"*Price Prediction Using Machine Learning*"

ACKNOWLEDGMENT

First and foremost, we would like to express our gratitude to the almighty Faculty for giving us this opportunity to undertake this project and complete this project "***Price Prediction Using Machine Learning***".

They have given us the power to believe in our passion and pursue our dreams. As a part of the curriculum, we opted for this project in Computer Science related course since it is always expanding the horizons of knowledge in an unending exercise.

We have learned a lot while developing this project. A lot of difficulties faced us in this project but this was an un-forgetful experience. The help extended by some special people enabled us to gain confidence and shape the project as well.

At the onset, we wish to express our sincere thanks to the **GLS University** & Faculty Members, Especially **Ms. Aditi Joshi** for providing timely guidance and helping with the troubleshooting of the project.

I would like to appreciate my team members - Ms. Khushi Agarwal, Ms. Neha Bhatt, Mr. Aayush Gandhi, Ms. Nidhi Gupta, and Mr. Suraj Gupta for their valuable inputs into this project.

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FACULTY OF COMPUTER TECHNOLOGY

Certificate

This is to certify that

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Students of MCA semester III, at

Faculty of Computer Technology

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have successfully completed the mini project/dissertation entitled

"Price Prediction of Wheat Using ML"

as partial fulfillment towards the degree of

Master of Computer Application (MCA)

Ms. Aditi Joshi

Internal Guide

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Index

No.	Title	Page No.
1	Project Profile	5
2	Abstract and Keywords	6
3	Introduction 3.1 Objectives 3.2 Software Specification 3.3 Problem Statement	7-10
4	Research Methods 4.1 Support Vector Regression 4.2 XgBoost 4.3 Linear Regression	11-15
5	Performance Evaluation 5.1 RMSE 5.2 R2Score 5.3 MAPE 5.4 Output	16-19
6	Data and Analysis	20-26
7	Final Output	27-39
8	Conclusion	40
9	Reference	41

PROJECT PROFILE

Project Title	Price Prediction of Wheat Using Machine Learning
Objective	Our goal behind this project is to predict price for product so that a farmer can gain access by selling those products at that price and make profit out of them.
Programming Language	Python
Tools	Anaconda, Jupiter Notebook
Guided By	Ms. Aditi Joshi
Group No	08
Group Member	Khushi Agarwal Neha Bhatt Aayush Gandhi Nidhi Gupta Suraj Gupta

Abstract

- Our target is focused largely on agriculture. In agriculture, farmers play the most important role. When the price falls after the harvest, farmers face immense losses.
- A country's GDP is affected by the price fluctuations of agricultural products. Crop price estimation and evaluation are done to take an intelligent decision before farming a specific type of crop.
- Predicting the price of a Wheat will help in taking better decisions which results in minimizing the loss and managing the risk of price fluctuations. In this project, we predicted the price of wheat by analyzing the previous WPI data.
- We used the SVR, LR and Xgboost to analyze the previous data and predict the price for the latest data.

Keywords: Linear Regression (lr), Support Vector Regression (svr), xgboost, Agriculture, Machine Learning, Crop Price.

Introduction

- In our country, agriculture is the principal pillar of the economy. The majority of families are dependent on agriculture.
- The country's GDP is primarily focused on agriculture. More than half of the land is used for agriculture to meet the needs of the population of the region.
- It is necessary to modernize agricultural practices to meet the demanding requirements. Our research aims to solve the problem of crop price prediction more effectively to ensure farmers' incomes.
- To come up with better solutions, we use Machine Learning methods on different data.
- Productivity can be improved by understanding and predicting crop prices.
- An efficient crop price forecasting system can offer farmers opportunities that can benefit people in a larger context. The fast fluctuations in crop costs are common within the market.
- Once the value rises and farmers suffer from an investment loss after the value decreases, it will lead the crops to be highly-priced, becoming a disadvantage for consumers.
- Farmers are not aware of the demand within the emerging agricultural economy that is taking place.
- Machine learning can be defined as one of the Artificial Intelligence applications that have proven to produce successful prediction models in various aspects, such as the stock market, weather, business decisions, and crop prices in our case.
- Most of the farmers in other countries are started to migrate for automated farming.

Objectives

- Our goal behind this project is to predict the price of Wheat so that a farmer can gain access by selling those products at those prices and make profit out of them.
- This makes sure that farmers get what they deserve the best.
- The main purpose of price prediction here is to help farmers manage their place risk and take informed decision.
- Different regression algorithm can be applied here to predict the data.

Software Specification

1. Operating System: Windows10
2. Programming Language: Python (3.9.7)
3. GUI Tool: Anaconda Navigator (Anaconda 3)

Problem Statement

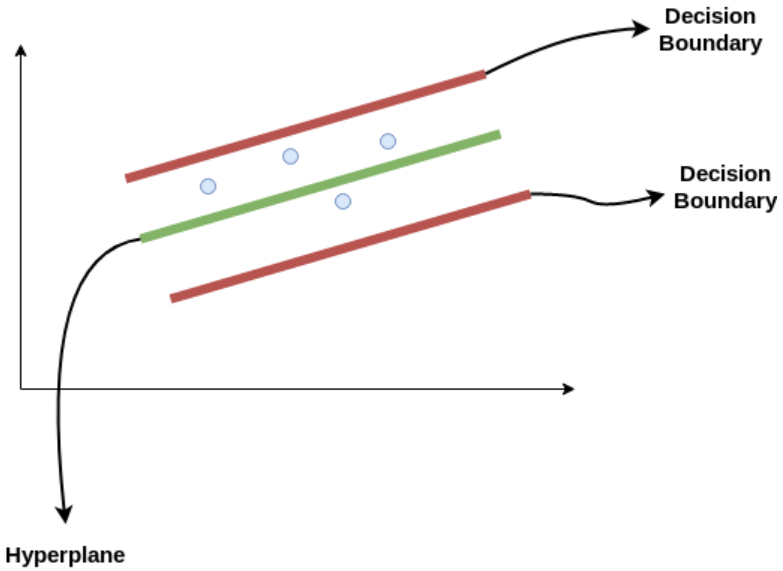
- Many factors affect the price such uncertain conditions such as climate changes, fluctuations in the market, flooding, etc. cause problems to the agricultural process.
- Other Factors such as demand and supply of the products.

Research Methods

- Support vector Regression
- XgBoost
- Linear Regression

Support Vector Regression (SVR)

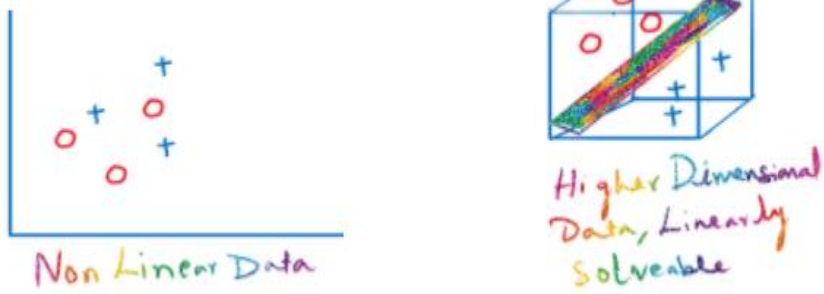
- Support vector regression uses the same principal as the SVM (Support vector machine)
- The SVM regression algorithm is referred as support vector regression or SVR.



- SVR is supervised learning algorithm that is used to predict discreate values. The basic idea behind SVR is to find the best fit line.
- SVR can handle highly non-linear data using an amazing technique called kernel trick.
- Kernel if function which places a low dimensional plane to high dimensional space which simply means it transforms linearly inseparable data to separable data by adding more dimensions to it.

- Widely used kernels are: -
    - Linear
    - Polynomial
    - Radial Basis Function

By default, RBF is used as the kernel



Linear:

Based on support vector machines method, the Linear SVR is an algorithm to solve the regression problems. The Linear SVR algorithm applies linear kernel method and it works well with large datasets.

Polynomial:

In machine learning, the polynomial kernel is a kernel function commonly used with support vector machines (SVMs) and other kernelized models, that represents the similarity of vectors (training samples) in a feature space over polynomials of the original variables, allowing learning of non-linear models.

RBF:

RBF kernels place a radial basis function centered at each point, then perform linear manipulations to map points to higher-dimensional spaces that are easier to separate. Radial Basis Networks are simple two-layer architectures with one layer of RBF neurons and one layer of output neurons.[5]

XgBoost

- XGBoost library in Python is used for supervised learning problems, where we use the training data (with multiple features) to predict a target variable. Or we can say that it is a distributed gradient boosting library which is highly efficient, flexible, and portable.[6]

Linear Regression

- Linear regression is one of the easiest and most popular Machine Learning algorithms. It is a statistical method that is used for predictive analysis.
- Linear regression makes predictions for continuous/real or numeric variables such as sales, salary, age, product price, etc.
- Linear regression algorithm shows a linear relationship between a dependent (y) and one or more independent (y) variables, hence called as linear regression.
- Since linear regression shows the linear relationship, which means it finds how the value of the dependent variable is changing according to the value of the independent variable.
- A linear regression line has an equation of the form Y = a + bX, where X is the explanatory variable and Y is the dependent variable.[7]

Performance Evaluation

Root Mean Squared Error

- The Mean Squared Error measures how close a regression line is to a set of data points.
- It is a risk function corresponding to the expected value of the squared error loss.
- Mean square error is calculated by taking the average, specifically the mean of errors squared from data as it relates to a function.

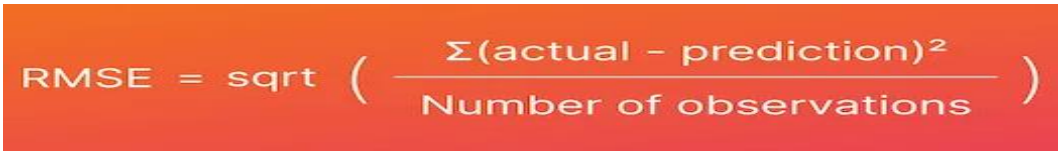


Figure 5.1: RMSE Formula

- To compute RMSE, calculate the residual (difference between prediction and truth) for each data point, compute the norm of residual for each data point, compute the mean of residuals and take the square root of that mean.
- The least value in RMSE gives the accurate result in prediction.[8]

R2Score

- The R2Score is a very important metric that is used to evaluate the performance of a regression-based machine learning model.
- It is pronounced as R squared and is also known as the coefficient of determination. It works by measuring the amount of variance in the predictions explained by the dataset.
- Simply put, it is the difference between the samples in the dataset and the predictions made by the model.
- R-squared value of above 0.75 would be considered a strong correlation.
- The R^2 is calculated by dividing sum of squares of residuals from the regression model by total sum of squares of errors from the average model and then subtract it from 1.

$$R^2 = 1 - \frac{\Sigma(y_{pred} - y_{mean})^2}{\Sigma(y_{actual} - y_{mean})^2}$$

Figure 5.2: R2Score Formula

- The sum squared regression is the sum of the residuals squared, and the total sum of squares is the sum of the distance the data is away from the mean all squared.
- In R2Score the range of value is 0 to 1.[9]

MAPE

- Mean Absolute Percentage Error (MAPE) is a statistical measure to define the accuracy
- Using MAPE, we can estimate the accuracy in terms of the differences in the actual v/s estimated values.
- For example, if your dataset included 12 entries, you would divide the sum by 12. The final result is the MAPE.

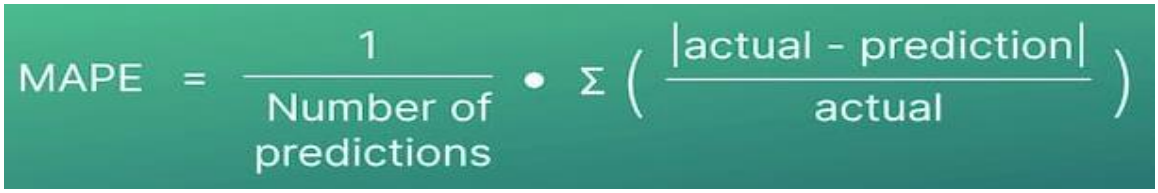


Figure 5.3: MAPE Formula

- MAPE can be considered as a loss function to define the error termed by the model evaluation. Using MAPE, we can estimate the accuracy in terms of the differences in the actual v/s estimated values.
- In MAPE, we initially calculate the absolute difference between the Actual Value (A) and the Estimated/Forecast value (F). Further, we apply the mean function on the result to get the MAPE value.
- In MAPE the range of value is 0 to infinity in percentage.[9]

Output

Models	RMSE	MAPE	R2Score
LR	210.32105	9.17438	-13.34426
SVR (RBF)	233.9552	10.2027	-109.1405
SVR (linear)	231.6196	10.0656	-10.9323
SVR (Poly)	237.9323	10.4439	-81.2829
XgBoost	216.08751	7.73675	-0.55528

Table 5.4

- Table represent the output of different results of different methods apply on the data.
- As per the Linear Regression we evaluate the RMSE, MAPE and R2Score.
- As per the SVR we have three built-in methods their name is: RBF, Linear and Polynomial based upon that we evaluate the RMSE, MAPE and R2Score.
- As per the XgBoost we evaluate the RMSE, MAPE and R2Score.
- So, as per the above data the least value in RMSE gives the accurate result in prediction and in MAPE the range of value is 0 to infinity in percentage and in R2Score the range of value is 0 to 1.
- So, as per the methods range, we finalize that the Linear Regression as best choice for predicting the values.

Data and Analysis

Data Visualization

- Data Visualization is a way to represent information graphically, highlighting patterns and trends in data and helping the reader to achieve quick insights.
- Data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data.

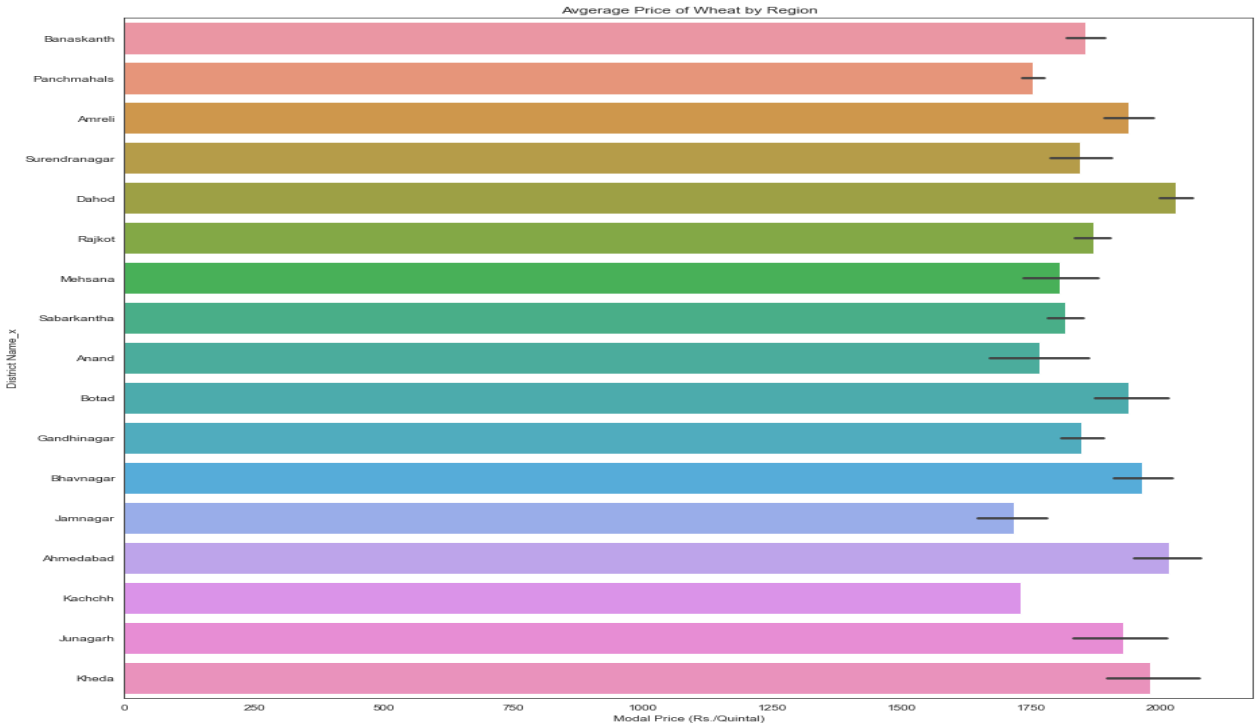


Figure 6.1: Bar plot.

- This graph represents data Visualization between Modal price and Region.
- And the results show here, that Ahmedabad has given a higher modal Price. Here, we are seeing that which district has highest modal price.
- We have 17 districts in our dataset so based upon the district we visualizing the highest model price.
- So, as per the graph you can see that the top 5 district's which have highest modal price is: 'Dahod', 'Ahmedabad', 'Kheda', 'Bhavnagar', and 'Botad'
- We give the value at X-axis as 'Modal Price' and Y-axis as 'District Name'.
- So, based upon the Modal Price it will show the result of District Name.

Year-wise, Month wise, day-wise, day of week

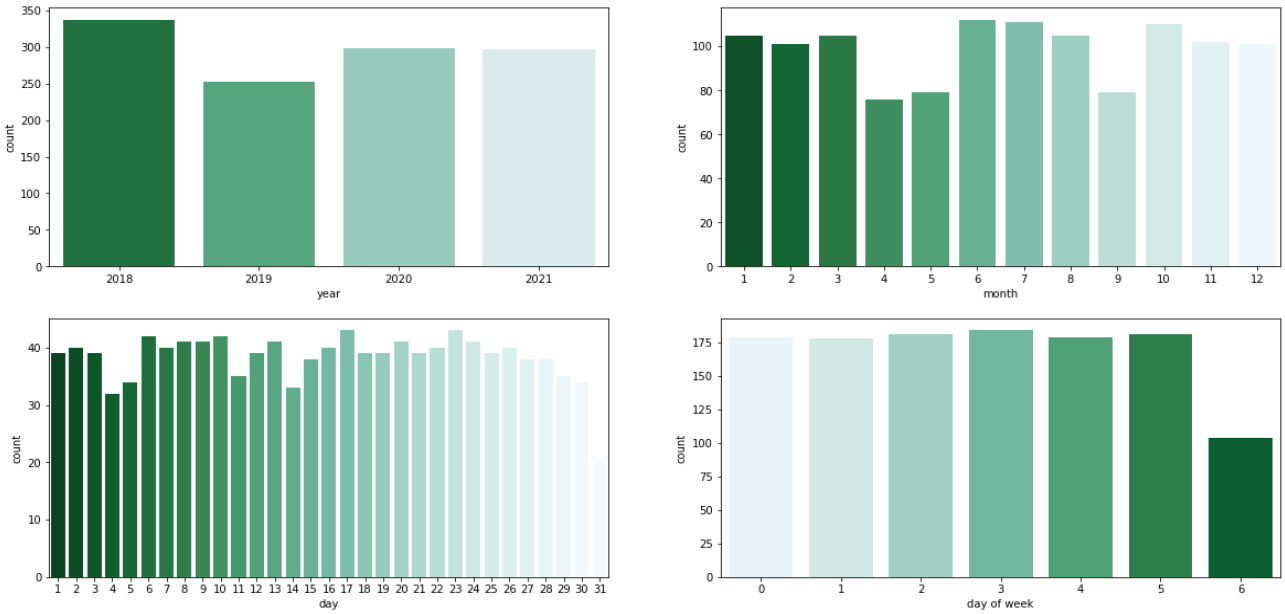


Figure 6.2: Count plot.

- This graph represents the modal price according to year wise, month wise, day wise, day of the week wise.
- In this visualizing we visualize that in which year the modal price of Wheat is higher.
- We also, visualize that in which month the price of modal is higher so, based upon that we can identify the Festival month's that in festival months the model price of Wheat is high or not.
- We also, visualize the price of model day by day and also visualizing the price of day of week that is M, T, W, T, F, S, and S.
- So, based upon the day of week we recognize that on which day the price of Wheat is higher based upon the Demand and Supply.

Impact of petrol price on the modal price

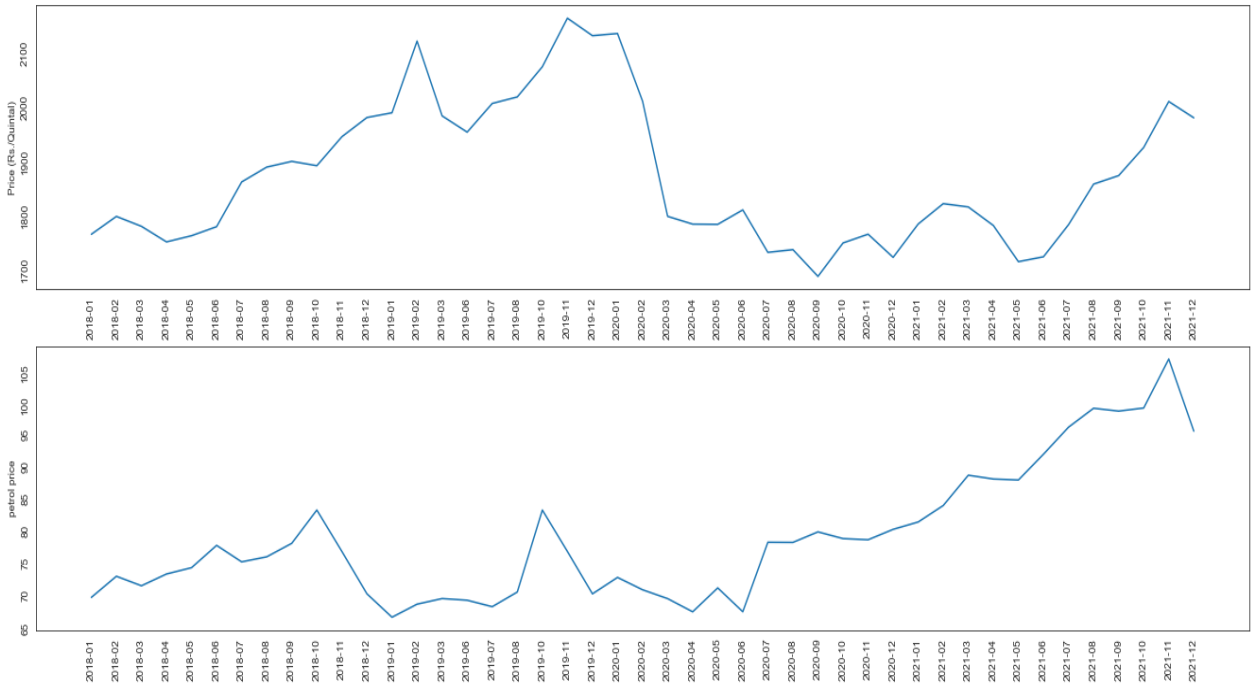


Figure 6.3: Subplot.

- This graph represents the impact of petrol price on modal price, if petrol price increases, then what was the modal price.
- We Visualizing, the Modal price and Petrol Price that if Petrol Price increases, then modal price is increased or not.
- So, based upon the visualization the impact of Petrol Price on Modal Price is Negative because the price of petrol is not impacting more to model price.

2020-2021 forecast vs actual

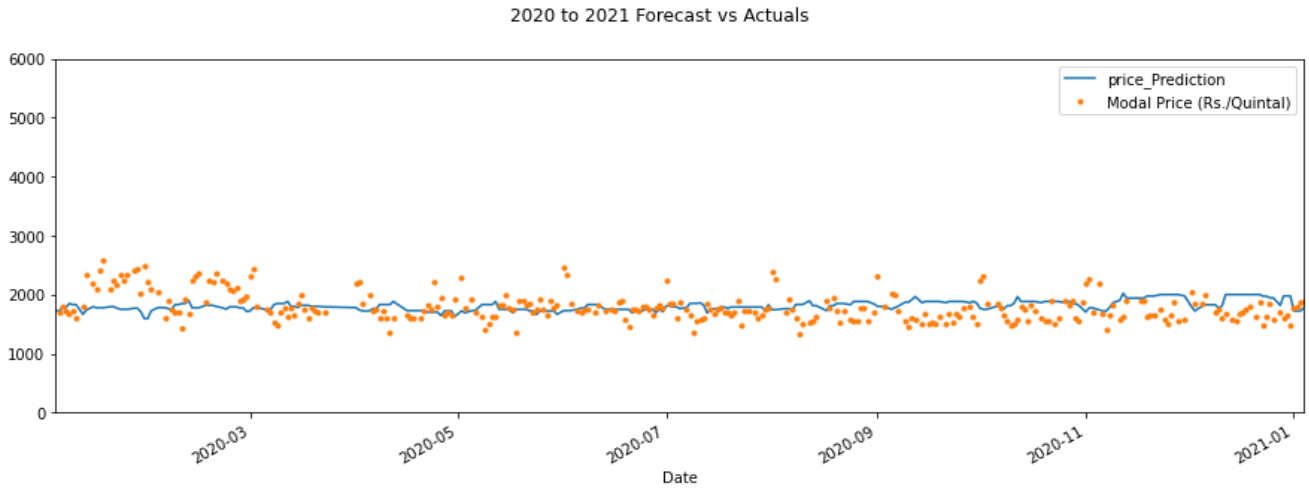


Figure 6.4: Forecast vs Actual

- This graph represents about what the forecast thinks and what the actual values comes as an output.
- The data visualization between the year 2020-2021.
- It is visualizing the price between modal and predicted price.
- So, as per visualization you can see that the price of Modal and Predicted price is not fluctuating more.
- You can see that the blue line in graph shows the Predicted price and Dot shows the modal price.

Year-wise visualization

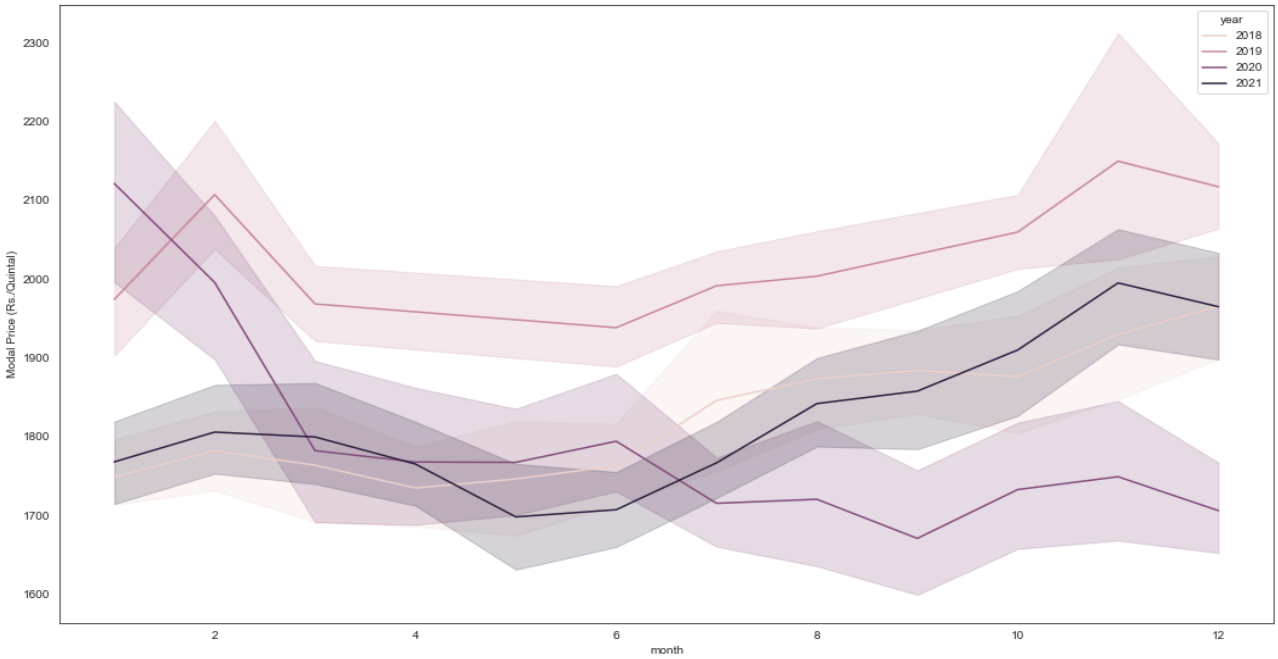


Figure 6.5: Line plot.

- This graph represents the year-wise visualization for the year- 2018, 2019, 2020, and 2021.
- Representing line plot, as it shows the trend throughout the years.
- The graph shows the modal price according to the month for the years.
- Here, the highest modal price in the year 2019 and the lowest modal price in the year 2020.
- In the month of April, there is a slight change in the model price for the year: 2018, 2020, and 2021.
- The modal price for the year- 2019 is always high compared to other years.
- The model price for the year 2020 drops month by month.
- The modal price for the years: 2018 and 2021 is almost the same.

Correlation

- Correlation is a statistical measure that expresses the extent to which two variables are linearly related.
- It's a common tool for describing simple relationships without making a statement about cause and effect.

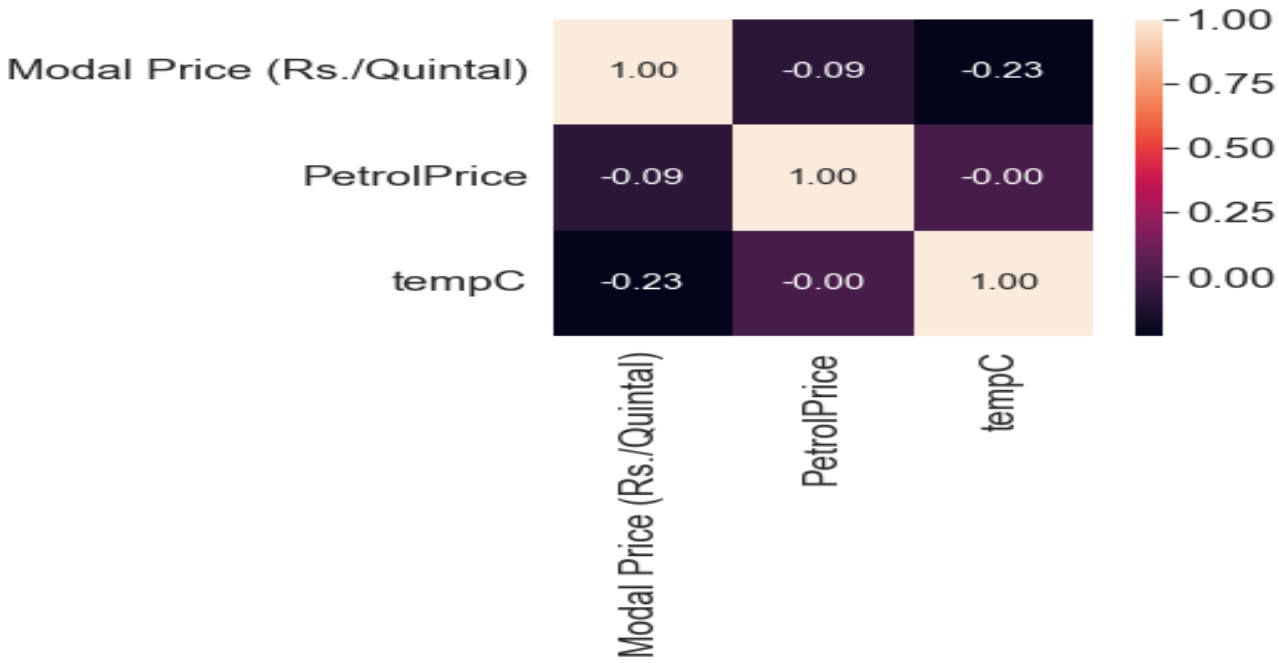


Figure 6.6: Correlation between petrol, temp, and modal price.

- It measures the correlation between modal price, petrol price, and Temperature.
- It represents the linear Relations between all.
- This represents the negative impact, which means that there is an inverse relationship between the value of features.
- Here, the petrol price is inverse to the price of the modal (-0.09),
  The temperature price is inverse to the price of the modal (-0.23),
  The temperature price is inverse to the price of Petrol (-0.00).

Figure 6.7: Correlation between min, max, and modal price.

- This measures, the correlation between modal price and their minimum price, and maximum price.
- It represents the linear relation of the minimum and maximum price.
- This implies a positive impact, which means parallel relation between the values of the feature.

Final Output

Linear Regression

```
In [208]: from sklearn import linear_model
          lm = linear_model.LinearRegression()
          model = lm.fit(input_train,target_train)
          prediction= model.predict(input_test)
          prediction

          import math

          mse = mean_squared_error(prediction, target_test)
          rmse_1 = math.sqrt(mse)

          mape_1 = mean_absolute_percentage_error(prediction, target_test)
          r_1 = r2_score(prediction, target_test)

          print('RMSE: ', rmse_1)
          print('MAPE: ', mape_1*100)
          print('R2 score: ',r_1)

          RMSE:  210.32105664755608
          MAPE:  9.174388420638712
          R2 score:  -13.344262152908223
```

Figure 7.1: LR

- Linear regression algorithm helps in predicting the value of Wheat.
- As per the Linear Regression we predict the values of wheat and also evaluating the values of RMSE, MAPE and R2Score.
- These methods help to evaluate the regression-based model.
- In Linear Regression, first we split the data into Train data and Test data based upon that we fit the model and predicting the price of wheat.

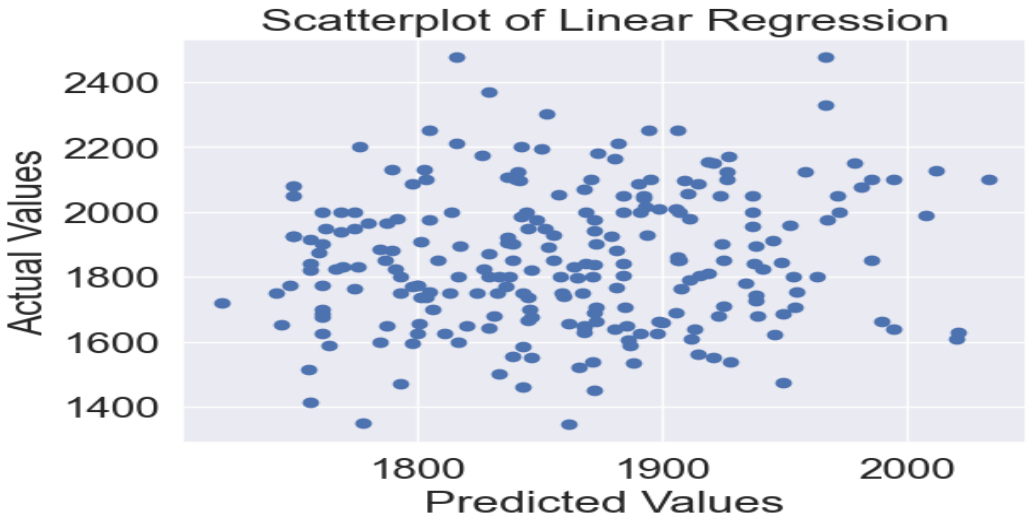


Figure 7.2: Scatterplot of LR

Support Vector Regression

Linear:

```
In [94]: from sklearn.svm import SVR

mlinear = SVR(kernel = 'linear')

mlinear.fit(input_train, target_train)

y_preds = mlinear.predict(input_test)

import math

mse = mean_squared_error(y_preds, target_test)
rmse_2 = math.sqrt(mse)
mape_2 = mean_absolute_percentage_error(y_preds, target_test)
r_2 = r2_score(y_preds, target_test)

print('RMSE: ', rmse_2)
print('MAPE: ', mape_2*100)
print('R2 score: ',r_2)
```

```
RMSE:  231.61965256947212
MAPE:  10.065672480797701
R2 score:  -10.932327578315894
```

Figure 7.3: SVR(Linear)

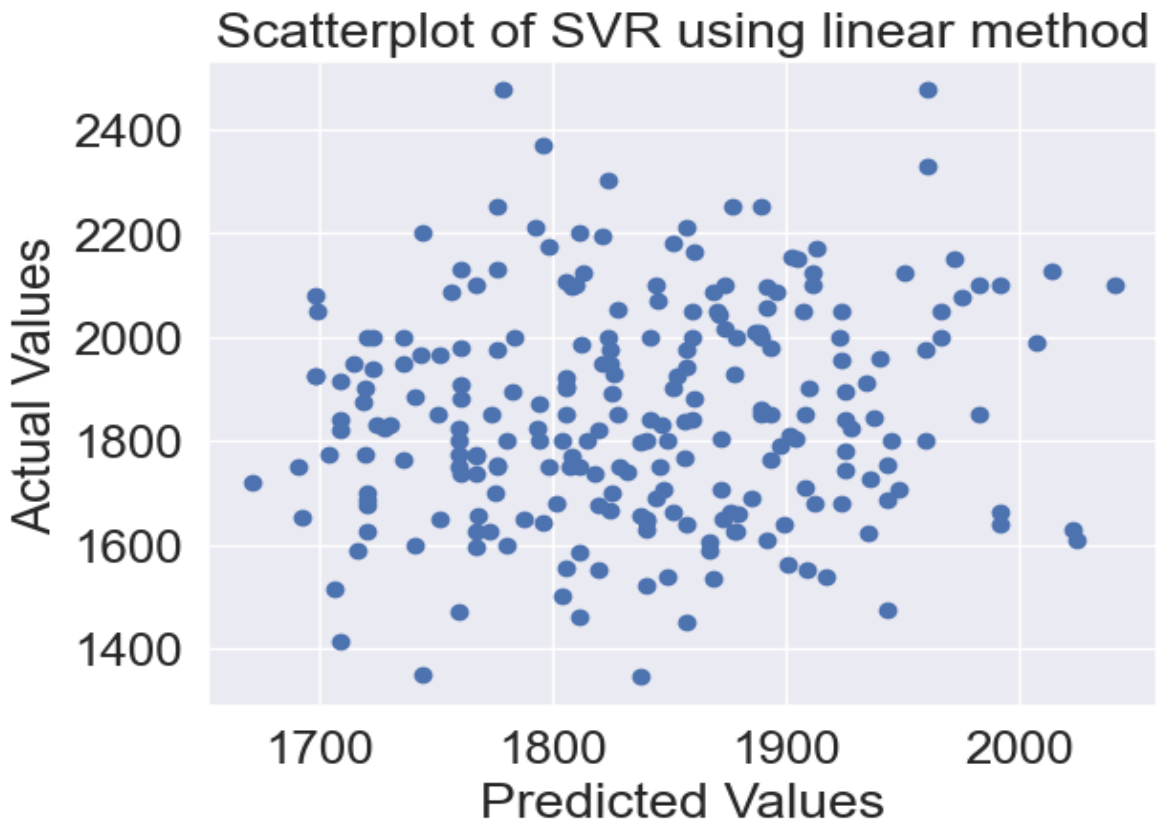


Figure 7.4: Scatterplot of SVR(linear)

Polynomial:

```
In [95]: from sklearn.svm import SVR

         mpoly = SVR(kernel = 'poly')

         mpoly.fit(input_train, target_train)

         y_preds = mpoly.predict(input_test)

         import math

         mse = mean_squared_error(y_preds, target_test)
         rmse_2 = math.sqrt(mse)
         mape_2 = mean_absolute_percentage_error(y_preds, target_test)
         r_2 = r2_score(y_preds, target_test)

         print('RMSE: ', rmse_2)
         print('MAPE: ', mape_2*100)
         print('R2 score: ',r_2)

RMSE:  237.9323804280286
MAPE:  10.443964251520434
R2 score:  -81.28292439111856
```

Figure 7.5: SVR(Poly)

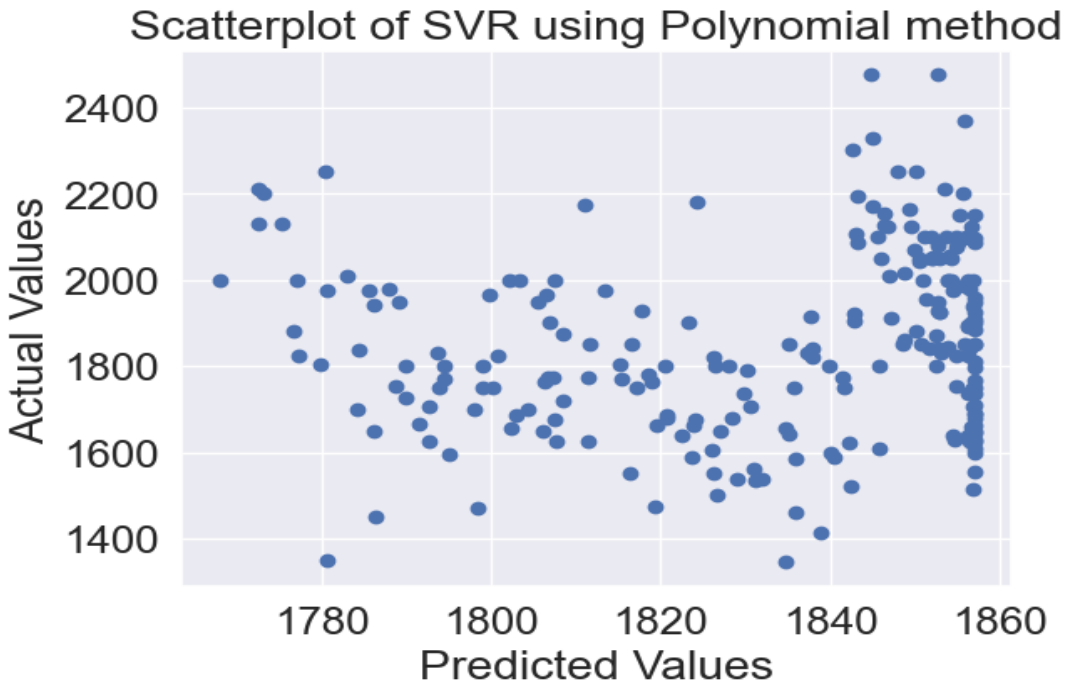


Figure 7.6: Scatterplot of SVR(Poly)

Radial Basis Function:

```
In [93]: from sklearn.svm import SVR

mrbf = SVR(kernel = 'rbf')

mrbf.fit(input_train, target_train)

y_preds = mrbf.predict(input_test)

import math

mse = mean_squared_error(y_preds, target_test)
rmse_2 = math.sqrt(mse)
mape_2 = mean_absolute_percentage_error(y_preds, target_test)
r_2 = r2_score(y_preds, target_test)

print('RMSE: ', rmse_2)
print('MAPE: ', mape_2*100)
print('R2 score: ',r_2)
```

```
RMSE:  233.95527331458715
MAPE:  10.202765316556732
R2 score:  -109.1405422060717
```

Figure 7.7: SVR(rbf)

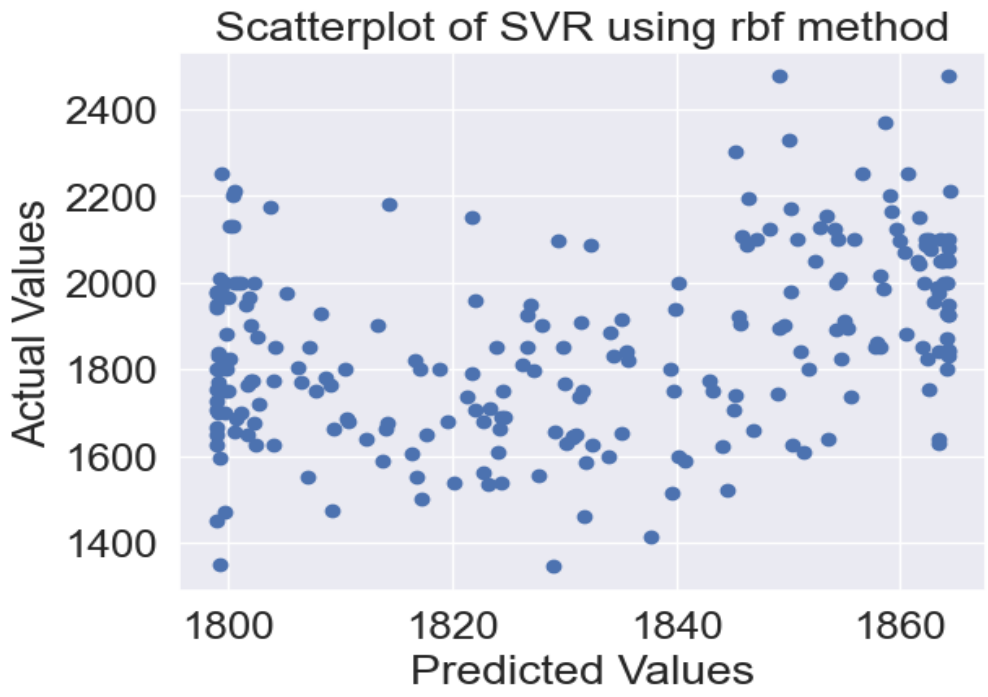


Figure 7.8: Scatterplot of SVR(rbf)

XgBoost

```
In [214]: from xgboost import XGBRegressor

          x = XGBRegressor()
          x.fit(input_train, target_train)

          y_preds = x.predict(input_test)
          import math

          mse = mean_squared_error(y_preds, target_test)
          rmse_7 = math.sqrt(mse)
          mape_7 = mean_absolute_percentage_error(y_preds, target_test)
          r_7 = r2_score(y_preds, target_test)


          print('RMSE: ', rmse_7)
          print('MAPE: ',mape_7*100)
          print('r2 score: ',r_7)

          RMSE:  216.08751505066365
          MAPE:  7.736759123525773
          r2 score:  -0.555286064434978
```

Figure 7.8: XgBoost

- XGBoost is a powerful approach for building supervised regression model.
- It represents about the difference about actual value and predicted value.

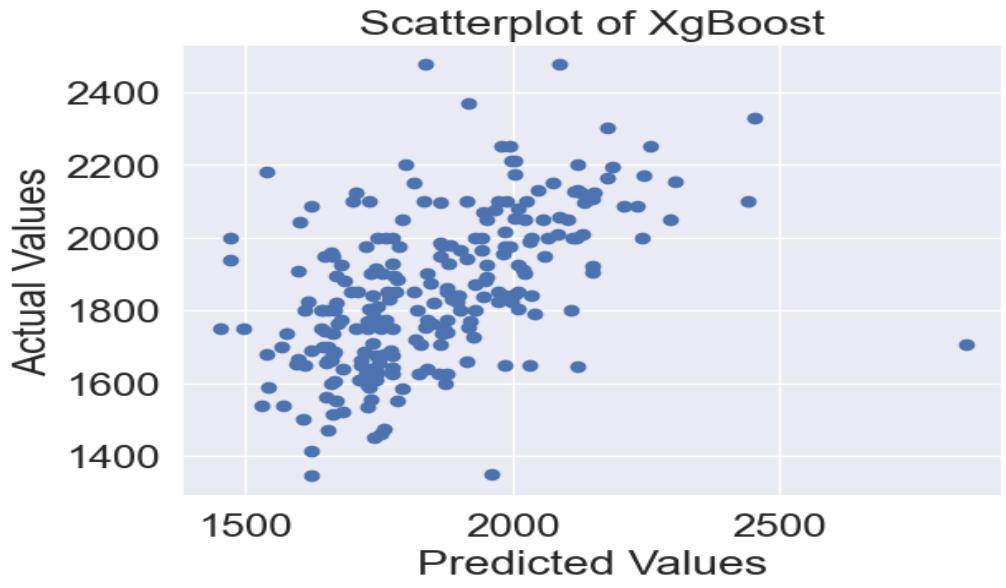


Figure 7.9: Scatterplot of XgBoost

Wheat price according to petrol price

Highest Petrol Price

```
In [165]: new_data=[[105,35,2023/5/1]]

In [167]: model.predict(new_data)
Out[167]: array([[1836.55427165]])
```

Figure 7.10: Based on Petrol Price

- We are assuming the highest price of Petrol based upon this we are predicting the price of Wheat.

Least Petrol price

```
In [159]: new_data=[[96.25,40,2023/5/1]]

In [160]: model.predict(new_data)
Out[160]: array([[1784.70583889]])
```

Figure 7.11: Based on Petrol Price

- We are assuming the least price of Petrol based upon this we are predicting the price of Wheat.

Wheat Price According to Season wise (Linear Regression)

January, 2023 (winter)

```
In [148]: new_data=[[100,10,2023/1/1]]

In [152]: model.predict(new_data)
Out[152]: array([[2107.21441528]])
```

Figure 7.12: Based on Season(Winter)

- The Price prediction of wheat in month of January helps to estimate the future price in 2023.
- According to Winter(season) get prediction the price of wheat.

April, 2023 (Summer)

```
In [153]: new_data=[[96,40,2023/4/1]]

In [154]: model.predict(new_data)
Out[154]: array([[1782.33633237]])
```

Figure 7.13: Based on Season(Summer)

- The Price prediction of wheat in month of April helps to estimate the future price in 2023.
- According to Summer (season) get prediction the price of wheat.

August, 2023 (Monsoon)

```
In [155]: new_data=[[96,29,2023/8/1]]

In [156]: model.predict(new_data)
Out[156]: array([[1924.23582217]])
```

Figure 7.14: Based on Season(Monsoon)

- The Price prediction of wheat in month of August helps to estimate the future price in 2023.
- According to Monsoon (season) get prediction the price of wheat.

Wheat Price According to Season wise (SVR Linear)

- With the help of SVR model as linear method we predict the price of wheat.

December, 2022 (winter)

```
In [99]: new_data=[[96,25,2022/12/1]]
         mlinear.predict(new_data)

Out[99]: array([1954.9253985])
```

Figure 7.15: SVR(Linear)

- The Price prediction of wheat in month of December helps to estimate the future price in 2023.
- According to Winter(season) get prediction the price of wheat.

March, 2023 (Summer)

```
In [100]: new_data=[[96,30,2023/3/15]]
          mlinear.predict(new_data)

Out[100]: array([1886.58639209])
```

Figure 7.16: SVR(Linear)

- The Price prediction of wheat in month of April helps to estimate the future price in 2023.
- According to Summer (season) get prediction the price of wheat.

August, 2023 (Monsoon)

```
In [101]: new_data=[[96,35,2023/8/15]]
          mlinear.predict(new_data)

Out[101]: array([1816.78689356])
```

Figure 7.17: SVR(Linear)

- The Price prediction of wheat in month of August helps to estimate the future price in 2023.
- According to Monsoon (season) get prediction the price of wheat.

Wheat Price According to Season wise (SVR Polynomial)

- With the help of SVR model as polynomial method we predict the price of wheat.

December, 2022 (winter)

```
In [102]: new_data=[[96,25,2022/12/15]]
          mpoly.predict(new_data)

Out[102]: array([1856.41088294])
```

Figure 7.18: SVR (Polynomial)

- The Price prediction of wheat in month of December helps to estimate the future price in 2023.
- According to Winter(season) get prediction the price of wheat.

March, 2023 (Summer)

```
In [103]: new_data=[[96,30,2023/3/15]]
          mpoly.predict(new_data)

Out[103]: array([1856.41290175])
```

Figure 7.19: SVR (Polynomial)

- The Price prediction of wheat in month of April helps to estimate the future price in 2023.
- According to Summer (season) get prediction the price of wheat

August, 2023 (Monsoon)

```
In [104]: new_data=[[96,35,2023/8/15]]
          mpoly.predict(new_data)

Out[104]: array([1856.41143101])
```

Figure 7.20: SVR(Polynomial)

- The Price prediction of wheat in month of August helps to estimate the future price in 2023.
- According to Monsoon (season) get prediction the price of wheat.

Wheat Price According to Season wise (SVR Radial Basis Function)

- With the help of SVR model as Radial Basis Function method we predict the price of wheat.

December, 2022 (winter)

```
In [96]: new_data=[[96,25,2022/12/1]]
         mrbf.predict(new_data)

Out[96]: array([1844.70321702])
```

Figure 7.21: SVR(rbf)

- The Price prediction of wheat in month of December helps to estimate the future price in 2023.
- According to Winter(season) get prediction the price of wheat.

March, 2023 (Summer)

```
In [97]: new_data=[[96,30,2023/3/15]]
         mrbf.predict(new_data)

Out[97]: array([1828.97241208])
```

Figure 7.22: SVR(rbf)

- The Price prediction of wheat in month of April helps to estimate the future price in 2023.
- According to Summer (season) get prediction the price of wheat

August, 2023 (Monsoon)

```
In [98]: new_data=[[96,35,2023/8/15]]
         mrbf.predict(new_data)

Out[98]: array([1825.44865753])
```

Figure 7.23: SVR(rbf)

- The Price prediction of wheat in month of August helps to estimate the future price in 2023.
- According to Monsoon (season) get prediction the price of wheat.

Predicted values of Wheat based on different models

Table: 7.24

Season	Date	SVR(RBF)	SVR (linear)	SVR (polynomial)	LR
Winter	2022/12/15	1844.7032	1954.9253	1856.4108	2107.2144
Summer	2023/3/15	1828.9724	1886.5863	1856.4129	1782.3363
Monsoon	2023/8/15	1825.4486	1816.7868	1856.4114	1924.2358

- Here we are showing the price of wheat based upon different models like LR and SVR.
- And, in SVR we get the price based on their three kernels that is RBF, Linear, and Polynomial.
- So here you can see that in Linear Regression the price of winter, summer and monsoon is in between 2107 to 1782.
- And, as compared to Linear Regression the Support Vector Regression gives the same range from Linear Regression.

Price prediction of top 5 regions

Price prediction of Dahod

```
In [19]: #Dahod is replaced with value 7
         new_data=[[96,25,2022/12/1,7]]
         model.predict(new_data)

Out[19]: array([[1913.65774361]])
```

Figure 7.25: Dahod

- This prediction shows that predicted price for Dahod on date 2022/12/1 with the temperature of 25^{o} and having petrol price of 96.

Price prediction of Ahmedabad

```
In [23]: #Ahmedabad is replaced with value 1
         new_data=[[96,25,2022/12/1,1]]
         model.predict(new_data)

Out[23]: array([[1966.98249579]])
```

Figure 7.26: Ahmedabad

- This prediction shows that predicted price for Ahmedabad on date 2022/12/1 with the temperature of 25^{o} and having petrol price of 96.

Price prediction of Kheda

```
In [27]: #Kheda is replaced with value 12
         new_data=[[96,25,2022/12/1,12]]
         model.predict(new_data)

Out[27]: array([[1869.22045013]])
```

Figure 7.27: Kheda

- This prediction shows that predicted price for Kheda on date 2022/12/1 with the temperature of 25^{o} and having petrol price of 96.

Price prediction of Bhavnagar

```
In [25]: #Bhavnagar is replaced with value 4
         new_data=[[96,25,2022/12/1,4]]
         model.predict(new_data)

Out[25]: array([[1940.3201197]])
```

Figure 7.28: Bhavnagar

- This prediction shows that predicted price for Bhavnagar on date 2022/12/1 with the temperature of 25^{o} and having petrol price of 96.

Price prediction of Botad

```
In [29]: #Botad is replaced with value 6
         new_data=[[96,25,2022/12/1,6]]
         model.predict(new_data)

Out[29]: array([[1922.54520231]])
```

Figure 7.29: Botad

- This prediction shows that predicted price for Botad on date 2022/12/1 with the temperature of 25^{o} and having petrol price of 96.
- So from the above predictions based on that we get the highest price of wheat at Ahmedabad at 1966.98 rs.

Conclusion

- In this project we are predicting the price of wheat and forecast the price of per day is proposed.
- The acquired training datasets provide ample insights to forecast the required price and demand in the markets.
- Therefore, the scheme allows farmers to reduce their problems and raise their income. Various algorithms can be used for crop price prediction such as Support vector regression, Linear Regression, Xgboost, etc.
- We are using SVR, LR, and Xgboost models. It is trained on Wheat for providing better accuracy.
- The Model further can be trained with petrol price, weather and season wise.
- As per the prediction we conclude that the impact of temperature on price is high.

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