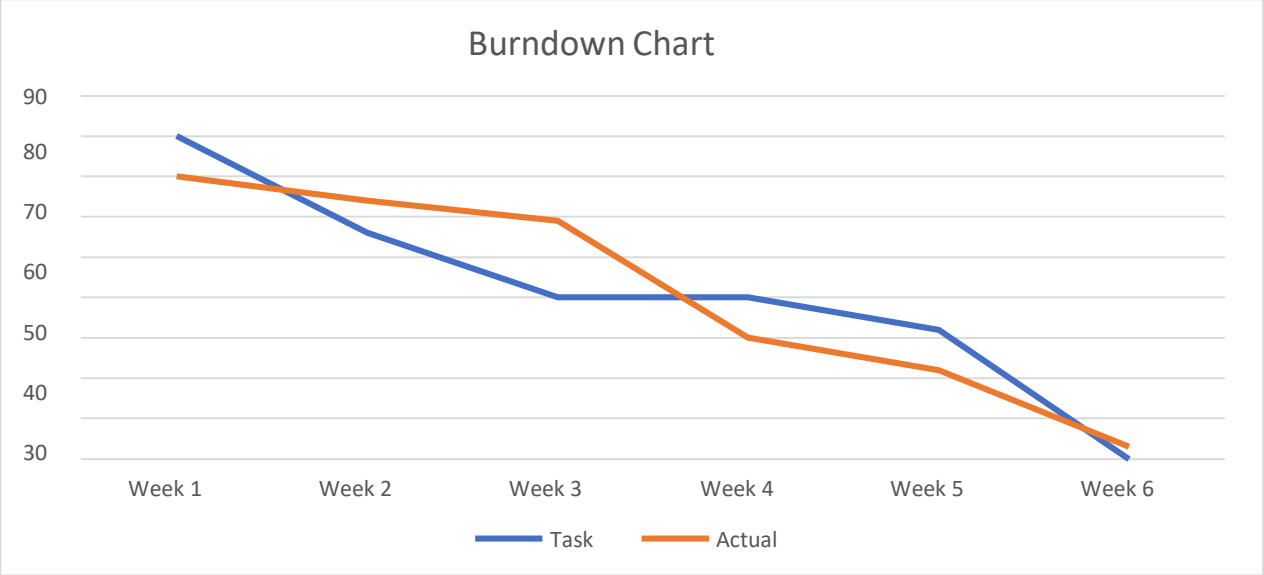


FIGURE 6.3

7. CODING AND SOLUTIONING

7.1 Feature 1

app.py

```
import numpy as np

from flask import Flask,render_template,request

from tensorflow.keras.models import load_model

app=Flask(_name_)

model=load_model('crude.h5',)

@app.route('/')

def home():

 return render_template("index.html")

@app.route('/about')

def home1():

 return render_template("index.html")

@app.route('/predict')

def home2():

return render_template("web.html", showcase="")

@app.route('/login',methods=['POST'])

def login():

x_input=[]

for i in request.form:
```

```
x_input.append(float(request.form[i]))
    x_input=np.array(x_input).reshape(1,-1)
    temp_input=list(x_input)
    temp_input=temp_input[0].tolist()
    lst_output=[]
    n_steps=10
    i=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_steps,1))
            yhat=model.predict(x_input,verbose=0)
            print("{} day output {}".format(i,yhat))
            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
    return render_template("web.html",showcase='Next Day Predicted Price
Is:'+str(lst_output[0][0]))
if _name=='main_':
app.run(debug=True,port=5000)
```

Output:

```
(base) C:\Users\navee>cd C:\Users\navee\OneDrive\Desktop\ibm\Flask
(base) C:\Users\navee\OneDrive\Desktop\ibm\Flask>python app.py
Debugger is active!
Debugger PIN: 342-672-433
Running on http://127.0.0.1:5000/
```

7.2 Feature 2

index.html

```
<html>
<head>
<title>Home</title>
 <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
<style>
body
{
background-image:url("https://etimg.etb2bimg.com/photo/94227420.cms");
background-position: center;
font-family:Times-new roman;
background-size:cover;
margin-top:40px;
}
.pd{
padding-bottom:100%;}
.navbar
{
margin-left:10px;
```

```
padding:10px;
background-color:hsl(180, 96%, 52%);
font-family:'Roboto',sans-serif;
font-style: italic;
border-radius:30px;
font-size:30px;
box-sizing: border-box;
max-width: 18%;
text-align:right;
}
a
{
color:grey;
float:right;
text-decoration:none;
font-style:normal;
padding-right:20px;
}
a:hover{
background-color:black;
color:white;
```

```
border-radius:15px;0

font-size:30px;

padding-left:10px;

}

p

{

color:turqouise;

font-style:italic;

font-size:30px;

text-align: left;

padding-left: 500px;

text-align: justify;

}

</style>

</head>

<body>

<div class="navbar">

<a href="/predict" >Predict</a>

<a href="/">Home</a>

<br>

</div>
```


Crude Oil Price Prediction

</body>

</html>

Output:

FIGURE 7.2.1

Web.html

```
<html>
 <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
<style>
div.header{
  top: 0;
  position: fixed;
  padding-left: 400px;}
div.header1{
  top:20;
  position: fixed;
  padding-left: 490px;
}
*{
  margin:0;
padding:0;
border:0;
outline:0;
text-decoration:none;
font-family:montserrat;
```

```
}
.navbar
{
margin-left:10px;
padding:10px;
background-color:hsl(180, 96%, 52%);
font-family:'Roboto',sans-serif;
font-style: italic;
border-radius:30px;
font-size:30px;
box-sizing: border-box;
max-width: 18%;
text-align:center;
}
a:hover{
background-color:black;
color:white;
border-radius:16px;0
font-size:30px;
padding:10px;
}
```

```
body

{

background-image:url("https://feeds.abplive.com/onecms/images/uploaded-images/2022/08/25/b763c80cc62950ec1bf529dd135bba8f1661390102565370_original.webp?impolicy=abp_cdn&imwidth=720");

background-position: center;

font-family:sans-serif;

background-size:cover;

margin-top:40px;

}

.main input[type="text"],.main input[type="text"],.main input[type="text"],.main input[type="text"],.main input[type="text"],.main input[type="text"]

{

border:0;

background:none;

display:block;

margin:20px auto;

text-align:center;

border:2px solid #800080;

padding:15px 3px;

width:400px;

outline:none;
```

```
color:white;
border-radius:100px;
transition:0.25s;
font-size:20;
}
.bor{
border:0;
background:none;
display:block;
margin:20px auto;
text-align:center;
border:2px solid #800080;
padding:10px 3px;
width:500px;
outline:none;
color:white;
transition:0.25s;
}
.main input[type="text"]:focus,.main input[type="text"]:focus,.main input[type="text"]:focus,.main input[type="text"]:focus,.main input[type="text"]:focus,.main input[type="text"]:focus,.main input[type="text"]:focus
{
```

```
width:280px;
border-color:#8e44ad;
}
.logbtn{
display:block;
width:35%;
height:50px;
border:none;
border-radius:24px;
background:linear-gradient(120deg,#3498db,#8e44ad,#3498db,#8e44ad);
background-size:200%;
color:#fff;
outline:none;
cursor:pointer;
transition:.5s;
font-size:25;
}
.logbtn:hover{
background-center;
}
input::placeholder{
```

```
color:#F5FFFA;

}


.bottom-text{

margin-top:60px;

text-align:center;

font-size:13px;

}

</style>

<body>

<div class="navbar">

<a href="index.html">Home</a>

<br>

</div>

<center><div><font color="Powderblue" font-family="sans-serif" size=8 >

<b>

Prediction On Progress</b></font></div></center>

<br><br><br><br>

<form class="main" action="/login" method="post">

<br>

<font size=20>
```

<input type="text" name="year1" placeholder="Enter previous 10th day price"/>

<input type="text" name="year2" placeholder="Enter previous 9th day price"/>

<input type="text" name="year3" placeholder="Enter previous 8th day price"/>

<input type="text" name="year4" placeholder="Enter previous 7th day price"/>

<input type="text" name="year5" placeholder="Enter previous 6th day price"/>

<input type="text" name="year6" placeholder="Enter previous 5th day price"/>

<input type="text" name="year7" placeholder="Enter previous 4th day price"/>

<input type="text" name="year8" placeholder="Enter previous 3th day price"/>

<input type="text" name="year9" placeholder="Enter previous 2nd day price"/>

<input type="text" name="year10"placeholder="Enter previous 1st day price"/>

<input type="submit" class="logbtn" value="Predict">

{{showcase}}

</form>

</body>

</html>

Output:

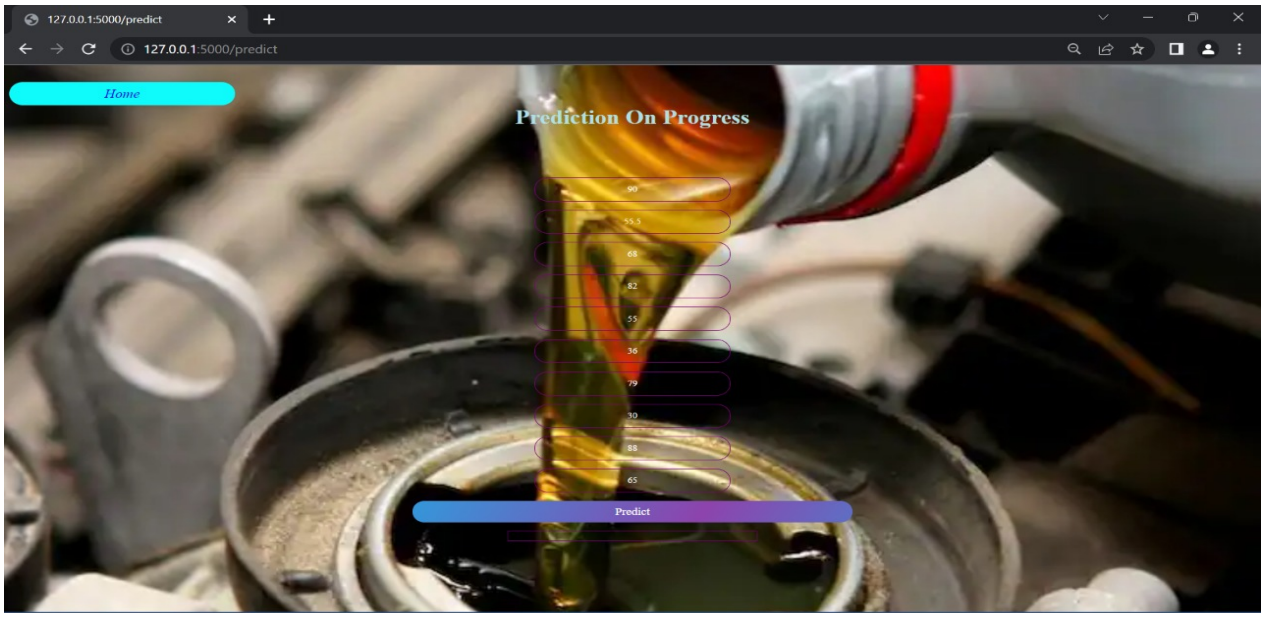


FIGURE 7.2.2

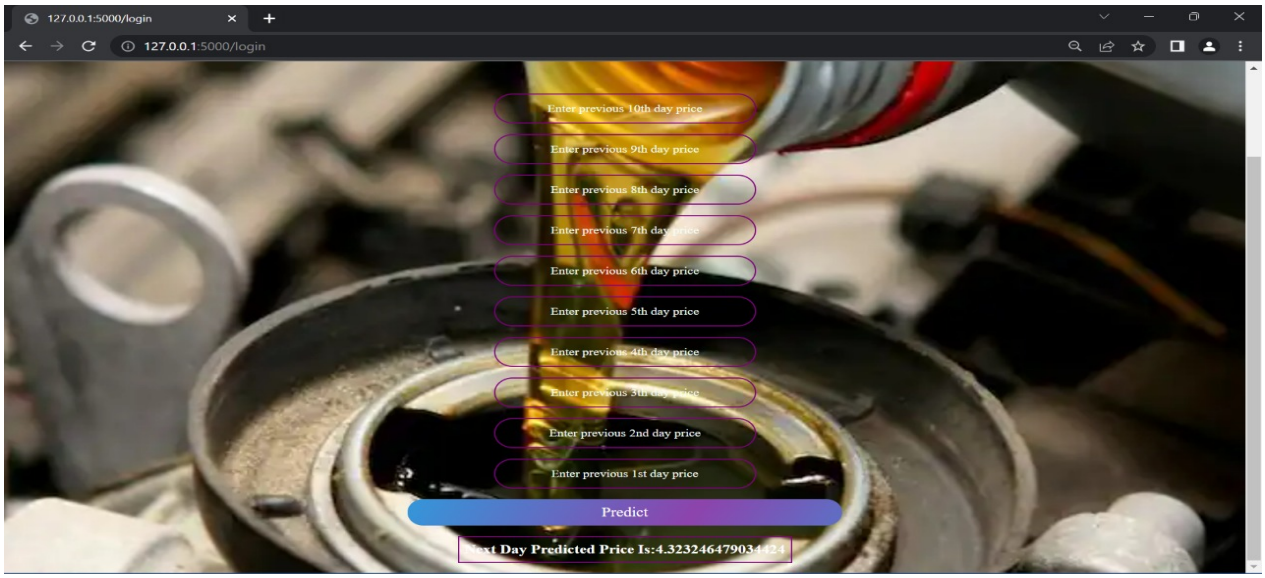


FIGURE 7.2.3

8. TESTING

8.1 TEST CASES

A test case is a series of operations carried out on a system to see if it complies with software requirements and operates properly. Preconditions, case name, input requirements, and anticipated outcome are all included in test case design. An action at the first level, test cases is derived from test scenarios.

8.2 USER ACCEPTANCE TESTING

Beta testing or end-user testing, commonly referred to as user acceptance testing (UAT), is the process of having users test software to evaluate if they will accept it or not. Once the functional, system, and regression testing is finished, this is the last testing carried out. This testing's primary goal is to confirm that the software meets the necessary standards for the business. End users that are familiar with the business requirements perform this validation. Different types of acceptance testing include UAT, alpha testing, and beta testing. The user acceptance test is the last testing done before the product goes live, thus it stands to reason that this is the last opportunity for the customer to evaluate the software and determine whether it is appropriate for the task at hand. User acceptance testing is necessary after software has undergone Unit, Integration, and System testing because developers may have created the software based on the requirements document according to their own interpretation and additional required changes during development may not have been effectively communicated to them. This makes it necessary to test whether the client's or end-acceptance user's of the final product.

9. RESULTS

9.1 PERFORMANCE METRICS

Performance metrics are defined as figures and data representative of an organization's actions, abilities, and overall quality. There are many different forms of performance metrics, including sales, profit, return on investment, customer happiness, customer reviews, personal reviews, overall quality, and reputation in a marketplace. Performance metrics can vary considerably when viewed through different industries. Performance metrics are integral to an organization's success. It's important that organizations select their chief performance metrics and focus on these areas because these metrics help guide and gauge an organization's success. Key success factors are only useful if they are acknowledged and tracked.

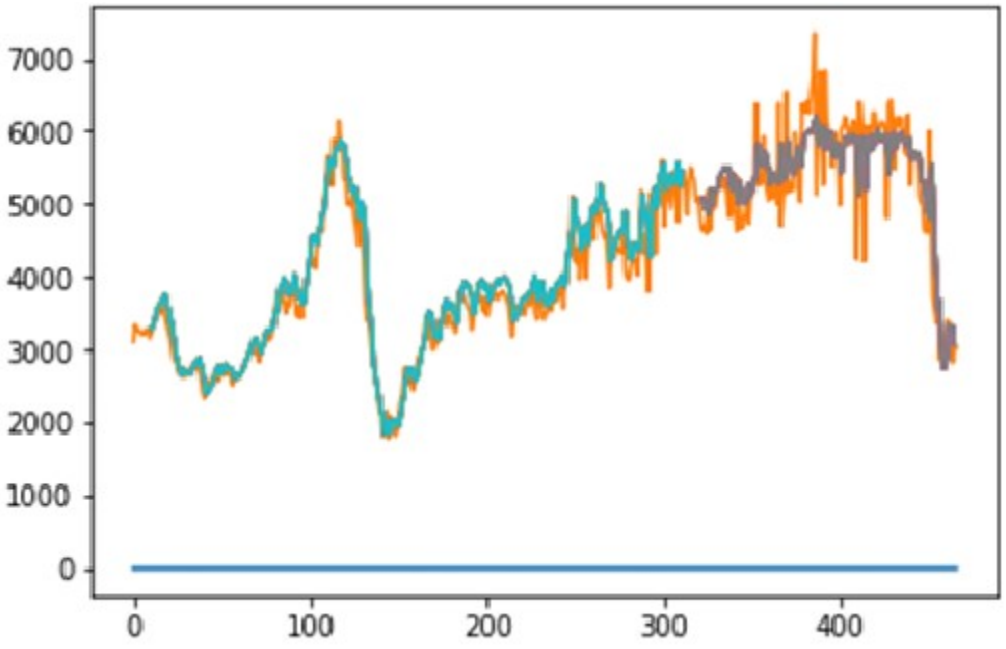


FIGURE 9.1

10. ADVANTAGES AND DISADVANTAGES

Advantages

- 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.
- It will assist the government in determining the price of gasoline the following day.
- This method will aid in predicting crude oil prices without the use of human labor.
- This method also benefits the people.
- The people will be aware of our country's economy.

Disadvantages

- Much of our oil must be imported, and it is becoming increasingly expensive as reserves dwindle and imports rise.
- Producing electricity from crude oil is more expensive than producing electricity from coal or gas.

11. CONCLUSION

In this project, we presented a system for predicting crude oil prices. Using Artificial Intelligence, we propose a modern and innovative method of predicting crude oil prices (AI). The main advantage of this AI approach is that it constantly captures the volatile pattern of crude oil prices. The volatility of the crude oil market and its knock-on effects on the global economy heightened public and private sector interest and fear. The price of crude oil has a significant impact on the global economy. Crude oil prices have fluctuated more than any other commodity price in recent years. Because crude oil prices are affected by a variety of external factors and are volatile, forecasting crude oil prices is difficult. LSTM based on a recurrent neural network performed better in predicting volatile prices. The significant crude oil price is evaluated and modeled using this model.

12. FUTURE ENHANCEMENT

This further research is implementing the proposed algorithm with the existing public datasets. Also, various prediction algorithms can be implemented to improve accuracy. 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

SOURCE CODE: https://github.com/IBM-EPBL/IBM-Project-1135-1658376145