Project Report Format

1. INTRODUCTION

1.1 PROJECT OVERVIEW

Crude oil is the world's most leading fuel. The main advantages of crude oil are it has high density, it is easily available. Oil is used in almost all the industries. Oil is a Constant Power Source. Oil energy is very reliable when compared to other sources such as solar and wind energy. Some machine learning models fit the data set efficiently depending upon the type of data points provided. The main aim of this project is to find the different models that efficiently fit the data points and predict the price of fuel with the help of machine learning models. This project works on comparing the different supervised learning models and brings a conclusion based on the efficiency. We have used 3 supervised learning models namely, Random Forest Regression, Linear Regression and Decision Tree Regression to know which gives the best in terms of accuracy and performance. These algorithms give a numeric value as output. So we can compare the output of these models with the actual models.

Now-a-days the oil price has been increasing in leaps and bounds due to certain reasons like inflation throughout the world. Hence these are derived or extracted from petroleum . The sources of crude oil for India come from neighboring countries such as Dubai and Saudi-Arabia. To predict the values of petroleum like petroleum and Diesel within the future, we've decided to use the Machine Learning algorithms and apply ensemble learning. Ensemble learning is a technique where we use different algorithms or single algorithms many times. In this way we can compare different algorithms and find the best one for our problem statement.

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 errors involves composite supply-demand structures. Crude oil volatility has a critical effect on economic factors which includes economic increase of the country, unemployment, exchange rate that moreover depends on crude oil export and import. In current days machine learning techniques can be implemented in various applications. Machine learning gives powerful computational tools and algorithms that are capable of learning itself and predict data with long short-term memory.

This paper contains LSTM based recurrent neural networks for the matter of crude oil price prediction. Recurrent neural networks (RNN) identifies to be the most powerful and impact models for processing time-series based sequential data. LSTM variants can be used for other task as well other than prediction such as speech, handwriting and polyphonic modeling. The hyper parameters of variants were assessed using random search and using variance framework.

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.

This Guided Project mainly focuses on applying Neural Networks to predict the Crude Oil Price. This decision helps us to buy crude oil at the proper time. Time series analysis is the best option for this kind of prediction because we are using the previous history of crude oil prices to predict future crude oil. So we would be implementing RNN (Recurrent Neural Network) with LSTM (Long Short Term Memory) to achieve the task.

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

Survey 1:

Jiayu Yi And Yuxiang Cheng (2019)

"Multi-Scale Volatility and External Event Analysis of Crude Oil Price Prediction".

crude oil price fluctuations and analyze the impacts of external events, this paper first employs the CEEMD method to decompose the crude oil historical prices into different components and extracts a market fluctuation, a shock from extreme events, and a long-term trend. And we find that when determining the crude oil prices, the shock from extreme events has become the most important factor. Then we combine the ICSS test with the Chow test to get the structural breaks and analyze extreme event impacts. Finally, considering the interaction between external event impacts and crude oil prices,we establish the models based on VAR, SVM, and structural breaks to predict the crude oil prices, finding that the CEEMD- VAR-SVM model with structural breaks performs best compared to other models we established.

Survey 2:

Lu-Xi Liu AND Ming -Fang Li (2020)

"Google Index-Driven Oil Price Value-at-Risk Forecasting: A Decomposition Ensemble Approach"

The oil price is in fl-fluctuations not only by the fundamentals of supply and demand but also by unpredictable political conflicts, climate emergencies, and investor intentions, which cause enormous short term fl fluctuations in the oil price. The proposition of the Google index-driven decomposition ensemble model to forecast crude oil price risk uses big data technology and a time series decomposition method. First, by constructing an index of investor attention for the market and emergencies combined with a bi variate empirical mode decomposition, we analyze the impact of investor attention on oil price fl- fluctuations. Second, we establish a vector auto regression model, and the impulse responses define the impact of emergencies on the crude oil price. Finally, with the help of machine learning and historical simulation methods, the risk of crude oil price shocks from unexpected events is predicted. Empirical research demonstrates that concerns related to the oil market and emergencies that appear in Google search data are closely related to changes in oil prices. Based on the Google index, our model's prediction of crude oil prices is more accurate than other models, and the prediction of value-at-risk is closer to the theoretical value than the historical simulation with the ARMA forecasts method.

Survey 3:

Azubuike H . Amadi , Orisa F. Ebube ,Silas I . Aire (2020)

"Effects of Covid-19 on Crude Oil Price and Future Forecast Using a Model Application and Machine Learning"

Oil Price has been a benchmark governing the trade of oil and gas globally. It is fixed by producing countries or countries in a consortium through organizations such as Organization of the Petroleum Exporting Countries (OPEC) or a particular mix of crude oil such as the West Texas Intermediate (WTI) or Brent. The spot price and future prices of crude oil is basically determined by demand and supply, however, some external factors can have great influence on oil price. This research work will be emphasizing on the direct and indirect effects of the COVID-19 pandemic as an external factor other than demand and supply on the benchmarks of oil pricing between 2000 and 2020. Having analyzed the various oil price fluctuation which have caused by several factors over the years, this research went further to identify those significant factors, weigh them and input them into a model that will generate simulated oil prices of past, present and future benchmarks with relation to demand, supply, production cost and other external factors. This model was also validated using machine learning algorithms and real data of previous yearly average oil price noting the reasons for each spot price. Significant recommendations were made on the use of this model for fixing oil price benchmarks as variables to each benchmark are numerous.

Survey 4:

Hongli Niu And Yazhi Zhao (2021)

"Crude oil prices and volatility prediction by a hybrid model based on kernel extreme learning machine".

In view of the important position of crude oil in the national economy and its contribution to various economic sectors, crude oil price and volatility prediction have become an increasingly hot issue that is concerned by practitioners and researchers. In this paper, a new hybrid forecasting model based on variation al mode decomposition (VMD) and kernel extreme learning machine (KELM) is proposed to forecast the daily prices and 7-day volatility of Brent and WTI crude oil. The KELM has the advantage of less time consuming and lower parameter-sensitivity, thus showing fine prediction ability. The effectiveness of VMD-KELM model is verified by a comparative study with other hybrid models and their single models. Except

various commonly used evaluation criteria, a recently-developed multi-scale composite complexity synchronization (MCCS) statistic is also utilized to evaluate the synchrony degree between the predictive and the actual values. The empirical results verify that 1) KELM model holds better performance than ELM and BP in crude oil and volatility forecasting; 2) VMD-based model outperforms the EEMD-based model; 3) The developed VMD-KELM model exhibits great superiority compared with other popular models not only for crude oil price, but also for volatility prediction.

Survey 5:

Xinran Gao,Junwei Wang And Liping Yang (2022)

"An Explainable Machine Learning Framework for Forecasting Crude Oil Price during the COVID-19 Pandemic ".

      Financial institutions, investors, central banks and relevant corporations need an efficient and reliable forecasting approach for determining the future of crude oil price in an effort to reach optimal decisions under market volatility. This paper presents an innovative research framework for precisely predicting crude oil price movements and interpreting the predictions. First, it compares six advanced machine learning (ML) models, including two state-of-the-art methods: extreme gradient boosting (XGB) and the light gradient boosting machine (LGBM). Second, it selects novel data, including user search big data, digital currencies and data on the COVID-19 epidemic. The empirical results suggest that LGBM outperforms other alternative ML models. Finally, it proposes an interpretable framework for facilitating decision making to interpret the prediction results of complex ML models and for verifying the importance of various features affecting crude oil price. The results of this paper provide practical guidance for participants in the crude oil market.

Survey 6:

M.Rajeswari , S. Ramya , A ArunPrasath (2022)

"OIL PRICE PREDICTION USING MACHINE LEARNING MODEL".

      Machine Learning allows programming applications to be more precise in predicting outcomes without having to explicitly customize it to try to do it. Oil plays an important part in the energy consumption of the world. The sharp rise in oil prices is shaking financial stocks globally. Because of non-linear factors, old statistical models are not suitable for accurately mpts us to mandate as a commitment to give a simple consent to the subsequent representation of oil price data and its related Index .

2.2 REFERENCES

1.   An, Jaehyung. "Oil price predictors: Machine learning approach." 670216917 (2019).

2.   Haykin, S. (1999). Neural Networks: A Comprehensive Foundation, 2nd edition, Prentice Hall, 842

3.   Gupta, Nalini, and Shobhit Nigam. "Crude oil price prediction using artificial neural network." Procedia Computer Science170 (2020): 642-647.

4.   Nandan Pandey. "Crude Oil Stock Price." Kaggle, 22

July 2020, www.kaggle.com/awadhi123/crude-oilstock-price.

5.   Coupland, Christine, and Andrew D. Brown. "Constructing organizational identities on the web: A case study of Royal Dutch/Shell." Journal of management studies 41.8 (2004): 1325-1347

6.   Kaufmann, R. K., & Ullman, B. (2009). Oil prices, speculation, and fundamentals: Interpreting causal relations among spot and futures prices. Energy Economics, 31(4), 550–558.

7.   Shobhit Nigam. "Chapter 84 Single Multiplicative Neuron Model in Reinforcement Learning" , Springer Science and Business Media LLC, 2019

2.3 PROBLEM STATEMENT DEFINITION

      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.

      Crude oil prices react to many variables, including supply and demand prospects and the perceived risk of market disruptions. Economic growth can drive up the demand for crude oil, while slowdowns tend to lower demand and prices.Crude oil prices react to many variables, including supply and demand prospects and the perceived risk of market disruptions. Economic growth can drive up the demand for crude oil, while slowdowns tend to lower demand prices.High oil prices can drive job creation and investment as it becomes economically viable for oil companies to exploit higher-cost shale oil deposits. However, high oil prices also hit businesses and consumers with higher transportation and manufacturing costs.

Factors That Influence Pricing Of Oil And Gas

      Demand,Supply

      Speculation, Demand for Oil.

      Temporary Price Fluctuations.

      Investing in Oil and Gas Drilling.

| I am	I'm trying to	But	Because	Which makes me feel
a Developer	future oil low cost for market	exporters in exporting countries	generate revenue by selling our application	I feel about the future price prediction

3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

It's easy to jump straight into value proposition design. That is the core of your business and where the revenue or exchange of value will come from. However, trying to provide value to a misunderstood customer is very risky business. Do you have your blinkers on? Try using this canvas before you design your value proposition to make sure your offer nails exactly what your customer wants, needs, or may pleasantly surprise them! Keep asking yourself "why would they care?". What problem are you solving? What opportunity are you creating? In this empathy map what customer think and feels. this map shows the pain and gain of the customer and what do their hear about the problem. this is the easy way to understand the problem statement

3.2 IDEATION & BRAINSTORMING
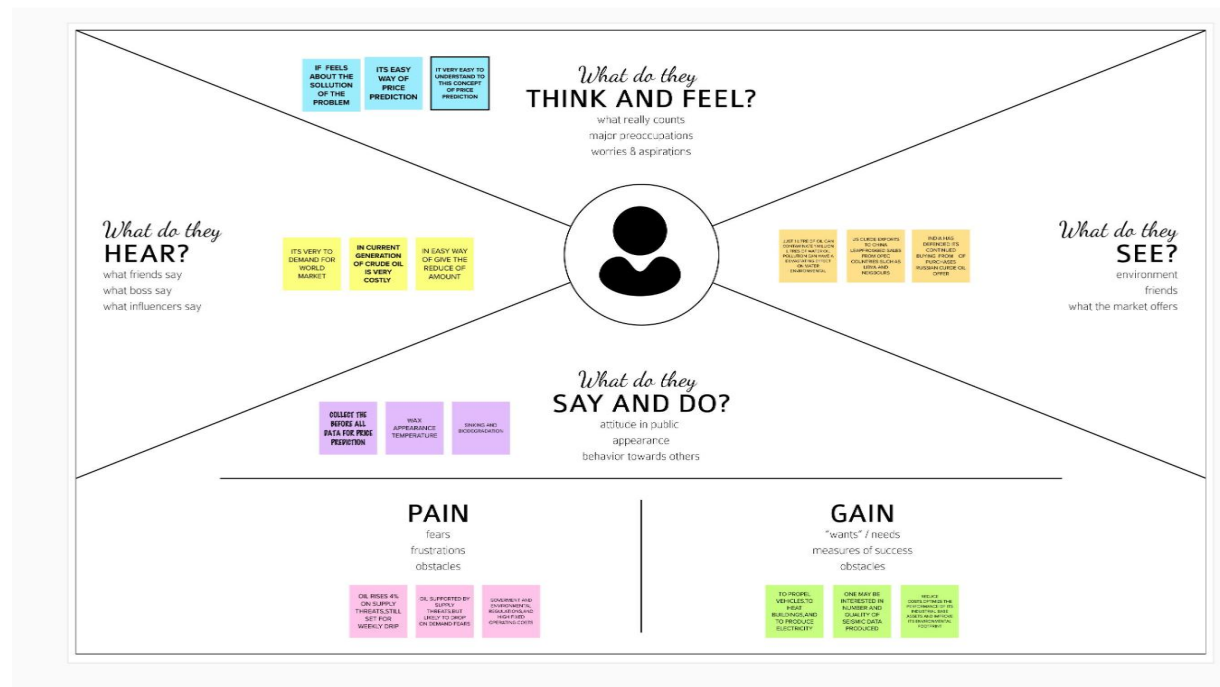
Brainstorming is **a method of generating ideas and sharing knowledge to solve a particular commercial or technical problem, in which participants are encouraged to think without interruption**. Brainstorming is a group activity where each participant shares their ideas as soon as they come to mind
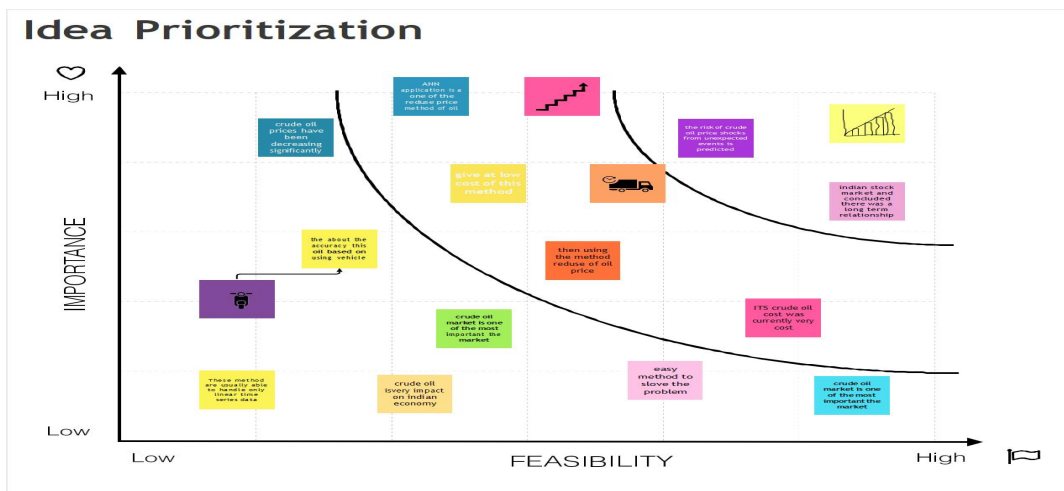
3.3 PROPOSED SOLUTION

Prediction of future crude oil price considered a significant challenge to the extremely complex,and dynamic nature of the market and stakeholders perception. Generate Revenue by Selling our application.The crude oil price movements are subject to diverse influencing factors.
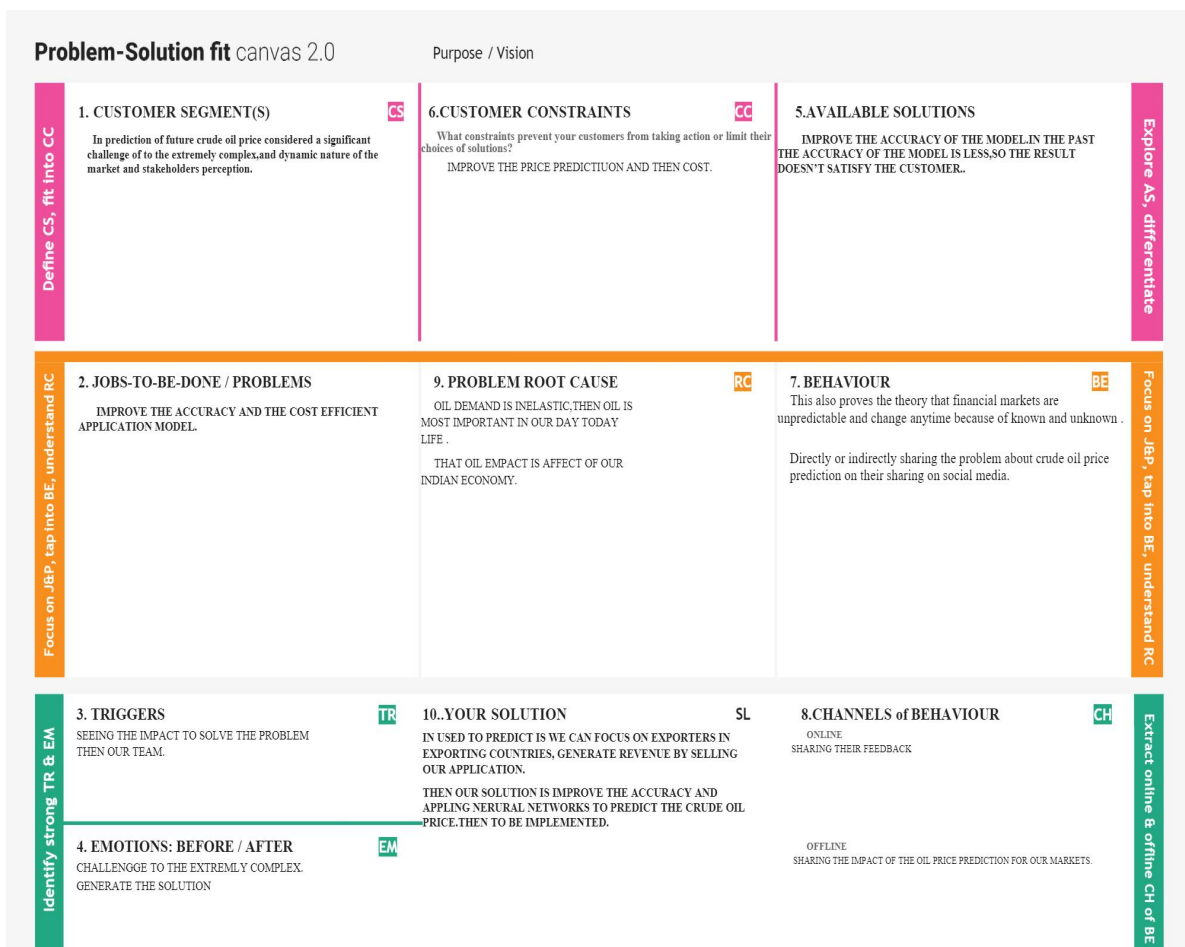
Includes on applying neural networks to predict the crude oil price .we are using the previous history of crude oil prices to predict future crude oil .so,we would implement and improve to accuracy model.

Our aim is to build an application of heart diseases prediction system using Flask and deployed on Heroku. A csv file is given as input . After the successful completion of operation the result is predicted and displayed.

3.4 PROBLEM SOLUTION FIT

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. After having identified the target customer segment, it's time to **investigate their needs**. One of the cheapest, fastest and most informative things to do at this stage is to meet with customers through **customer discovery interviews** (more about customer discovery interviews here and here) until we keep hearing the same things from customers.

Meeting with a customer is an invaluable source of insights, much more valuable than a survey.Besides, as entrepreneurs, our job is to meet and pitch to customers all the time, we'd be better off to start earlier rather than later.

Problem-Solution fit canvas 2.0   Purpose / Vision

Define CS, fit into CC

1. CUSTOMER SEGMENT(S)   `CS`

In prediction of future crude oil price considered a significant challenge of to the extremely complex,and dynamic nature of the market and stakeholders perception.

6.CUSTOMER CONSTRAINTS   `CC`

What constraints prevent your customers from taking action or limit their choices of solutions?

IMPROVE THE PRICE PREDICTIUON AND THEN COST.

5.AVAILABLE SOLUTIONS

IMPROVE THE ACCURACY OF THE MODEL.IN THE PAST THE ACCURACY OF THE MODEL IS LESS,SO THE RESULT DOESN'T SATISFY THE CUSTOMER..

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS

IMPROVE THE ACCURACY AND THE COST EFFICIENT APPLICATION MODEL.

9. PROBLEM ROOT CAUSE   `RC`

OIL DEMAND IS INELASTIC,THEN OIL IS MOST IMPORTANT IN OUR DAY TODAY LIFE .

THAT OIL EMPACT IS AFFECT OF OUR INDIAN ECONOMY.

7. BEHAVIOUR   `BE`

This also proves the theory that financial markets are unpredictable and change anytime because of known and unknown .

Directly or indirectly sharing the problem about crude oil price prediction on their sharing on social media.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS   `TR`

SEEING THE IMPACT TO SOLVE THE PROBLEM THEN OUR TEAM.

4. EMOTIONS: BEFORE / AFTER   `EM`

CHALLENGGE TO THE EXTREMLY COMPLEX. GENERATE THE SOLUTION

10..YOUR SOLUTION   SL

IN USED TO PREDICT IS WE CAN FOCUS ON EXPORTERS IN EXPORTING COUNTRIES, GENERATE REVENUE BY SELLING OUR APPLICATION.

THEN OUR SOLUTION IS IMPROVE THE ACCURACY AND APPLING NERURAL NETWORKS TO PREDICT THE CRUDE OIL PRICE.THEN TO BE IMPLEMENTED.

8.CHANNELS of BEHAVIOUR   `CH`

ONLINE
SHARING THEIR FEEDBACK

OFFLINE
SHARING THE IMPACT OF THE OIL PRICE PREDICTION FOR OUR MARKETS.

Extract online & offline CH of BE

4. REQUIREMENT ANALYSIS

A functional requirement defines a system or its component. A non-functional requirement defines the quality attribute of a software system. It specifies "What should the software system do?" It places constraints on "How should the software system fulfill the functional requirements?"

4.1 FUNCTIONAL REQUIREMENT

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Application	User Direct Open With Google Play Store App User Can Download The Crude Oil Price
FR-2	User Products Available	User Using The Application There Are So Many Products In Crude Oil Price App User Update The Energy And Oil Price Instant The Application
FR-3	User Additional Features	User Can Read Latest News And View Oil Price Charts User View Major Energy Quotes User Can Using A Multiple Color Themes
FR-4	User Exceptions	User Can Exchange Rates And Currancy Converter

## 4.2 NON-FUNCTIONAL REQUIREMENT

Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Used to improve to the Accuracy of crude oil price prediction
NFR-2	Security	In the rising oil price can even shift economical/political power from oil importers to oil exporters communications will be secured
NFR-3	Reliability	Reliability of the pointing towards high −risk components
NFR-4	Performance	Performance of the this project is to improve to the accuracy of crude oil price prediction
NFR-5	Availability	The Availability Solution is More Benefit for and the Importers and exporters in the crude oil price prediction.
NFR-6	Scalability	The scalability are 90%-95%

5.PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

A data flow diagram (DFD) is **a graphical or visual representation using a standardized set of symbols and notations to describe a business's operations through data movement**.
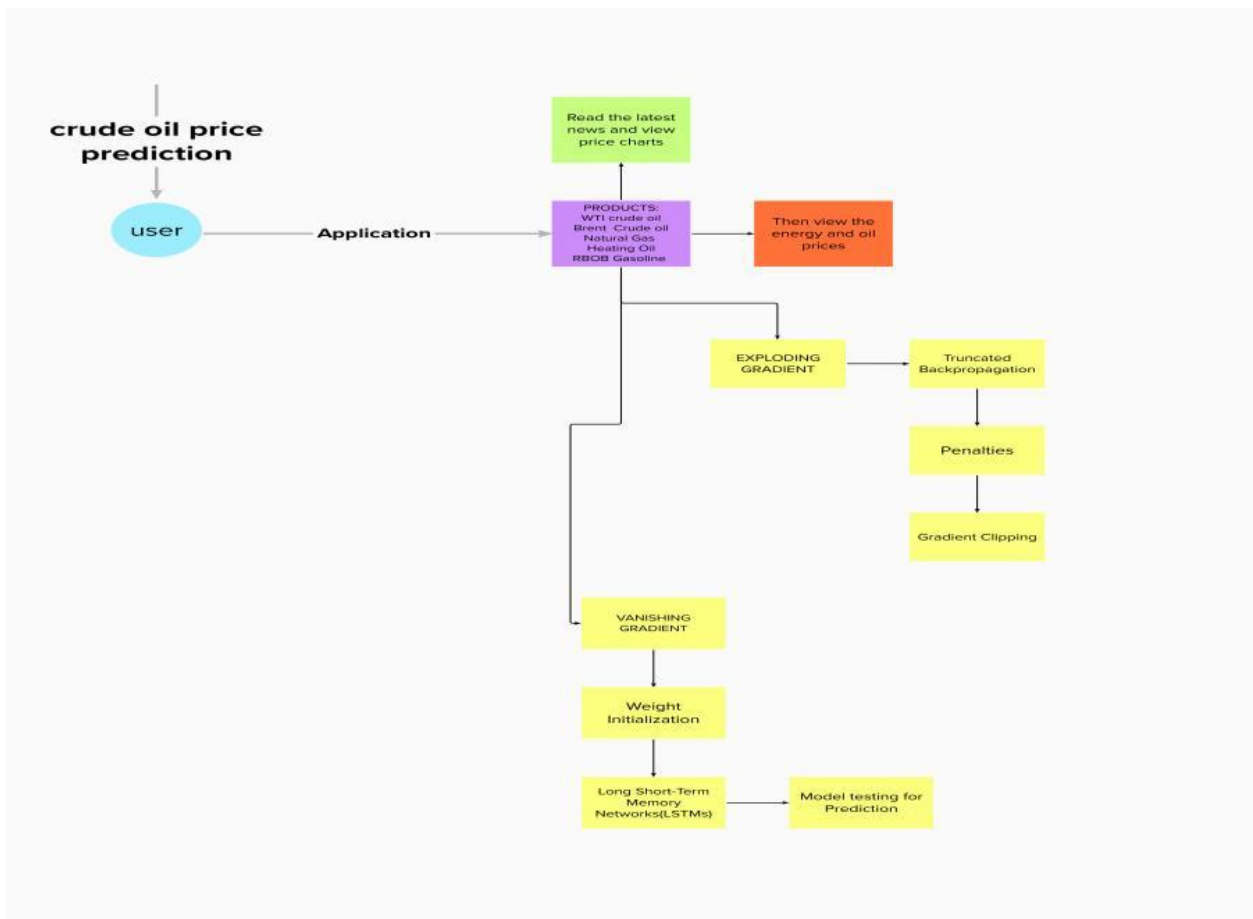

In this flow diagram we are showing that the crude oil price prediction.

5.2 SOLUTION AND TECHNICAL ARCHITECTURE

A solution architecture (SA) is **an architectural description of a specification solution**. SA combine guidance from different enterprise architecture viewpoints (business, information and technical), as well as from the enterprise solution architecture (ESA)
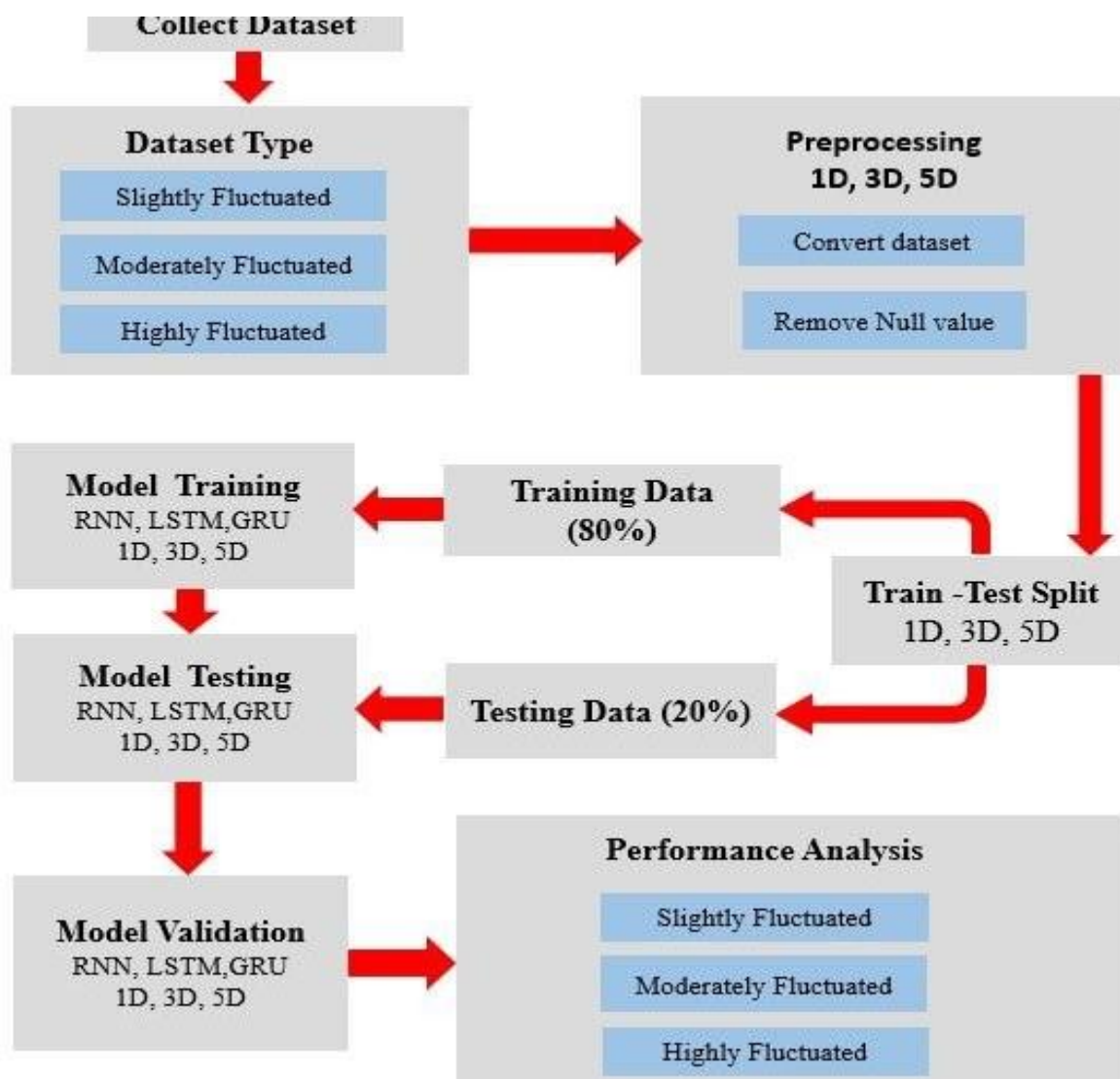
5.3 User Stories

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)	Application	USN-1	As a User Direct Open With Google Play Store App User Can Download The Crude Oil Price	I can access own decisions.	High	Sprint-1
	Available Products	USN-2	As a User Using The Application There Are So Many Products In Crude Oil Price App User Update The Energy And Oil Price Instant The application	I can receive the data once click then confirm	High	Sprint-1
	Additional Features	USN-3	As a User Can Read Latest News And View Oil Price Charts User View Major Energy Quotes User Can Using A Multiple Color Themes	I can view then read the price prediction.	High	Sprint-2
	Expectations	USN-4	User Can Exchange Rates And Currency Converter	I can expect	Medium	Sprint-1
	Login	USN-5	As a user, login directly then no email,username ,password.		High	Sprint-1
Customer (Web user)			As a user I can view the crude oil price	I can view the price directly	High	Sprint-1
Customer Care Executive			As a user I executive the given price history	I can accept the terms	medium	Sprint-1

6.PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create product backlog and sprint schedule

| Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a User Direct Open With Google Play Store App User Can Download The Crude Oil Price	2	High	Team leader, Team member 1
Sprint-1		USN-2	As a User Using The Application There Are So Many Products In Crude Oil Price App User Update The Energy And Oil Price Instant The application	1	High	Team leader, Team member1, Member2, member 3
Sprint-2		USN-3	As a User Can Read Latest News And View Oil Price Charts User View Major Energy Quotes User Can Using A Multiple Color Themes	2	Low	Team leader, Team member2, member 3
Sprint-1		USN-4	User Can Exchange Rates And Currency Converter	2	Medium	Team leader, Team member 1, member 3
Sprint-1	Login	USN-5	As a user, login directly then no email, username ,password.	1	High	Team leader, Team member1, member 2

6.2 SPRINT

DELIVERY&SCHEDULE

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on the selected project & gathering information by referring the, technical papers, research publications etc.	28 SEPTEMBER 2022
Prepare Empathy Map	Prepare Empathy Map Canvas to capture the user Pains & Gains, Prepare list of problem statements	11 OCTOBER 2022
Ideation	List the by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.	18 OCTOBER 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	23 OCTOBER 2022
Problem Solution Fit	Prepare problem - solution fit document.	15 OCTOBER 2022
Solution Architecture	Prepare solution architecture document.	10 OCTOBER 2022

Customer Journey	Prepare the customer journey maps to understand the user interactions & experiences with the application (entry to exit).	9 OCTOBER 2022
Functional Requirement	Prepare the functional requirement document.	20 OCTOBER 2022
Data Flow Diagrams	Draw the data flow diagrams and submit for review.	23 OCTOBER 2022
Technology Architecture	Prepare the technology architecture diagram.	26 OCTOBER 2022
Prepare Milestone & Activity List	Prepare the milestones & activity list of the project.	26 OCTOBER 2022
Project Development - Delivery of Sprint-1, 2, 3 & 4	Develop & submit the developed code by testing it.	12 NOVEMBER 2022.

6.3 REPORT FROM JIRA

A Burn down chart **shows the amount of work that has been completed in an epic or sprint, and the total work remaining**. Burn down charts are used to predict your team's likelihood of completing their work in the time available.

Burn down chart:
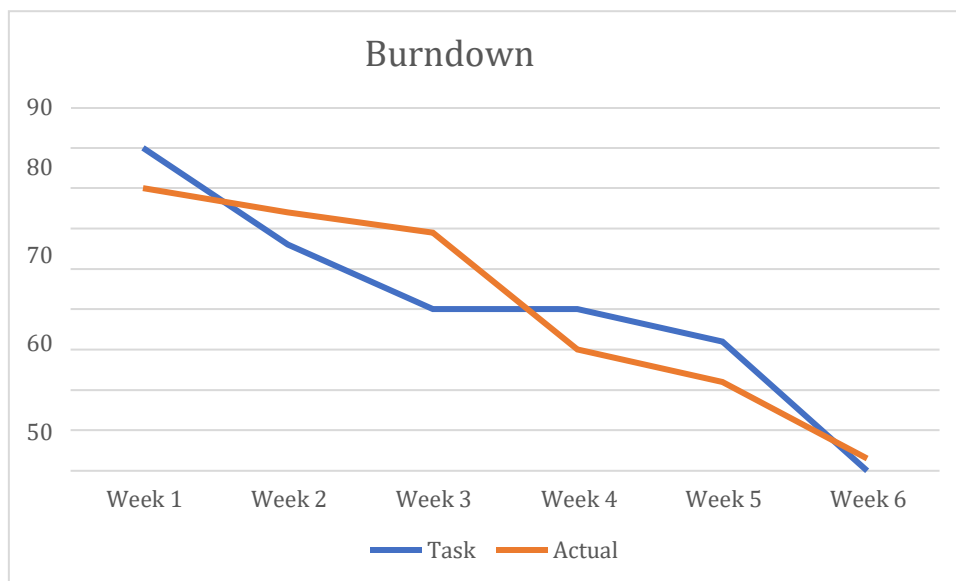
7. CODING & SOLUTIONING

7.1 FEATURE 1

```html
<!DOCTYPE html>
<html lang="en">
<head>
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Home page</title>
  <link rel="stylesheet" href="style.css">
</head>
<body>
  <div class="main">
    <div class="navbar">
      <div class="icon">
        <h2 class="logo">CRUDE OIL</h2>
      </div>
      <div class="menu">
        <ul>
          <li><a href="#">HOME</a></li>
          <li><a href="#">ABOUT</a></li>
          <li><a href="#">SERVICE</a></li>
          <li><a href="#">CONTACT</a></li>
```

```html
        </ul>

      </div>

      <div class="search">

        <input class="srch" type="search" name="" placeholder="Type To text"

      <a href="#"> <button class="btn">Search</button></a>

      </div>

    </div>

    <div class="content">

      <h1>Crude Oil<br><span>Price Prediction</span><br></h1>

      <p class="par"> Crude oil means a mixture of hydrocarbons that exists in
liquid phase in<br>

        natural underground reservoirs and remains liquid <br>at atmospheric
pressure

        after passing through <br>surface separating facilities.</p>

      <button class="cn"><a href="register.html">JOIN US</a></button>

      <div class="form">

        <h2>Login Here</h2>

        <input type="email" name="email" placeholder="Enter Email Here">

        <input type="password" name="" placeholder="Enter Password
Here">

        <button class="btnn"><a href="#">Login</a></button>

        <p class="link">Don't have an account<br>

        <a href="#">Sign up </a> here</a></p>

        <p class="liw">Log in with</p>
```

```html
            <div class="icons">

                <a href="#"><ion-icon name="logo-facebook"></ion-icon></a>

                <a href="#"><ion-icon name="logo-google"></ion-icon></a>

            </div>

        </div>

            </div>

        </div>

    </div>

  </div>

  <script src="https://unpkg.com/ionicons@5.4.0/dist/ionicons.js"></script>
</body>

</html>
```

7.2 FEATURE 2

```css
    color:#ff7200
}*{
   margin: 0;
   padding: 0;
}
body{
   background:url(cr.jpg);
   background-position: center;
   background-size: cover;
}
div.main{
   width: 400px;
   margin: 100px auto 0px auto ;
}
h2{
   text-align: center;
   padding: 20px;
   font-family: Arial;
}
div.register{
   background-color: rgba(0, 0, 0, 0.5);
```

```css
    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);

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-color: #000;

    box-shadow: inset 1px 1px 5px

    rgba(0, 0, 0, 0.3);
```

```css
}
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;

    color: #fff;

    transition: 0.4s ease;

    margin-bottom: 20px;
}
label,h2{

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

    color: #000;

    text-shadow: 1px 1px 5px rgba(0, 0, 0, 0.3);
}
```

```css
    font-size: 1.5vw; 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{
```

```css
        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;
```

```css
}
.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;
```

```css
    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;

    }
```

```css
.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%;

}
```

```css
    .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;
```

8.   TESTING

8.1 TEST CASES

A test case is nothing but **a series of step executed on a product, using a predefined set of input data, expected to produce a pre-defined set of outputs, in a given environment**. It describes "how" to implement those test cases. Test case specifications are useful as it enlists the specification details of the items. The purpose of testing is to discover errors . Testing is the process of trying to discover every conceivable fault or weakness in a work product . It provide a way to check the functionality of component , sub assemblies , assemblies and/or a finished product.

It is the process of exercising software with the intent of ensuring that the software system meets its requirement and user expectation and does not fail in an unacceptable manner. There are various types of testing. Each test type addressing a specific testing requirement.

The testing report are submitted in github.

Test case Template

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result
LoginPage_TC_OO1	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button	Registration	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Singup popup displayed or not	https://register.html/	Login/Signup popup should display
LoginPage_TC_OO2	UI	Login page	Verify the UI elements in Login/Signup popup	Receving Verification mail/Login	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Singup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Create account link e.Last password? Recovery password link	https://index.html/	Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Create account link e.Last password? Recovery password link

5	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation	BUG ID	Executed By
6	Registration	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Singup popup displayed or not	https://register.html/	Login/Signup popup should display	Working as expected	Pass	Steps are very clear to follow	Yes	1177	
7	Receving Verification mail/Login	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Singup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Create account link e.Last password? Recovery password link	https://index.html/	Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Create account link e.Last password? Recovery password link	Working as expected	Pass	Steps are very clear to follow	No	1177	

5	Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result
8	LoginPage_TC_O O3	Functional	Enquiry	Verify user is able to log into application with Valid credentials	Enter The Range Of Day	1.Enter the range of date	Date:11/07/2007 to 17/07/2007	Uesr can move on next step	working as expected
9	LoginPage_TC_O O4	Functional	Visulazie	Verify user is able to log into application can move visulization	Visualize The Trend	1.Enter and move on.	visualize .	user can be visualize very quickly	Working as expected
10	LoginPage_TC_O O4	Functional	End point page	In user can be view the results	See The Results	can be viewed the price.	Price Results can Visualized	See The correct Price	Working as expected

5	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation	BUG ID	Executed By
8	Enter The Range Of Day	1.Enter the range of date	Date:11/07/2007 to 17/07/2007	Uesr can move on next step	working as expected	pass	Steps are very clear to follow	No	1177	
9	Visualize The Trend	1.Enter and move on.	visualize .	user can be visualize very quickly	Working as expected	pass	Steps are very clear to follow	yes	1177	
10	See The Results	can be viewed the price.	Price Results can Visualized	See The correct Price	Working as expected	pass	Steps are very clear to follow	yes	1177	

8.2 USER ACCEPTANCE TESTING

User acceptance testing is a critical phase of any project and requires significant participant by the end user. It also ensure that the system meets the functional requirement.

1. Purpose of Document

   The purpose of this document is to briefly explain the test coverage and open issues of the [Crude Oil] 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	3	2	19
Duplicate	1	0	2	0	3
External	2	2	0	1	5
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	1	0	0	1
Won't Fix	1	5	0	0	6
Totals	25	14	10	23	72

1. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	1	1	5
Client Application	51	0	1	50
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

9. RESULTS

9.1 PERFORMANCE METRICS

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot
1.	Metrics	**Regression Model:** MAE -, MSE -, RMSE -, R2 score **Classification Model:** Confusion Matrix -, Accuracy Score- & Classification Report -	<table><tr><td></td><td>RMSE</td><td>MAE</td><td>R2-SCORE</td></tr><tr><td>1</td><td>12.08626 473</td><td>0.5738016 561</td><td>7.6429788</td></tr><tr><td>2</td><td>9.147314 047</td><td>0.9047892 679</td><td>5.0380903 1</td></tr><tr><td>3</td><td>1.452734 461</td><td>0.9979856 3</td><td>0.8729176 886</td></tr></table> **RMSE for different models used in our project** Linear Regression : 19.3533662859143 Decision Tree Regression : 9.14731404717267 Random Forest Regression : 1.45273446145987 **R2 Score for different models used in our project :** Linear Regression : 0.57380165610804 Decision Tree Regression : 0.90478926790260 Random Forest Regression : 0.997598562970117 *Calculate RMSE performance metrics* *Accuracy :* **29.347830443269938**
2.	Tune the Model	Hyper parameter Tuning - Validation Method -	**Hyper parameter tuning** In the case of over fitting, some inclusion of regularization and further hyper parameter tuning for the training process must be considered. A good model should be based on a compromise between capturing the essential patterns in the data without

10. ADVANTAGE

- The advantage of this model are high performance and accuracy rate.

- It is very flexible and high rates of success are achieved

- The application when implemented using random forests has more accuracy rate when compare to other algorithm. In this system, we achieve around 98%.

11. CONCLUTION

The main purpose of this paper is to develop a time series collection of regular observations on oil price datasets. Used to predict future value based on historical data. Non- linear trends are fitted using annual, weekly, and daily data. This white paper integrates machine learning models such as FB Prophet a to analyze, classify, and predict time series data.Historical data is presented using variables analyzed and calculated during the algorithm execution module, and each algorithm makes a series of oil price predictions using this setof values.

12. FUTURE SCOPE

The project's future potential is enormous. The project can be implemented with the real-time functionalities that are necessary. Because it is quite versatile in terms of expansion, the project can be upgraded in the near future as and when the need arises. The complete prediction value can be increased in a much better, accurate, and error-free mannerwith the proposed approach. The project can be enhanced withreal time data.

12. APPENDIX

PYTHON

Python is a computer programming language often used to **build websites and software, automate tasks, and conduct data analysis**. Python is a general purpose language, meaning it can be used to create a variety of different programs and isn't specialized for any specific problems.

SOURCE CODE

LOGIN

```css
h1 {
  text-align: center;
        color: floralwhite;
        font-size: 50px;
        font-family: cursive;
}

p {
   font-family: cursive;
        color: ghostwhite;
        margin-right: 30px;
        margin-left: 30px;
        text-align: center;
        font-size: 20px;
        font-weight: bold;
}

body{
        background: url(back2.jpg);
        background-repeat: no-repeat;
        background-size: 100% 275%;
    }
```

```css
.button {
    display: inline-block;
    border-radius: 4px;
    background-color: black;
    border: none;
    color: #FFFFFF;
    text-align: center;
    font-size: 20px;
    padding: 12px;
    width: 100px;
    transition: all 0.5s;
    cursor: pointer;
    margin: 5px;
}

a{
    font-size: 20px;
    font-family: cursive;
        color: ghostwhite;
        margin-right: 30px;
        margin-left: 30px;
        text-align: center;
        font-size: 20px;
        font-weight: bold;
}
```

USER REGISTRATION

```html
<!DOCTYPE html>
<html>
    <head>
        <title>Registration Form</title>
        <link rel="stylesheet"
        href="register.css" type="text/css">
    </head>
    <body>
        <div class="main">
            <div class="register">
                <h2>Register Here</h2>
                <form id="register" method="post">
```

```html
            <label>First Name : </label>
            <br>
            <input type="text" name="fname"
            id="name" placeholder="Enter Your First Name">
            <br><br>
            <label>Last Name : </label>
            <br>
            <input type="text" name="lname"
            id="name" placeholder="Enter Your last Name">
            <br><br>
            <label>Your Age : </label>
            <br>
            <input type="number" name="age"
            id="name" placeholder="How Old Are You">
            <br><br>
            <label>Email : </label>
            <br>
            <input type="email" name="email"
            id="name" placeholder="Enter Your Valid Email">
            <br><br>
            <label>Gender : </label>
            <br>
                 
            <input type="radio" name="gender"
            id="male">
             
            <span id="male">Male</span>
                 
            <input type="radio" name="gender"
            id="female">
             
            <span id="female">Female</span>
            <br><br>
            <input type="submit" value="Submit"
            name="submit" id="submit">
        </form>
      </div>
    </div>
  </body>
</html>
```

BUILD CODE

```python
import numpy as np
from flask import Flask,render_template,request #flask is a application
#uesd to run/serve our application
#request is used to access the files which is uploaded by the user in
#our application
#render_template is used for rendering the html pages
from tensorflow.keras.models import load_model
app = Flask(__name__)#our flask app
model = load_model('crude_oil.h5',)#loading the model in the flask app

@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")
@app.route('/login',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=10
  i=0
while(i<1):
    if(len(temp_input)>10):
      #print("temp_input",temp_input)
      x_input=np.array(temp_input[1:])
      print("{} day input {}".format(i,x_input))
```

```python
            x_input=x_input.reshape(1,-1)
            x_input = x_input.reshape((1,n_steps, 1))
            #print(x_input)
            yhat =model.predict(x_input, verbose=0)
            print("{} day output {}".format(i,yhat))
            temp_input.extend(yhat[0].tolist())
            temp_input=temp_input[1:]
            #print(temp_input)
            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_output)

    return render_template("web.html",showcase = 'The next day predicted value is:'+
str(lst_output))
    #print str(x)
if __name__  == '__main__' :

    app.run(debug=True,port=5000)
```
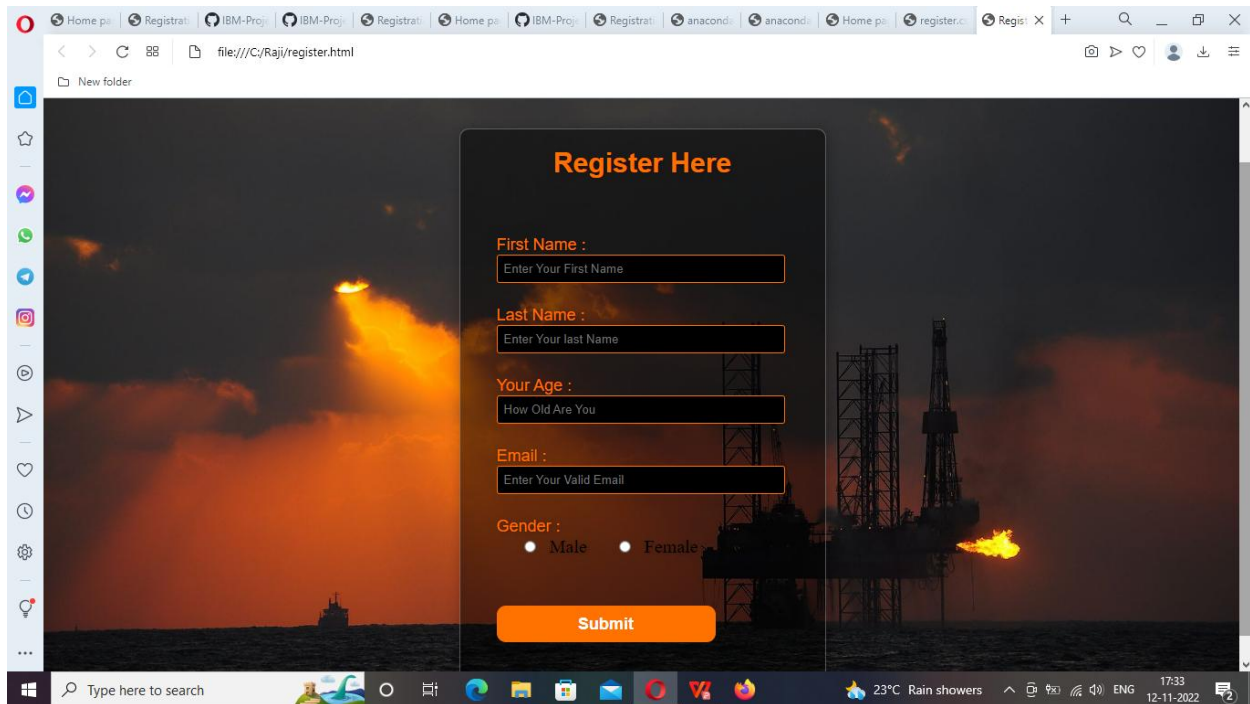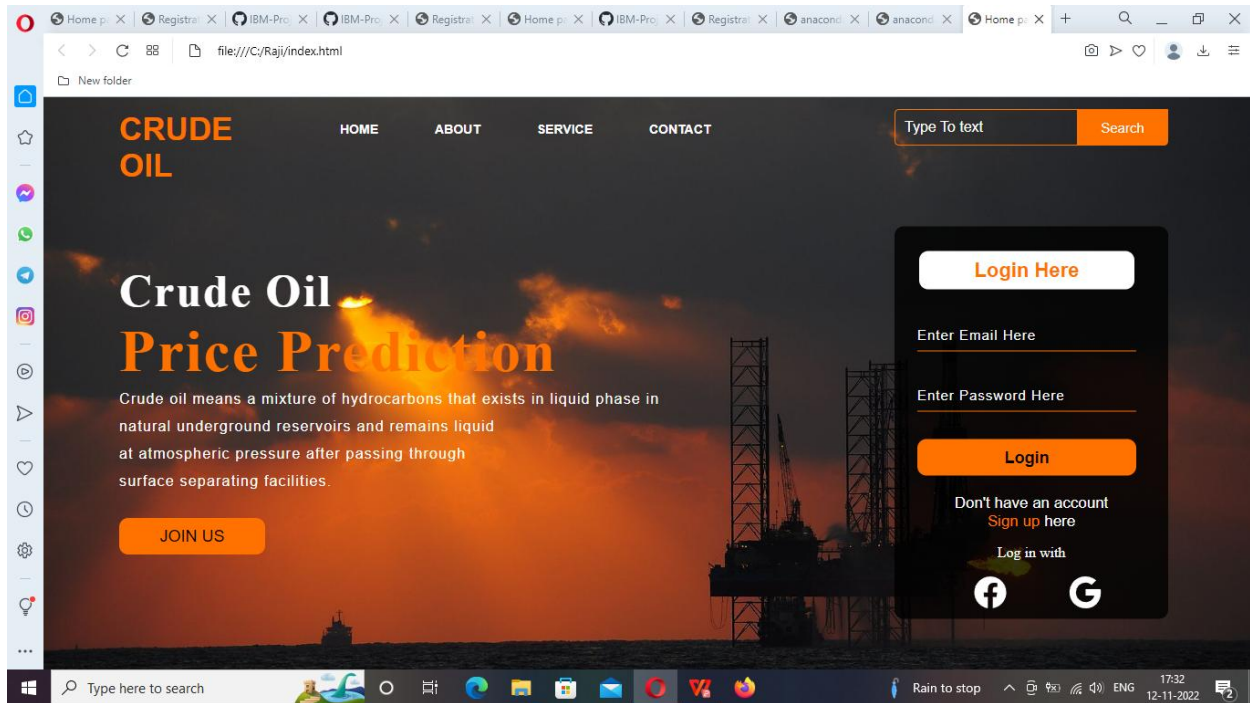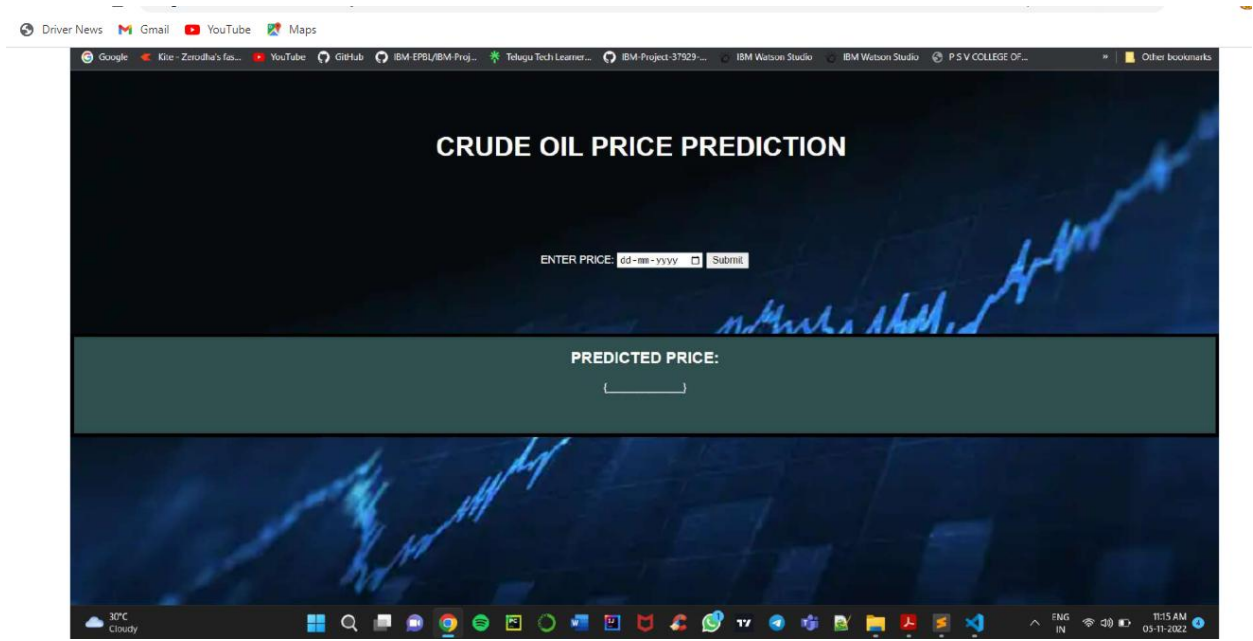
SCREEN SHOT

PROJECT DEMO LINK

https:///C:/Users/Rajalakshmi/Downloads/PROJECT%20-%20IBM%20Watson%20Studio%20(1).mp4

IBM-EPBL/IBM-Project-41698-1660644260