Project Report

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1. INTRODUCTION

1.1 Project Overview

Crude oil is one of the most important energy resources on earth. So far, it remains the world's leadingfuel, with nearlyone-third of global energyconsumption.
Crude oil prices are determined by many factors and have a big impact on the global environment and economy. Although crude oil prices were firm in early 2014, they fell sharplyfrom mid-2014.

In January 2016, the U.S. refiner acquisition cost for crude oil imports,as a proxy for worldoil price, is only $28.81per barrel on average, and the West Texas Intermediate (WTI) crude oil spot price, as the benchmark oil price in North America, is only $31.68 per barrel on average. The priceshave dropped by more than seventy percent since June 2014.

The world's environment is affected by the oil price falling. With the drop of oil prices, the fuel bills are lowered. As a result, consumers are very likely to use more oil and thus increase the carbon emission. In addition, there is less incentive to develop renewable andclean energy resources.

On the other hand, sustained low oil prices could lead to a drop in global oil and gas exploration and exploitation activities.
Fluctuatingoil prices also play an important role in the global economy.

The fall in oil prices would result in a modest boost to global economic activity, although the owners of oil sectorssuffer income losses.Recent research from the World Bank showsthat for every30% decline of oil

prices,the global GDP (Gross DomesticProduct) would be increased by 0.5%. At the same time, the drop of oil priceswould reduce the cost of living,and hence the inflation rate would fall.

There is no doubt that crude oil price forecasts are very useful to industries, governments as well as individuals. Thus, forecasting crude oil priceshas been the subject of research by both academia and industry. Many methods and approaches have been developed for predicting oil prices. However, due to the high volatility of oil prices, it remains one of the most challenging forecasting problems.
In recent years, machine learning techniques have been used in many applications in geosciences. Machinelearning provides powerfulcomputational tools and algorithms thatcan learn from and make predictions on data. In this paper, we propose a novel approach for crude oil price prediction based on a new machine learning paradigm called stream learning.The main advantageof our stream learning approachis that the prediction modelcan capture the changing patternof oil prices since the model is continuously updated

whenever new oil price data are available, with very small constant overhead. We compare our stream learningmodel with three other popularoil price prediction models for predicting two types of oil prices(the U.S. refineracquisition cost for crude oil imports and the WTI crude oil spot price).The experiment resultsshow that our stream learningmodel achieves the highest accuracyin terms of both mean squared prediction error and directional accuracy ratio over a varietyof forecast time horizons.

1.2 Purpose

The purpose of this project is to capture the changing pattern of oil prices. Our model is constantly updated whenever new oil price data is available, with very small overhead.

2.LITERATURE SURVEY

2.1 Existing problem

Wedid a survey over the possible sourcesthat we could access. In our exploration, we did find the authors.

Authors:Ms.Bhanupriya.N our mentor proposed the literature on forecasting the black gold price is vast. This paper provides a literature review on the various techniques that have been used to forecast crude oil price. They mainly focused on the researches that have utilized artificial neural network models in their forecasting study. Therefore, a detailed description of this model was presented in the paper[1].

Thegoal of this article is to review the existingliterature on crude oil price forecasting. They categorized the existing forecasting techniques into the two main groups of quantitative and qualitative methods; and then performed an almost comprehensive survey on the available literature with respect to these two main forecasting techniques. A reviewon the existing literature aboutcrude oil price forecasting. For this purposethey distinguished forecasting methods into the two main techniques of quantitative and qualitative techniques [2].

In this paper [3], they develop a new research framework for core influence factorsselection and forecasting. Firstly, this paper assesses and selects core influence factors with the elastic-net regularized generalized linear Model (GLMNET), spike-slab lasso method,and Bayesian model average (BMA).Secondly, the new machine learningmethod long short-term Memory Network (LSTM) is developed for crude oil price forecasting. Then six different forecasting techniques, random walk (RW), autoregressive integrated moving average models (ARMA), elman neural Networks (ENN), ELM Neural Networks (EL), walvet neural networks (WNN) and generalized regression neural network Models(GRNN) were used to forecast the price. Finally, we compare and analyze the different results with root mean squared error (RMSE), mean absolute percentage error (MAPE), directional symmetry

(DS). This empirical results show that the variable selection-LSTMmethod outperforms the benchmark methods in both level and directional forecasting accuracy [3].

The following price forecasting techniques have been covered: (i) artificial neural network, (ii) support vector machine, (iii) wavelet, (iv) genetic algorithm, and (v) hybrid systems. In order to investigate the state of artificial intelligent models for oil price forecasting, thirty five research papers (published during 2001 to 2013) had been reviewed in form of table (for ease of comparison) based on the following parameters:

i. input variables. (b) input variablesselection method, (c) data characteristics

(d) forecasting accuracy and (e) model architecture. This review revealsprocedure of

Al methods used in complex oil price related studies. The review further extended above overview into discussions regarding specific shortcomings that are associated with feature selection for designing input vector, and then concluded with future insight on improving the current state-of-the-art technology[4].

Oil embodies a vital role in the world economyas the backbone and origin of numerous industries. It is an importantsource of energy representing an indispensable raw material and as a major componentin many manufacturing processes and transportation. Oil price suffer from high volatility and fluctuations. In global markets, it is the most active and heavily traded commodity. Recently many studies emerged to discuss the problem of predicting oil prices and seeking to access to the best outcomes. Despite these attempts there were no enough studies that could be used as a reference covering all aspects of the problem. In this research, a comprehensive survey covering the previous methodsand some resultsand experiments are presented with a focus on and maintaining the necessary steps when predicting oil prices[5].

2.2 References:

1. Manel Hamdi & Chaker Aloui, 2015. "Forecasting Crude Oil Price Using Artificial Neural Networks: A Literature Survey," Economics Bulletin, AccessEcon, vol.35(2), pages 1339-1359.
2. Bashiri Behmiri, Niaz and PiresManso, José Ramos, Crude Oil Price Forecasting Techniques: A Comprehensive Review of Literature (June 6, 2013).
3. Quanying Lu, Shaolong Sun, Hongbo Duan & Shouyang Wang, Analysis and forecasting of crude oil price based on the variable selection-LSTM integrated model: Proceedings of the EnergyInformatics.Academy Conference Asia 2021
4. Sehgal, N.; Pandey, K.K. Artificial intelligence methods for oil price forecasting:

   A review and evaluation. Energy Syst.2015,6,479–506.
5. Dietterich, T. G.,"Ensemble methodsin machine learning". In Multiple classifier systems pp. 1-15,Springer Berlin Heidelberg, 2000

2.3 Problem statement

1. Supply

Supply and demandhas to do with how much oil is available.

Supply has historically been determined by countries that are part of OPEC. But now, the UnitedStates is playing a bigger role in supply thanks to booming production from American shale fields. So if major oil-producing countriesare pumping out a lot of crude,the supply will be high.

Just look at what happened in 2014.

“Saudi Arabia made the decision that they were not going to cut back production, they were going to continue to produce at record high levels,” said Tamar Essner, senior energy director at Nasdaq IR Solutions.

“At the same time, you had very robust output from the United States, and from other
producers around the world.”

Oil prices fell sharply as producers pumped more than the world could consume. OPEC was largely blamed for the free fall in oil prices because it refused to cut down its production. But OPEC said U.S. shale drillers were to blame for pumping too much, and should cut their production first.

In 1973, Arab members of OPEC put an embargo against the United States as a retaliatory measure for U.S. supportof Israel duringthe Yom KippurWar. After the embargo, the oil supplyin 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.

2. Demand

Demand on the other hand is determined by how much need there is for oil at a given time. That need is oftenfor things like heat, electricity and transportation. The more economicgrowth a region sees, the more demand there will be for oil.

“Economies around the world have picked up since the financial crisis, and growth has gotten stronger so people have been using more energy,”Essner said.

And then there’s the question of howthe market will react to renewable energy.

“A lot of this will be impacted by public policy,but at the end of the day renewable can only

displace hydrocarbons if it’s economically feasible,” Essner said.

“Right now, renewables are still more expensive than hydrocarbons, so consumers aren’t goingto voluntarily make the switch.”

3. Geopolitics

Since supply is determined by the big oil-producing countries, tension with one of those nations can cause major problems. So if there’swar or conflict in an oil-producing region, crude inventories could seem threatened, and thatcould ultimately alterthe price of oil.

“Geopolitics has traditionally been a factorin the oil price,” Essnersaid.

“Particularly when situations in the Middle East or other oil-richregions of the world would flare up and there would be conflict, you would generally speaking see a little bit of an uptick in the price of oil as a result, just by virtue of the risk of supply being disrupted, or of means of transportation being disrupted, such as a canal or pipeline or workers going on protest, things like that.”

Just think back to the Gulf War of 1991. Oil production fell, which causedprices to rise.

And in 2003, oil prices soared after the U.S. invaded Iraq. That Middle Eastern nation produces a lot of oil, and with instability in the region, people weren’t immediately sure what would happen to thesupply.

“That’s what makes the oil markets so fascinating, is that it’s really a very interesting interplay of financial markets, the economy,and those are two very different things,the currency market,geopolitics and the environment,” Essner said.

The energy industry is sure to evolve, and experts are watching to see what role oil will play in the future. But for now, the oil markets remain a powerful force in the world of economics, geopolitics and yourcommuting budget.

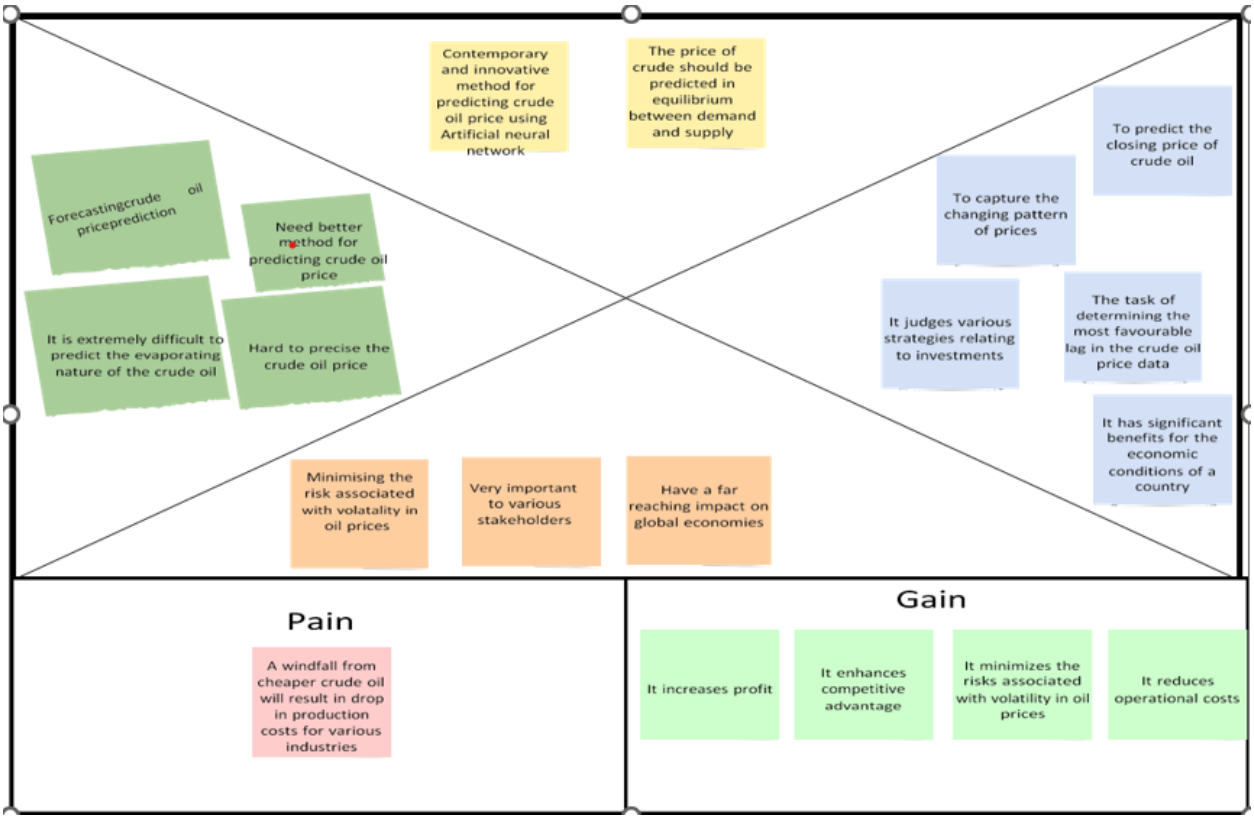
3.IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

An empathy map canvas is a more in-depth version of the original empathy map, which helps identify and describe the user's needs and pain points. And this is valuable information for improving the user experience.

Teams rely on user insights to map out what is important to their target audience, what influences them, and how they present themselves. This information is then used to create personas that help teams visualize users and empathizewith them as individuals, ratherthan just as a vague marketing demographic or account number.

An empathy map canvas helps brands provide a better experience for users by helping teams understand the perspectives and mindset of their customers. Using a template to create an empathy map canvas reduces the preparation time and standardizes the process so you create empathy map canvasesof similar quality.

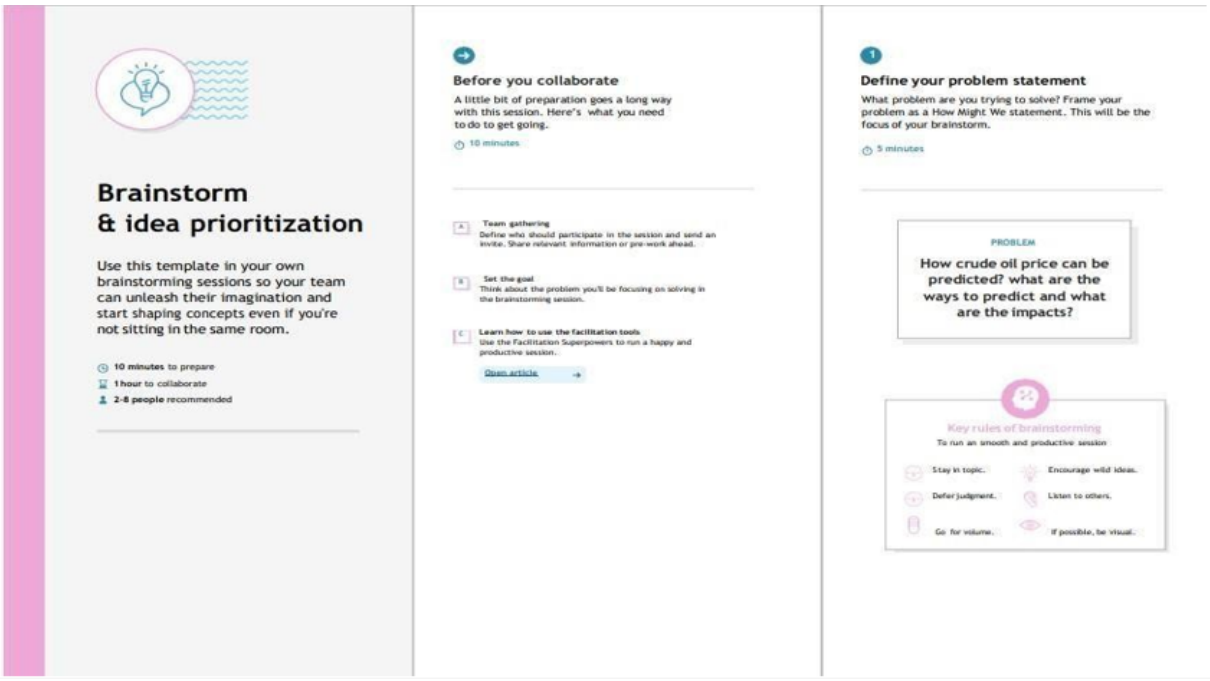


3.2 Ideation & Brainstorming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creativethinking process that leads to problem solving.Prioritizing volume

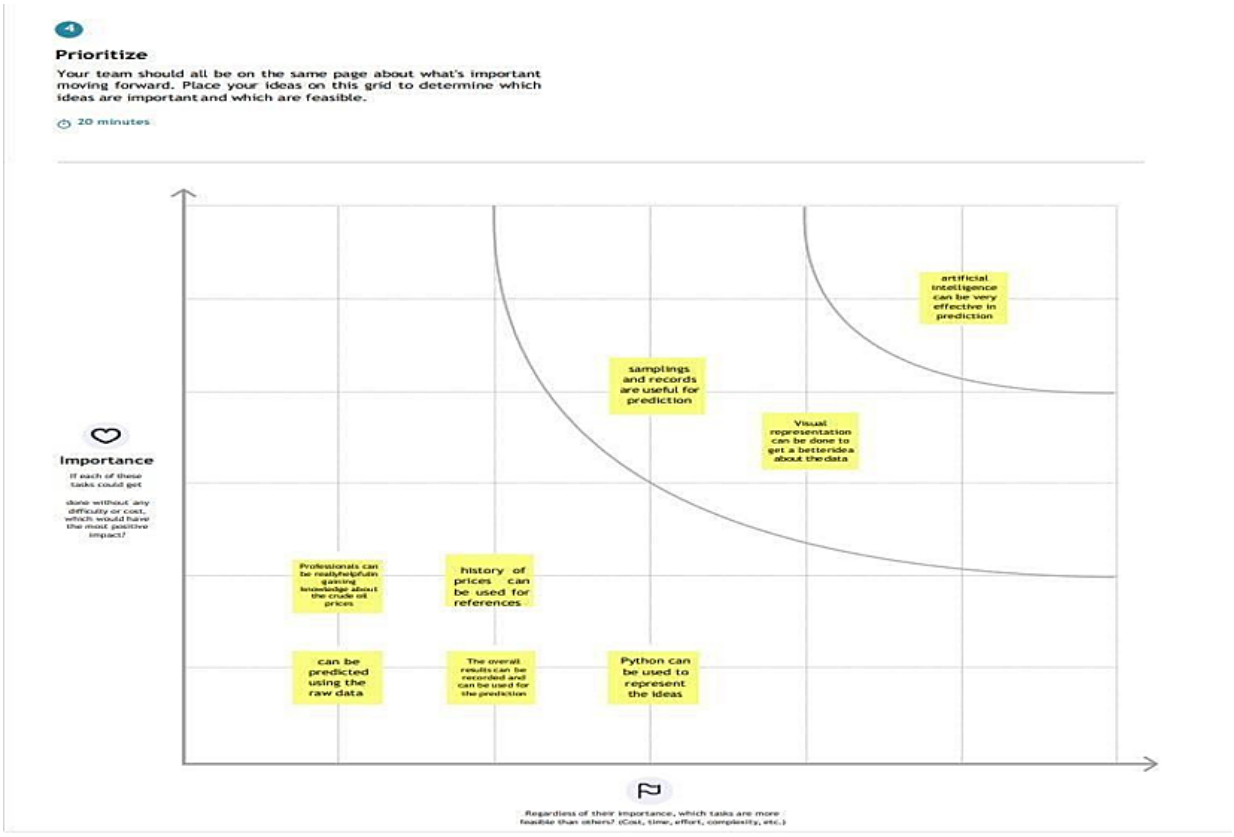
over value,out-of-the-box ideas are welcome and built upon, and all participants areencouraged to collaborate, helping each other develop arich number of creativesolutions.

Step-1: Team Gathering, Collaboration and Selectthe Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping

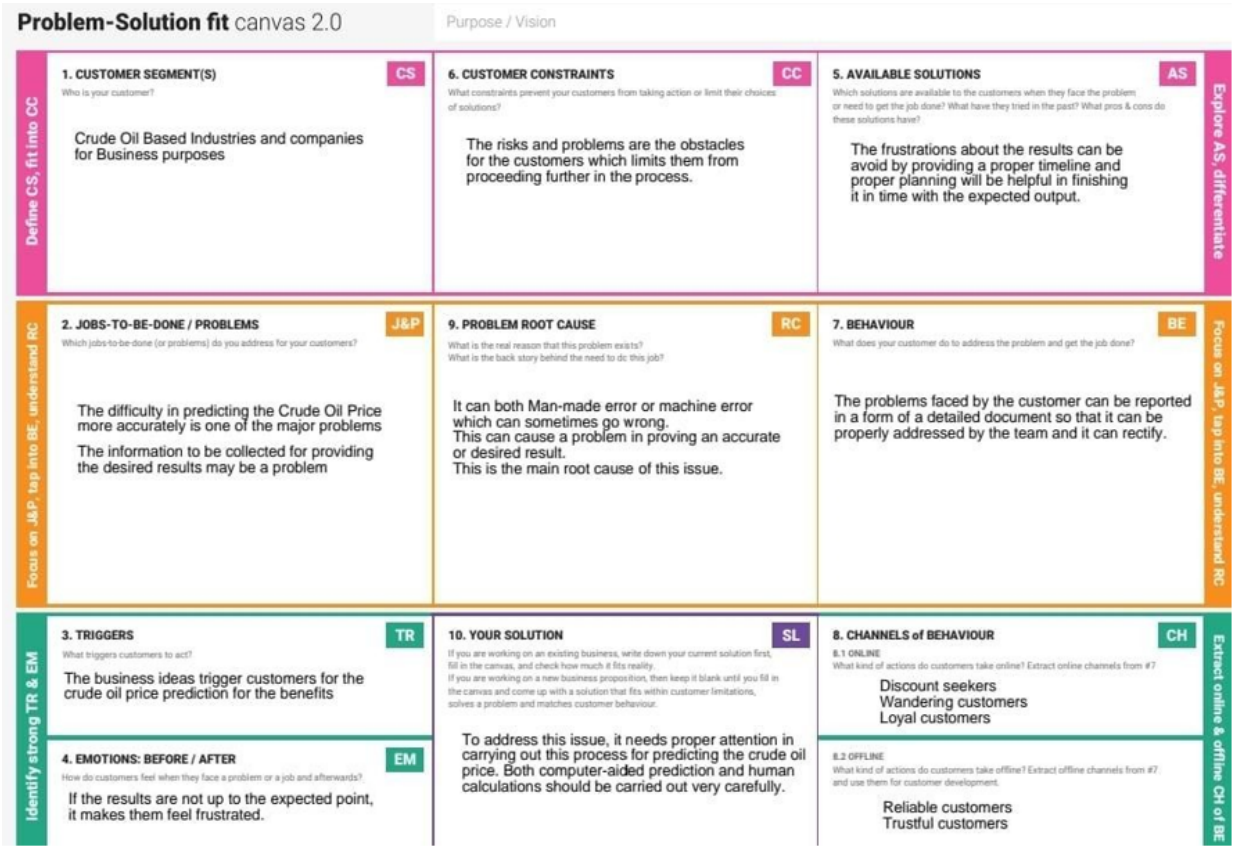
Step-3: Idea Prioritization



3.3 Proposed Solution

S. No	Parameter	Description
1.	Problem Statement (Problem to besolved)	As with the erraticchanges in supplyand demand and the influence of geopolitics, it is very hard to predictthe value of crude oil prices in theglobal market.
2.	Idea / Solution description	We are going to collect the dataset of the pastoil prices with time sothat by feeding those tothe model and training it and compiling it andwhen it is achieved the optimal state we can implement it in the web application.
3.	Novelty / Uniqueness	It may be a traditional idea but theimplementation of periodic training will haveabetter effecton it.
4.	Social Impact / CustomerSatisfaction	By usingthe web app customer can gain knowledge of the crudeoil price and get benefits financially.
5.	Business Model (Revenue Model)	It will be used by every individual at ease so that they can have an idea of the crude price so, that the use of the crude will be stable inthe market
6.	Scalability of the Solution	The idea we proposed it take the input in the periodic andadjust and trainthrough these so,that it willadapt to verydifferent situations.

3.4 Problem Solution fit



4.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 Application	User DirectOpen with GooglePlay Store AppUser Can Download the Crude Oil Price.

FR-2	User Products Available	User Usingthe Application ThereAre So ManyProducts in Crude Oil Price App. User Updatethe Energy and Oil PriceInstant in the Application.
FR-3	User Additional Features	User Can Read LatestNews and ViewOil PriceCharts. User View Major EnergyQuotes. User Can Using a Multiple ColorThemes.
FR-4	User Exceptions	User Can Exchange Ratesand Currency Converter.

4.2 Non-Functional requirement

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 shifteconomical/political power from oil importers to oil exporters communications will be secured.

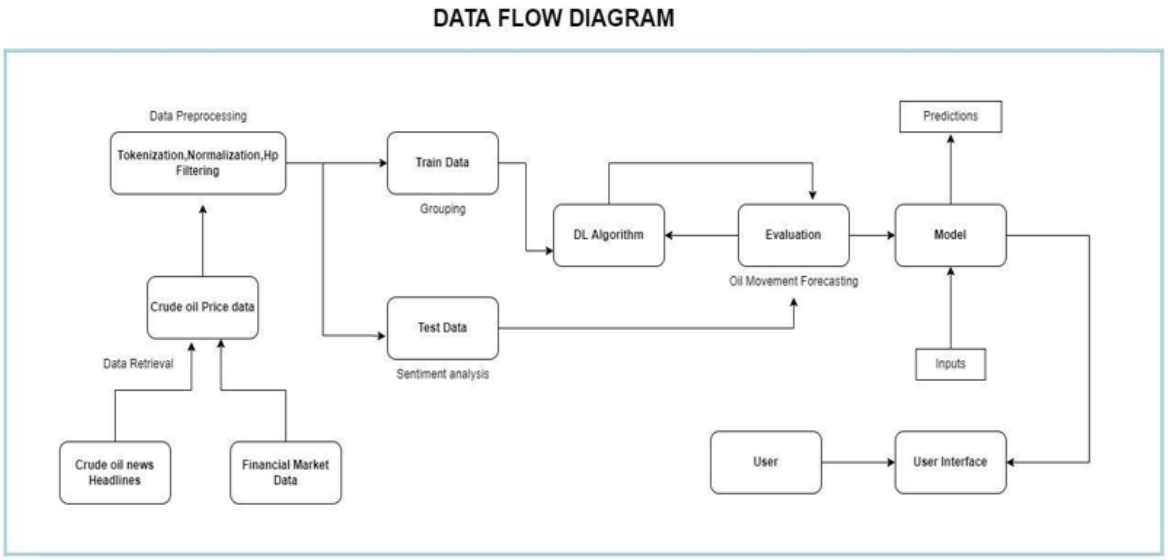
NFR-3	Reliability	Reliability of the pointing towardshigh –risk components.
NFR-4	Performance	Performance of this project is to improve to the accuracy of crudeoil price prediction.
NFR-5	Availability	The Availability Solution is More BenefitforandtheImporters and exporters in the crudeoil price prediction.
NFR-6	Scalability	The scalability is 90%-95%.

5.PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

DATA FLOW DIAGRAM:

A Data Flow Diagram (DFD) is a traditional visualrepresentation of the information flowswithina system.A neat and clear DFD can depictthe right amount of the system requirementgraphically. It shows how data enters and leaves the system, what changes the information, andwhere data is stored



5.2 SOLUTION & TECHNICAL ARCHITECTURE

Solution Architecture:

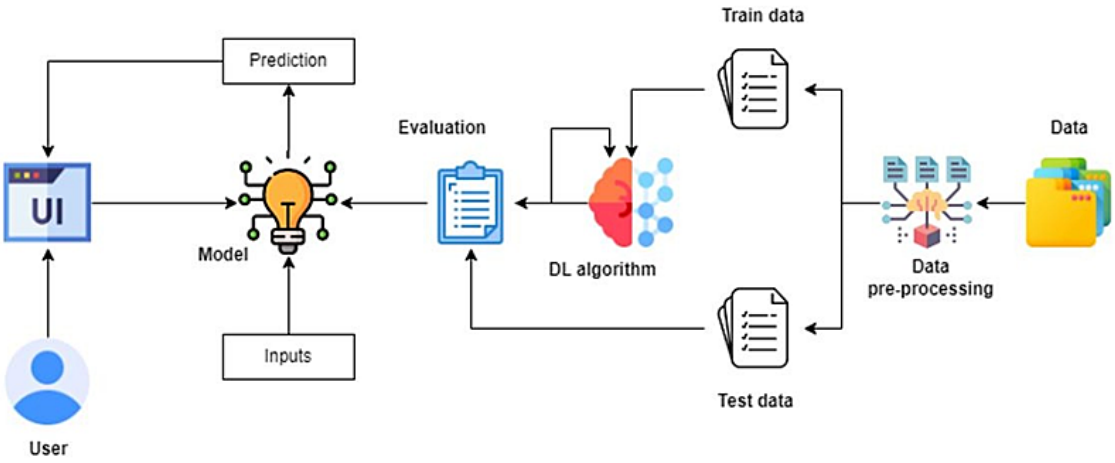
Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

1.Find the best tech solutionto solve existingbusiness problems.

2.Describe the structure, characteristics, behaviour, and other aspects of the softwaretoproject stakeholders.

3.Define features, development phases, and solutionrequirements.

4.Provide specifications accordingto which the solution is defined, managed,and delivered



5.3 USER STORIES

User Stories

Use the below templateto list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Numb er	UserStory/ 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 confirmingmy password.	I can accessmy account/ Displays Line gragh / Bar gragh.	High	Sprint-1
		USN-2	As a user,Iwill receive confirmation emailonce 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 applicationthrough Facebook	I canregister &accessthemy Account	Low	Sprint-2
		USN-4	As a user,I can register for the applicationthrough 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 canlog in byonlyemail &password.	Hi gh	Sprint-1
	Line\Bar gragh		After entering theinputs,the model will displaypredictions in Line\Bar GraghFormat.	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 simplybyusing Gmail or Facebook account.	Already createdgmail canbe used for Login.	Medium	Sprint-2
Customer Care Executive	Support		The Customer careservice will providesolutionsfor any FAQ and also provideChatBot.	I can solve the problems arised by Support.	Low	Sprint-3
Administrator	News		Admin will givethe recent news of Oil Prices.	Provide the recent oil prices.	High	Sprint-4

	Notification		Admin will notifywhen the oil prices changes.	Notification by Gmail.	High	Sprint-4
	Access Control		Admin can control the accessof users.	Accesspermission for Users.	High	Sprint-4
	Database		Admin can store the detailsof users.	Stores User details.	High	Sprint-4

6.PROJECTPLANNING AND SCHEDULING

6.1&6.2 Sprint Planning, Estimation and Delivery Schedule

Product Backlog, Sprint Schedule,and Estimation

Use the below templateto create productbacklog 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, I canregister for the application byentering myemail, password, and confirming my password.	10	High	D.HarshithaReddy
Sprint-1		USN-2	As a user, I willreceive confirmation emailonce I have registered for the application	10	High	B .Harshini

Sprint-1	Login	USN-3	As a user, Ican logintothe application by entering email & password.	15	High	P . Abitha
Sprint-2	Input NecessaryDetails	USN-4	As a user, I can give InputDetails to Predict Likeliness of crude oil	15	High	Ila Choudary . A
Sprint-2	Data Pre-processing	USN-5	Transform raw data intosuitable format for prediction.	15	High	B .Harshini
Sprint-3	Prediction of Crude Oil Price	USN-6	As a user, I can predict Crude oil	20	High	Ila Choudary.A
			using machine learning model.			

Sprint-3		USN-7	As a user, I can getaccurate prediction of crude oil	5	Medium	P . Abitha
Sprint-4	Review	USN-8	As a user, I can givefeedback of the application.	20	High	D.Harshitha Reddy

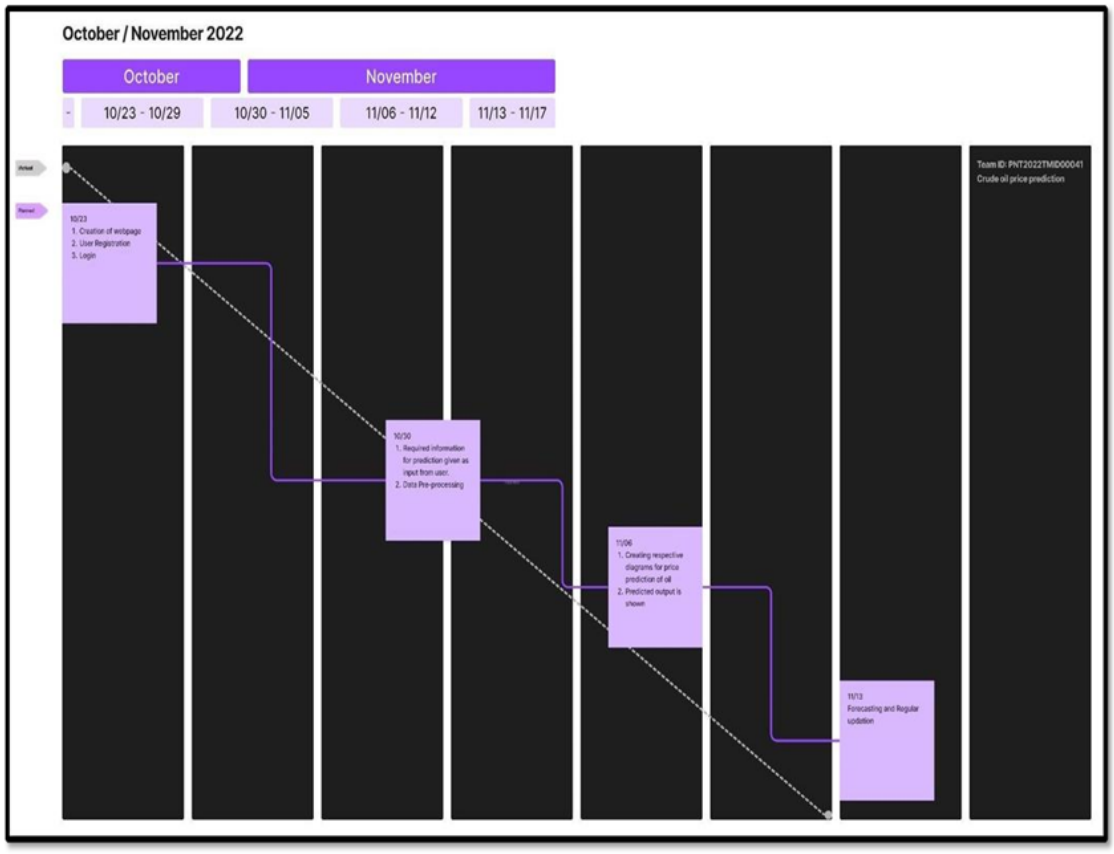
Sprint	**Total Story Points**	**Duration**	**Sprint Start Date**	**Sprint EndDate (Planned)**	**Story Points Completed(as on Planned End Date)**	**Sprint Release Date(Actual)**
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022		
Sprint-3	20	6 Days	07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

Velocity:

Imagine we have a 10-day sprint duration, and the velocityof the team is 20 (points per sprint).

Let’s calculate the team’saverage velocity (AV) per iteration unit (story points per day)

Burndown Chart:



7.Coding and Solutioning

7.1 Feature 1

Feature Scaling

Feature scalingis a method used to normalize the range of independent variables or features ofdata.

The next step is to scale the crude oil prices between (0, 1) to avoid intensive computation.Common methods include **Standardization** and **Normalization**.

Normalization	Standardization
$x_{norm} = \frac{x - \min(x)}{\max(x) - \min(x)}$	$x_{stand} = \frac{x - \mathrm{mean}(x)}{\mathrm{Std}(x)}$

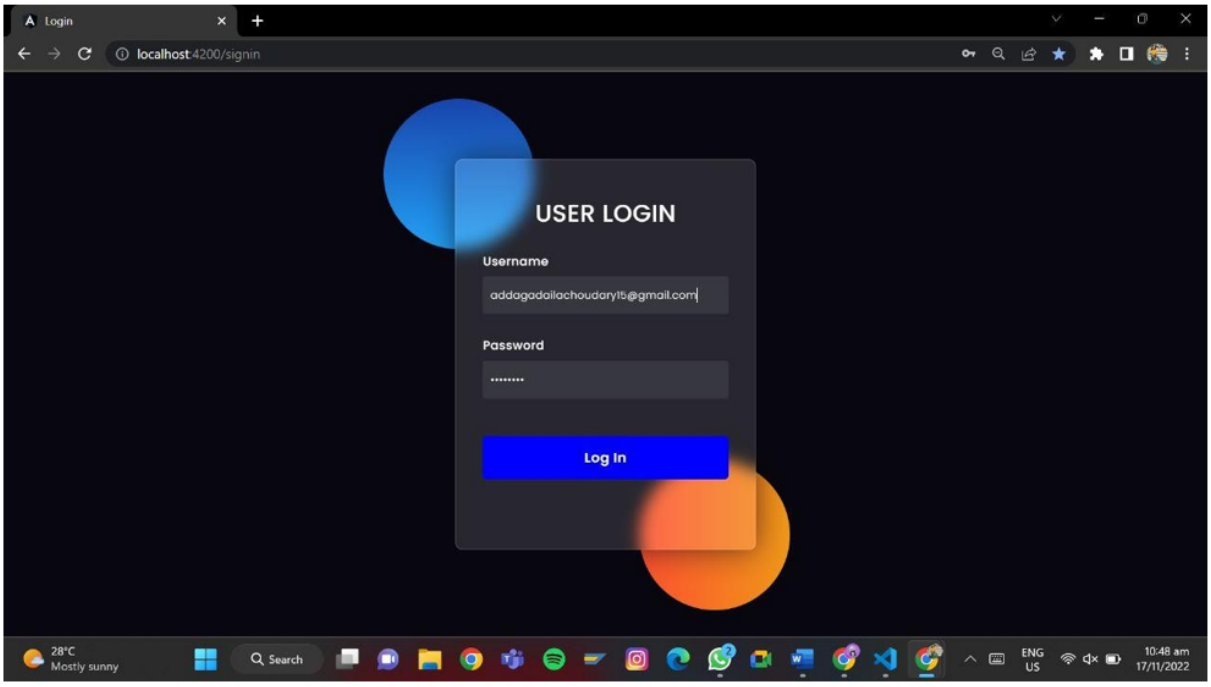
7.2 Feature 2

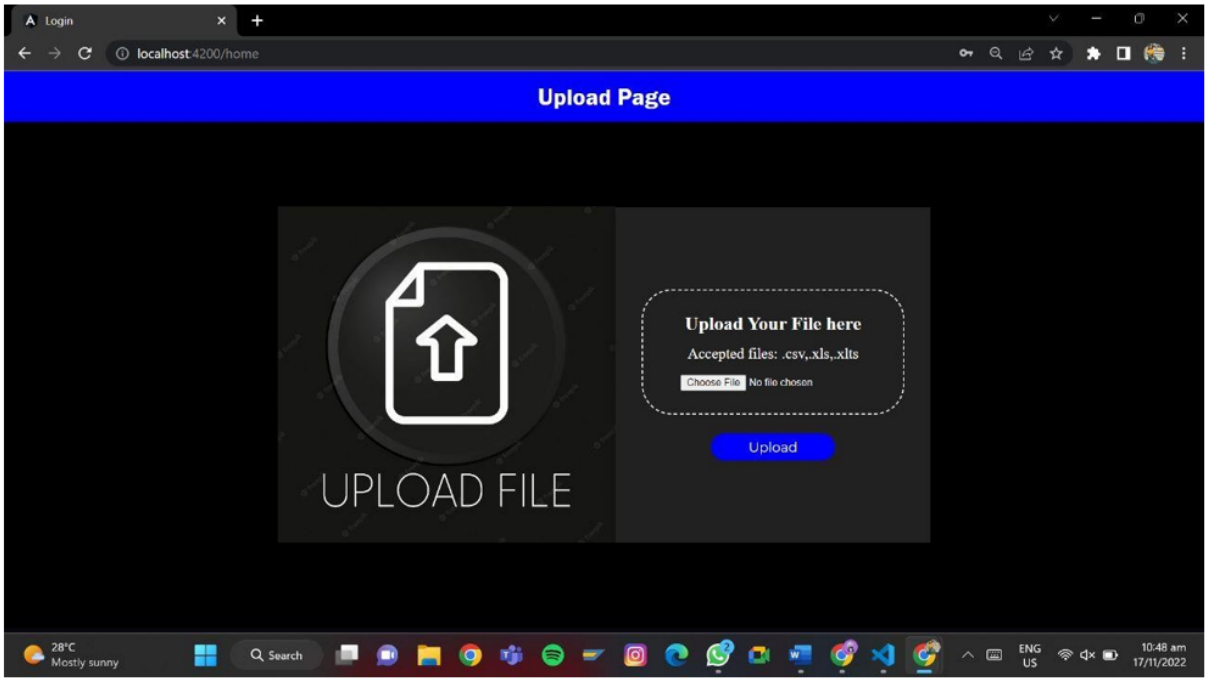
STM's are sensitive to the scale of the data so we apply MinMax scaler.

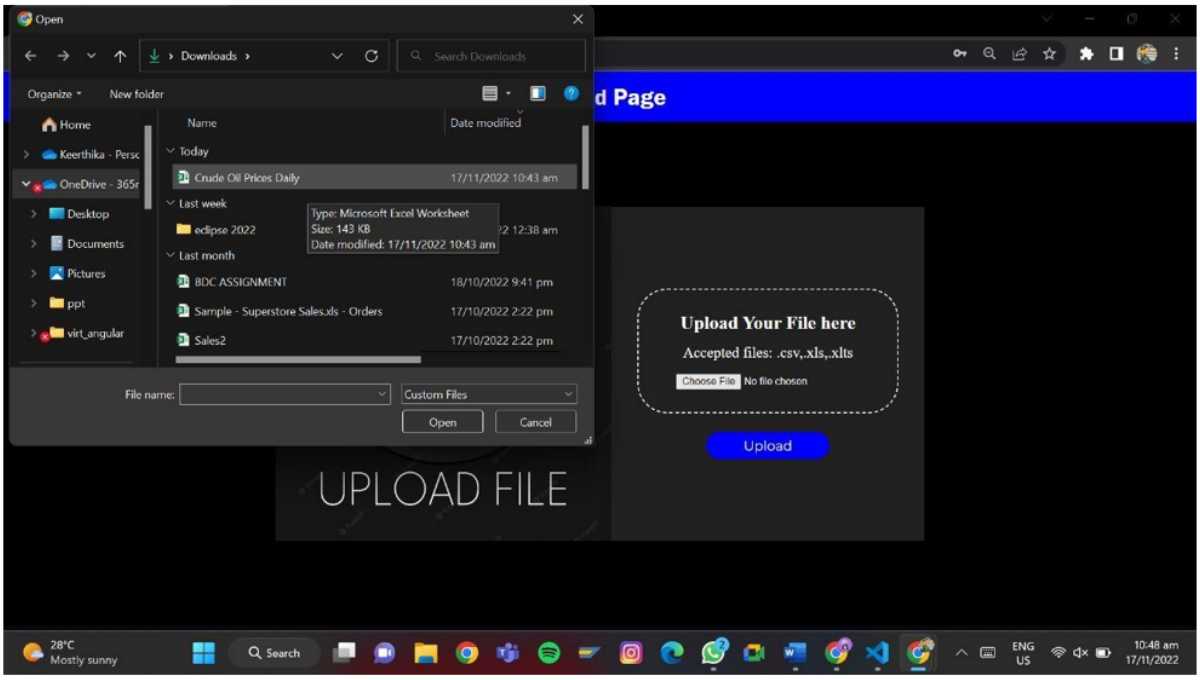
```
from sklearn.preprocessing import MinMaxScaler
scaler=MinMaxScaler(feature_range=(0,1))
data_oil=scaler.fit_transform(np.array(data_oil).reshape(-1,1))
```

8.TESTING

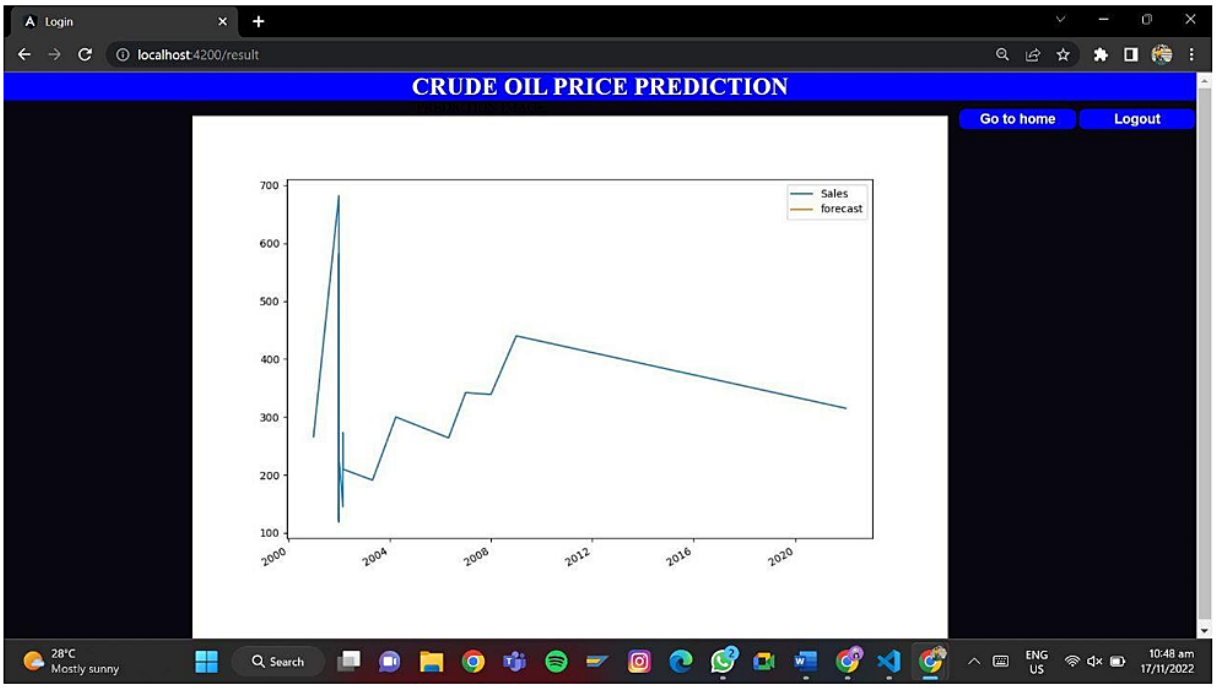
8.1Test cases







User Acceptance Testing



9.RESULTS

a. PERFORMANCE METRICS

performance metrics, the mean absolute error (MAE) and the root mean square error (RMSE) which have been frequently used in previous studies (e.g., Tang et al. 2015; Lerner and Seru 2021), formulated as:

MAE=1T2−1∑t=T1+2T1+T2|yt−y^t|RMSE=1T2−1∑t=T1+2T1+T2(yt−y^t)2−−−−−−−−−−−−

Performance evaluation metrics

√

In order to evaluate the one-step prediction performance of the models from comprehensiverespects, we selecttwo conventional

where T1 and T2 are the length of the training and testing set respectively, and yt and yˆt arethe actual and predicted returns on real oil price. Obviously, smaller MAE and RMSE indicate a better prediction model.

In addition, we use anotherpopular evaluation metric,the out-of-sample R-squared, i.e., R2OOS, which compares different forecast approaches with a benchmark model. In this paper, we use the random walk model as benchmark, which is solidly based on the Efficiency Market Hypothesis (EMH), and consequently, the R2OOS statistic is defined as:

R2OOS=100×[1−∑T1+T2t=T1+2(yt−y^t)2∑T1+T2t=T1+2(yt−y^RWt)2]

where the yˆRWt is the random walk predictions. The R2OOS measures the performance of candidate prediction approach relative to the trivial prediction, hence a higher and positive R2OOS indicates a better accuracy of forecasting, compared with the benchmark as R2OOS=0. For the evaluation of

returnprediction, the information coefficient (IC) has been widelyadopted in prior studies, see for exampleGuerard et al. (2021). The IC describes the correlation betweenthe predicted and realized asset returns as:

IC=corr(yt,y^t)

where y^t is the return forecast and yt is the actual return. The IC is calculated on the testing set. Undoubtedly, higher ICs indicate a better prediction.

Change pointsdetected within the predictor panel

We perform the first module of the proposed CP-ADARNN framework to detect the common breaks in the mean of the predictors (non-normalized) following Horváth et al. (2021c). As discussed in Subsect. 3.2, we apply the change-in-mean test based on the detection statistic vN,T for the high-dimensional cross-dependent panel. To accommodate potential multiple changes, a binary segmentation method is used in the fixed sample of the training set. Accordingly, we find the first and largest change in the predictors structure as October 2007 which divides the whole training sampleinto two parts—from March 1993 to October 2007 (176 monthlyobservations) and from November 2007 to February2016 (100 monthlyobservations). In addition, two sub-period changes are detected in April 2000 and December 2009.

10.ADVANTAGES AND DISADVANTAGES

Method	Advantages	Disadvantages
Oil expeller	1.Easy to use 2.No solvent required	1.Large amount of biomass require Slow process
Ultra-sonication assisted	1.Reduced extraction time 2.Reduced solvent consumption	1.High power consumption, difficult to scale up
Microwave assisted	1.More economical 2.Environmental friendly, 3.Reduced extraction time, 4.Reduced solvent usage 5. Improved extraction yield.	1. Filtration or centrifugation is necessary to remove the solid residue; 2. Efficiency of microwaves can be very poor when either the target compounds
Solvent extraction	1.Very simple and cheap 2.Good for small scale 3. High efficiency.	1.Extraction time is long; 2.Large volume of solvent required, toxic and highly flammable 3.Solvent recovery is energy intensive
Supercritical CO_2	1.Reduced time, 2.Low toxicity solvents, 3.Favorable mass transfer equilibrium due to intermediate diffusion/viscosity properties of the fluid, 4. Production of solvent-free extract.	1. High process cost associated with its infrastructure and operation.

11&12 Conclusion and Future Scope

In this paper, an artificial neural network model is presentedwith the task of determining themost favourable lag

in the crude oil price data.It is evident, the resultis shown in the figure,the prediction isaccurate till there is a

massive and sudden change in the actual data,where it becomeschallenging to predicttheexact new price with

the change, however, the proposed model has efficiently taken into consideration thesepatterns. Else ways, this

also provesthe theory that financial marketsare unpredictable and change anytimebecause ofknownand unknown

factors[13]. This work indicates that the ANN model is an effective tool for crude oil pricepredictionand can be

efficiently used for short term price forecasting by determining the optimal lags. The proposedmodelis powerful

and highly suggested becauseinvestors can use it not only to initiate tradesbut also as aneffective tool to judge

various strategiesrelating to investments. This work is carried out on the closing price of crudeoil; however,there are variousother factors

which also affect the crude oil prices like change in the prices and quantities (demand andsupply), change in the

economy and current affairs as shown by the media. The main advantageof this research is incapturing the changing

pattern of these prices. In the coming future, fundamental indicatorsand market trends havebeenplanned to be

incorporated into a model which will help the proposed model perform more efficiently.

13.Appendix

13.1 SourceCode

```
<!DOCTYPE html>

<!-- saved from url=(0139)https://github.com/IBM-EPBL/IBM-Project42851-1662634493/blob/main/Project%20Development%20Phase/Sprint%204/showcasing_price_pr ediction.jpg -->

<html lang="en" data-color-mode="auto" data-light-theme="light" data-dark-theme="dark" data-a11y-animated-images="system" data-turbo-loaded=""><head><meta http- equiv="Content-Type" content="text/html; charset=UTF-8"><style type="text/css">.turbo- progress-bar {
position:fixed;
display: block;
top: 0;
left: 0:
height:3px;
background: 2147483647
transition:
width 300 ms ease-out,
opacity 1150 ms 150ms ease-in;
transform:translate3d(0,0,0);
}
</style>

<link crossorigin="anonymous" media="all" rel="stylesheet" href="./python_code_files/light- 719f1193e0c0.css"><link crossorigin="anonymous" media="all" rel="stylesheet" href="./python_code_files/dark-0c343b529849.css"><link data-color-theme="dark_dimmed" crossorigin="anonymous" media="all" rel="stylesheet" data-href="https://github.githubassets.com/assets/dark_dimmed-f22da508b62a.css"><link data- color-theme="dark_high_contrast" crossorigin="anonymous" media="all" rel="stylesheet" data-href="https://github.githubassets.com/assets/dark_high_contrast-188ef1de59e6.css"><link data-color-theme="dark_colorblind"
```

crossorigin="anonymous"media="all"
rel="stylesheet" data-
href="https://github.githubassets.com/assets/dark_colorblind-
bc6bf4eea850.css"><link data-color-theme="light_colorblind"
crossorigin="anonymous" media="all" rel="stylesheet" data-
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crossorigin="anonymous"media="all"
rel="stylesheet" data-
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<link crossorigin="anonymous" media="all"
rel="stylesheet"href="./python_code_files/primer-f9c4f0f1debb.css">

<link crossorigin="anonymous" media="all"
rel="stylesheet"href="./python_code_files/global-fbcd8ad98877.css">

<link crossorigin="anonymous" media="all"
rel="stylesheet"href="./python_code_files/github-5d7162839c37.css">

<link crossorigin="anonymous" media="all" rel="stylesheet"
href="./python_code_files/code-096ebcd52499.css">

<script crossorigin="anonymous" defer="defer"
type="application/javascript"src="./python_code_files/wp-runtime-
8e2c2a015b68.js.download"></script>

<script crossorigin="anonymous" defer="defer"
type="application/javascript"src="./python_code_files/vendors-
node_modules_manuelpuyol_turbo_dist_turbo_es2017- esm_js-
af11d99b3e65.js.download"></script>

<script crossorigin="anonymous" defer="defer"
type="application/javascript"src="./python_code_files/vendors-
node_modules_stacktrace-parser_dist_stack-trace- parser_esm_js-
node_modules_github_bro-d351f6-c1d63d230b29.js.download"></script>

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