

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

1.INTRODUCTION

1.1 Project Overview

The price of a new car in the industry is fixed by the manufacturer with some additional costs incurred by the Government in the form of taxes. So, customers buying a new car can be assured of the money they invest to be worthy. But, due to the increased prices of new cars and the financial incapability of the customers to buy them, Used Car sales are on a global increase. Therefore, there is an urgent need for a Used Car Price Prediction system which effectively determines the worthiness of the car using a variety of features. Existing System includes a process where a seller decides a price randomly and buyer has no idea about the car and its value in the present day scenario. In fact, seller also has no idea about the car's existing value or the price he should be selling the car at. To overcome this problem we have developed a model which will be highly effective. Regression Algorithms are used because they provide us with continuous value as an output and not a categorized value. Because of which it will be possible to predict the actual price a car rather than the price range of a car. User Interface has also been developed which acquires input from any user and displays the Price of a car according to user's inputs.

1.2 Purpose

Car resale value prediction system is made with the purpose of predicting the correct valuation of old cars that helps customers to sell the car remotely with perfect valuation and without human intervention in the process which saves the time of the customer.

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

2.LITERATURE SURVEY

2.1 Existing problem

Existing System includes a process where a seller decides a price randomly and buyer has no idea about the car and it's value in the present day scenario. In fact, seller also has no idea about the car's existing value or the price he should be selling the car at. To overcome this problem we have developed a model which will be highly effective. Regression Algorithms are used because they provide us with continuous value as an output and not a categorized value. Because of which it will be possible to predict the actual price a car rather than the price range of a car. User Interface has also been developed which acquires input from any user and displays the Price of a car according to user's inputs.

2.2 References

- [1] Sameerchand Pudaruth, "Predicting the Price of Used Cars using Machine Learning Techniques";(IJICT 2014).
- [2] Enis gegic, Becir Isakovic, Dino Keco, Zerina Masetic, Jasmin Kevric, "Car Price Prediction Using Machine Learning"; (TEM Journal 2019).
- [3] Ning sun, Hongxi Bai, Yuxia Geng, Huizhu Shi, "Price Evaluation Model In Second Hand Car System Based On BP Neural Network Theory"; (Hohai University Changzhou, China).
- [4] Nitis Monburinon, Prajak Chertchom, Thongchai Kaewkiriya, Suwat Rungpheung, Sabir Buya, Pitchayakit Boonpou, "Prediction of Prices for Used Car by using Regression Models" (ICBIR 2018).

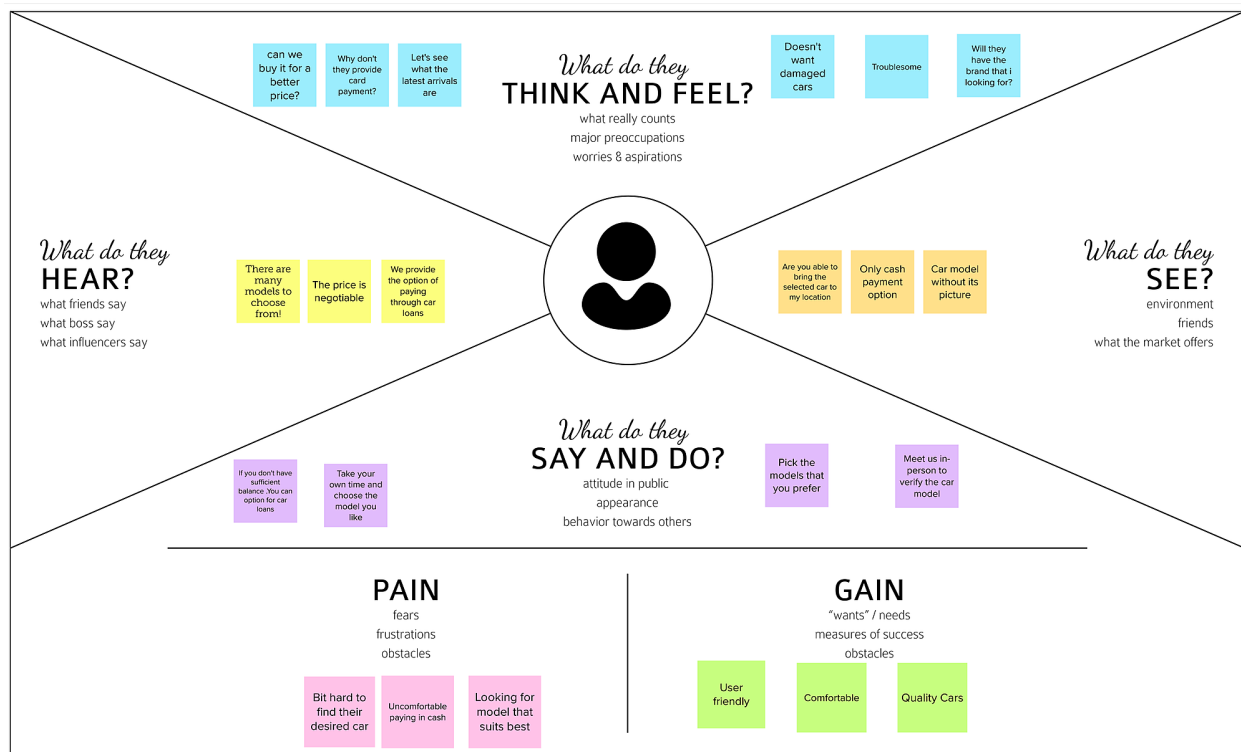
Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

2.3 Problem Statement Definition

If anyone wants to sell their car, either they have to take their car to a respective company workshop or have to make an appointment for the company to get an estimate of the price. This process involves a lot of time and resources.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

3.2 Ideation & Brainstorming

Template

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 10 minutes to prepare
- 1 hour to collaborate
- 2-6 people recommended

[Share template feedback](#)

➔

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

A

Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B

Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.

C

Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#)

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

PROBLEM

If anyone wants to sell their car, either they have to take their car to a respective company workshop or have to make an appointment for the company to get an estimate of the price. This process involves a lot of time and resources.

24

Key rules of brainstorming

To run a smooth and productive session

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

Retheshh

Can use with the dataset	Make a Supervised model	

Preetha

To develop an experimental website to upload photos of a car for resale.	Can use with various algorithms. An dataset and integrate to web application	

Rohith

To make a loan facility of with better experience	Make users feel comfortable, take input from the user and predict the price.	

Sujitha

An website and machine learning model for predicting the price of a used car using the data of used cars.	To develop an algorithm that can predict the price of a used car using the data of used cars.	

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

Training Model:

Can use with the dataset	Make a Supervised model	An website and machine learning model for predicting the price of used cars	Can use with various algorithms. An dataset and integrate to web application
--------------------------	-------------------------	---	--

Web Application:

To develop an experimental website to upload photos of a car for resale.	To make a loan facility of with better experience	To develop an algorithm that can predict the price of a used car using the data of used cars.	Make users feel comfortable, take input from the user and predict the price.
--	---	---	--

TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

3.3 Proposed Solution

S.No	Parameter	Description
1	Problem Statement (Problem to be solved)	If anyone wants to sell their car, either they have to take their car to a respective company workshop or have to make an appointment for the company to get an estimate of the price. This process involves a lot of time and resources.
2	Idea / Solution description	Car resale value prediction system is made with the purpose of predicting the correct valuation of old cars that helps customers to sell the car remotely with perfect valuation and without human intervention in the process which saves the time of the customer.
3	Novelty / Uniqueness	Our Objective is to make a model for third-party companies that will make an estimate the Price of the customer's car directly from their online portal rather than asking price information from third person. Easy to predict the used car price.
4	Social Impact / Customer Satisfaction	Customer satisfaction is more important here our car resale value prediction provides a more accurate price for the used car and it takes less time to find which satisfies the customer need.
5	Business Model (Revenue Model)	Business-2-consumer business model Business-2-consumer business model is a model that refers to businesses that sell their services or the products directly to the consumer who are the end users of the products or services.

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

3.4 Problem Solution fit

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS The person who's age is greater than 18 and also having car The person who needs to sell old car in an appropriate value.	6. CUSTOMER CONSTRAINTS CC The customer constraints are providing information about the the used car no cash,network connection,available devices.	5. AVAILABLE SOLUTIONS AS Customer needs to handler their car to broker and they need to spend money for them also. They sell their old cars according to the brokers provided rate.
	2. JOBS-TO-BE-DONE / PROBLEMS J&P If anyone wants to sell their car either they have to take their car to a respective company workshop or have to make an appointment for the company to get an estimate of the price . This process involves a lot of time and resources.	9. PROBLEM ROOT CAUSE RC The customer who needs to resale the car has no idea about fixing the rate for their used car.They don't know any prior knowledge about it.So,They need to look for third person (Brokers)	7. BEHAVIOUR BE Customer's are directly related.They just need to provide the use car information in their free time by providing the information. Our web application gives the accurate value for the old car.
Identify strong TR & EM	3. TRIGGERS TR Seeing their neighbour's.Buying a used car with cheap price and gather the web application information from them.	10. YOUR SOLUTION SL If you want to sell used cars,Write down your current information about the car in the appropriate field and check the appropriate rate for the used car. It may be very old model car or a new model car.It provides the accurate rate for selling the car.	8. CHANNELS of BEHAVIOUR CH 8.1 ONLINE Fill the required field ,Predicate the price and buy the used car depends upon the price.
	4. EMOTIONS- BEFORE / AFTER EM Before : The customer needs to look for a 3rd person and also they need to spend money. After:Without any human intervention,The customer just provides the information about their car.Our application provides the accurate value.		8.2 OFFLINE After bought the car,Modification and maintenance happens in offline.

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Collect Dataset	We can collect datasets from different open sources like kaggle.com, data.gov, UCI machine learning repository, etc.
FR-2	Pre-Process The Data	Import Required Libraries ,Read The Datasets, Cleaning The Dataset, Splitting Data Into Independent And Dependent Variables.
FR-3	Model Building	Choose The Appropriate Model, Check The Metrics Of The Model, Save The Model
FR-4	Application Building	Build The Python Flask App ,Build An HTML Page, Execute And Test Your Mode

4.2 Non-Functional requirements

NFR No	Non-Functional Requirement	Description
NFR-1	Usability	The system provides a help and support menu in all interfaces for the user to interact withthe system. The user can use the system by reading help and support.
NFR-2	Security	All communications will be encrypted. This protects the application, data, and the personal information of the user from interception. The application will not store personal data of the user on

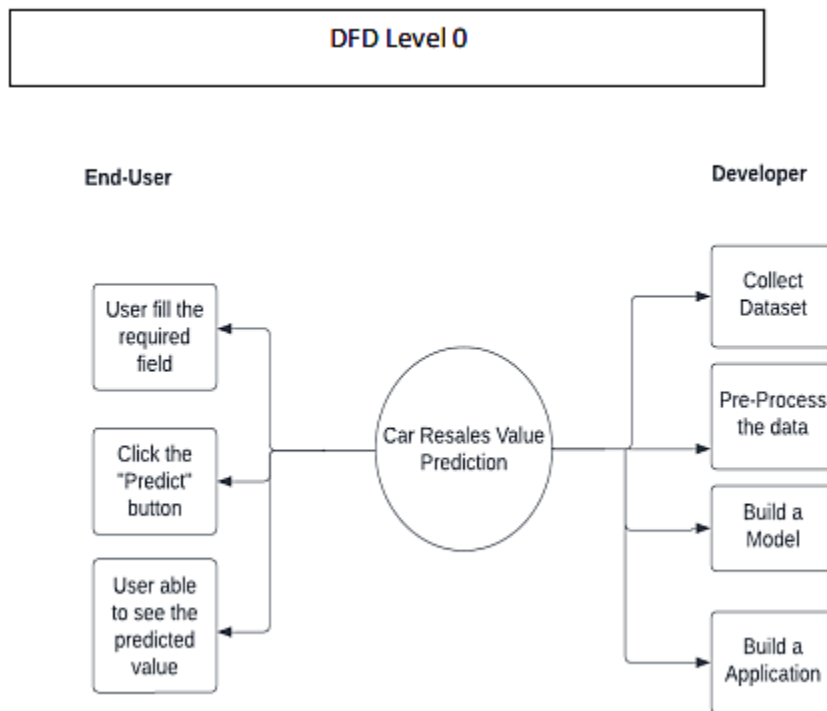
Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

		the device. The application requires a valid SSL certificate be maintained at all times to allow trusted and secure communication.
NFR-3	Reliability	We don't share the user's information to the 3rd party for any marketing and we won't share the cookies in backend.
NFR-4	Performance	The system response time for every instruction conducted by the user must not exceed more than a minimum of 10 seconds. The system should have high performance rate when executing user's input and should be able to provide response within a short time span usually 50 second for highly complicated task and 20 to 25 seconds for less complicated task.
NFR-5	Availability	The system should always be available for access at 24 hours, 7 days a week. Also in the occurrence of any major system malfunctioning, the system should be available in 1 to 2 working days, so that business process is not severely affected.
NFR-6	Scalability	Our solution provides approximately 0.7 accuracy for training dataset and 0.6 accuracy for test dataset in the case of higher workloads also.

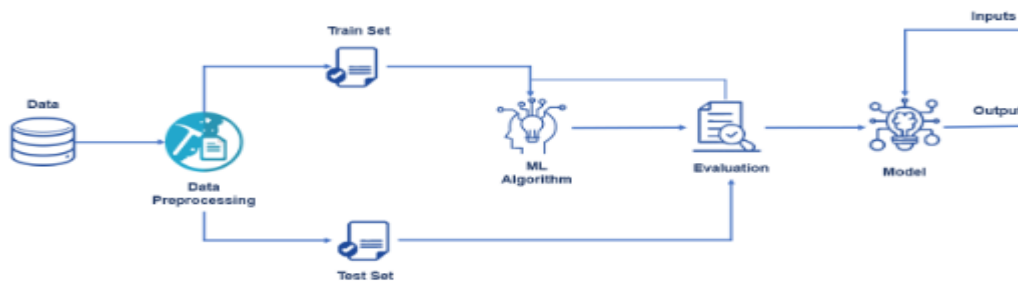
Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture



Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (WebUser)	Fill the required field in the user interface	USN-1	As a user,I will fill the field with the help text and drop down menu's	I can fill the required information in the UI itself	High	Sprint-1
	After fill all the required fields,User will click the 'predict' button.	USN-2	As a user, I will click 'Predict' button to see the value prediction of the used car's	I can receive value of used car's prize in the UI	High	Sprint-1
	User can able to see the multiple time of used car's prize	USN-3	As a user, I can able to reset the previously entered information in the UI.	I can able to reset the fields for new information	Low	Sprint-2

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

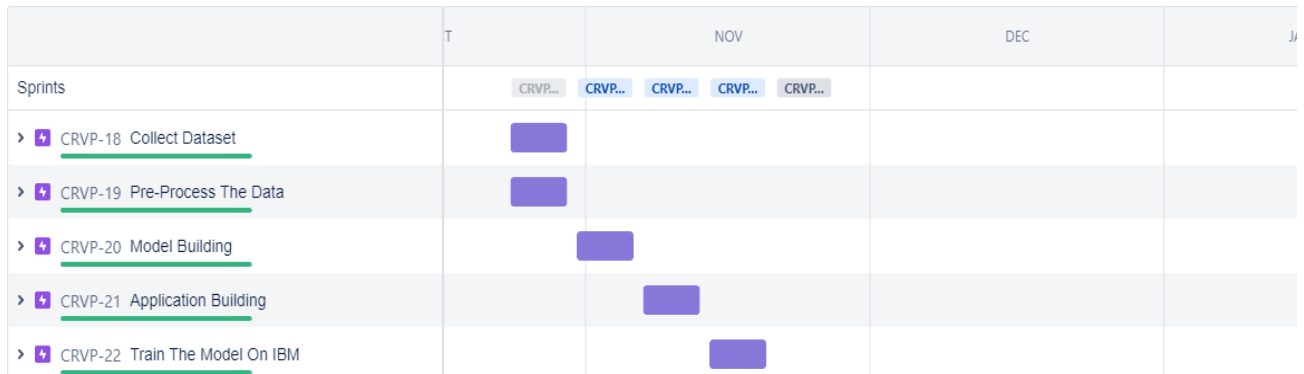
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Collect Dataset	USN-1	The dataset which contains a set of features through which the resale price of the car can be identified is to be collected.	2	High	Preetha G
Sprint-1	Pre-Process The Data	USN-2	In this milestone, we will be preprocessing the dataset that is collected. Preprocessing includes: <ol style="list-style-type: none"> 1. Handling the null values. 2. Handling the categorical values if any. 3. Normalize the data if required. 4. Identify the dependent and independent variables. 5. Split the dataset into train and test sets. 	1	Low	Retheshh E D
Sprint-2	Model Building	USN-3	You will need to train the datasets to run smoothly and see an incremental improvement in the prediction rate.	2	Medium	Rohith D
Sprint-3	Application Building	USN-4	we will be integrating it into a web application so that normal users can also use it to know the resale price of the care. In the application, the user provides the parameter values affecting the resale value.	2	Medium	Sujitha D
Sprint-4	Train The Model On IBM	USN-5	Build a Machine Learning Model and deploy it on the IBM Cloud.	2	High	Rohith D

6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (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	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

6.3 Reports from JIRA



7. CODING & SOLUTIONING

7.1 Feature 1

The process starts by collecting the dataset. The next step is to do Data Preprocessing which includes Data cleaning, Data reduction, Data Transformation. Then, using various machine learning algorithms we will predict the price. The algorithms involve Linear Regression, Ridge Regression and Lasso Regression. The best model which predicts the most accurate price is selected. After selection of the best model the predicted price is displayed to the user according to user's inputs. User can give input through website to for used car price prediction to machine learning model.

Code :

```
# Model Building
from sklearn.linear_model import LinearRegression
lr = LinearRegression()

# Training Model
lr.fit(x_train,y_train)

# Model Summary
y_pred_lr = lr.predict(x_test)

r_squared = r2_score(y_test,y_pred_lr)
rmse = np.sqrt(mean_squared_error(y_test,y_pred_lr))
print("R_squared :",r_squared)

R_squared : 0.8407655400238141
```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

8. TESTING

8.1 Test Cases

Test Case No	Test Case Scenario	Status
1	Verify user is able to see the information needed page	Pass
2	Verify user is able to fill the userd car details or not?	Pass
3	Verify user is able to navigate from home page to other pages?	Pass
4	Verify user is able to get the expected results accurately	Pass
5	Veriify information collected page elements	Pass

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

8.2 User Acceptance Testing

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
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

Here we will be evaluating the model built. We will be using the test set for evaluation. The test set is given to the model for prediction and prediction values are stored in another variable called `y_pred`. The `r2` score of the model is calculated and its performance is estimated.

Learning Algorithm	R square Score on Test 2 Data	R square Score on Training 2 Data	Training Time
Linear Regression	0.87	0.87	5 Minutes
Random Forest	0.88	0.98	10 Minutes

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

10. ADVANTAGES & DISADVANTAGES

10.1 Advantages

- Price
- Variant Upgrades
- Lower Loan Amount
- Warranty On Repair

10.2 Disadvantages

- Buying From Individuals
- Higher interest rate
- Lack Of Choice
- Additional Benefits

11. CONCLUSION

The increased prices of new cars and the financial incapability of the customers to buy them, Used Car sales are on a global increase. Therefore, there is an urgent need for a Used Car Price Prediction system which effectively determines the worthiness of the car using a variety of features. The proposed system will help to determine the accurate price of used car price prediction.

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

12. FUTURE SCOPE

In future this machine learning model may bind with various website which can provide real time data for price prediction. Also we may add large historical data of car price which can help to improve accuracy of the machine learning model. We can build an android app as user interface for interacting with user. For better performance, we plan to judiciously design deep learning network structures, use adaptive learning rates and train on clusters of data rather than the whole dataset.

13. APPENDIX

Source Code

resaleintro.html

```
<html>
<head>
  <h3>Get the Accurate Resale Value of your Car!!</h3>
  <style>
    h3
    {
      text-align: center;
      font-weight: bold;
      font-size: 25px;
      background-color:greenyellow;
    }
    p
    {
      margin-top: -450px;
      margin-left: 780px;
      font-size: 20px;
      text-align: justify;
```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

```

    }
    body
    {
        background-color:burlywood;
    }
    .button
    {
        background-color: #4CAF50; /* Green */
        border: none;
        color: white;
        padding: 15px 32px;
        text-align: center;
        text-decoration: none;
        display: inline-block;
        font-size: 16px;
        margin-left: 780px;
    }
</style>
</head>
<body>
    <img src ="static/audi.jfif" width="750px" height="550px">
    <p>
        With difficult economic conditions,it is likely that sales of reconditioned second-hand cars will
        increase.In most of the countries,it is common to lease a car rather than buying it outright.
        A lease is a binding contract between a buyer and a seller in which the buyer must pay fixed
        instalments for a pre-defined number of months/years to the seller/financer.After the lease
        period is over,the buyer has the possiblity to buy the car at its residual value, i.e, its
        expected resale value.Thus,this application is of commercial interest to seller/financers to be
        able to predict the residual value of cars with accuracy.
    </p>
    <a href="/predict" class="button">WANT TO KNOW THE RESALE VALUE OF YOUR
    CAR?</a>
</body></html>

```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

resalepredict.html

```

<!DOCTYPE html>
<html lang="en">
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
  <head>
    <title> 🚗 Car Price Prediction 🚗 </title>
  </head>

  <style>

input[type=text], select {
  width: 80%;
  padding: 12px 20px;
  margin: 8px 0;
  display: inline-block;
  border-radius: 4px;
  font-weight: bolder;
}

input[type=submit] {
  width: 80%;
  background-color: red;
  opacity: 0.7;

```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

```

color:black;
padding: 14px 20px;
margin: 8px 0;
border: none;
border-radius: 10px;
cursor: pointer;
font-size:100;
font-weight: bolder;
}

```

```

input[type=submit]:hover {
  background-color: red;
  opacity: 0.9;
}

```

```

form{
  border-radius: 10px;
  padding-top: 5%;
  font-weight: bolder;
}

```

```

div {

border-radius: 5px;
margin-left: 35%;
width: 30%;

```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

```

}
h1{
    color:color-blue;
    font-size: 40px;
    font-weight: bolder;
    background-color: greenyellow;
}
h3{
    color:white;
    font-size: 40px;
    border-radius: 10px;
    font-weight: bolder;
    padding: 14px 20px;
}

body {

    background-image: url("static/audi.jfif");
    background-repeat: no-repeat;
    background-size: cover;
    text-align: center;
    padding: 0px;
}

</style>

```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

<body>

<h1> Car Price Prediction 🚗 </h1>

<div>

<form action="/y_predict" method="post" style="background-color:#E6E6FA">

<label for="Year">Registration Year 📅</label>

<input type="text" id="Year" name="Year" placeholder="For example: 2014/2015...." required="required">

<label for="Present_Price">Showroom Price ₹ (in lakhs)</label>

<input type="text" id="Present_Price" name="Present_Price" placeholder="For example: 3.4 (for 3.4 lakhs)" required="required">

<label for="Kms_Driven">Kilometers car has driven </label>

<input type="text" id="Kms_Driven" name="Kms_Driven" placeholder="For example: 50000 (for 50000 kms)" required="required">

<label for="Owner">No. of Owners </label>

<select id="owner" name="Owner">

<option value="0">0</option>

<option value="1">1</option>

<option value="2">2</option>

<option value="3">3</option>

</select>

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

```

<label for="Fuel_Type_Petrol">Fuel type of the car 🚗</label><br>
  <select id="Fuel_Type_Petrol" name="Fuel_Type_Petrol" required="required">
    <option value="Petrol">Petrol 🚗</option>
    <option value="Diesel">Diesel 🚗</option>
    <option value="Cng">CNG 🚗</option>
  </select><br>
<label for="Seller_Type_Individual">Owner type  </label><br>
  <select id="Seller_Type_Individual" name="Seller_Type_Individual" required="required">
    <option value="dealer">Broker  </option>
    <option value="individual">Individual  </option>
  </select><br>
<label for="Transmission_Manual ">Gear Box Type ⚙️</label><br>
  <select id="Transmission_Manual" name="Transmission_Manual" required="required">
    <option value="manual car">Manual  </option>
    <option value="automatic car ">Automatic  </option>
  </select> <br>

<input type="submit" value="Predict">
</form>
</div>

<h3>{{ prediction_text }}</h3>

</body></html>

```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

app.py

```
from flask import Flask, render_template, request, jsonify
import requests
import pickle
import numpy as np
import sklearn
from sklearn.preprocessing import StandardScaler

app = Flask("car_model")

model = pickle.load(open('resale_value.sav', 'rb'))

@app.route('/',methods=['GET'])
def intro():
    return render_template('resaleintro.html')

@app.route('/predict',methods=['GET'])

def Home():
    return render_template('resalepredict.html')

standard_to = StandardScaler()

@app.route("/y_predict", methods=['POST'])
```


Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

```
def predict():
```

```
    Fuel_Type_Diesel=0
```

```
    if request.method == 'POST':
```

```
        Year = int(request.form['Year'])
```

```
        Year = 2020 - Year
```

```
        Present_Price=float(request.form['Present_Price'])
```

```
        Kms_Driven=int(request.form['Kms_Driven'])
```

```
        Kms_Driven2=np.log(Kms_Driven)
```

```
        Owner=int(request.form['Owner'])
```

```
        Fuel_Type_Petrol=request.form['Fuel_Type_Petrol']
```

```
        if(Fuel_Type_Petrol=='Petrol'):
```

```
            Fuel_Type_Petrol=1
```

```
            Fuel_Type_Diesel=0
```

```
        elif(Fuel_Type_Petrol=='Diesel'):
```

```
            Fuel_Type_Petrol=0
```

```
            Fuel_Type_Diesel=1
```

```
        else:
```

```
            Fuel_Type_Petrol=0
```

```
            Fuel_Type_Diesel=0
```

```
        Seller_Type_Individual=request.form['Seller_Type_Individual']
```

```
        if(Seller_Type_Individual=='Individual'):
```

```
            Seller_Type_Individual=1
```

```
        else:
```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

```

        Seller_Type_Individual=0

    Transmission_Manual=request.form["Transmission_Manual"]
    if(Transmission_Manual=='Mannual'):
        Transmission_Manual=1
    else:
        Transmission_Manual=0

prediction=model.predict([[Present_Price,Kms_Driven2,Owner,Year,Fuel_Type_Diesel,Fuel_Type_Petrol,Seller_Type_Individual,Transmission_Manual]])
output=round(prediction[0],2)

    if output<0:
        return render_template('resalepredict.html',prediction_text="× Sorry you cannot predict this car. ")

    else:
        return render_template('resalepredict.html',prediction_text=" The resale value predicated is {} lakhs".format(output))

    else:
        return render_template('resalepredict.html')

if __name__=="__main__":
    app.run(debug=True)

```

Team ID	PNT2022TMID21102
Project Name	Car Resale Value Prediction

GitHub & Project Demo Link

<https://github.com/IBM-EPBL/IBM-Project-28674-1660115151/tree/main/Final%20Deliverables/Demo%20Video>