Project Report Format

1. INTRODUCTION

1.1 Project Overview:

The "Car Purchase Prediction Using ML" project is a cutting-edge application of machine learning that aims to accurately forecast car purchases based on customer data. By utilizing features such as age, income, and historical purchase patterns, the model achieves high predictive accuracy. This innovation assists potential buyers by estimating their likelihood to make a purchase, guiding their decision-making process. The model is integrated into a user-friendly interface for easy use.

Overall, this project has the potential to revolutionize the automotive industry by offering tailored marketing strategies, enhancing customer experiences, and optimizing dealership targeting through data-driven predictions.

1.2 Purpose:

The purpose of "Car Purchase Prediction Using ML" is to leverage machine learning techniques to accurately forecast the likelihood of a customer making a car purchase. By analysing various features such as age, income, and historical purchase patterns, the model aims to provide valuable insights to potential buyers, guiding them in their decision-making process.

This technology-driven approach aims to enhance the overall customer experience, optimize marketing efforts, and refine dealership targeting strategies in the automotive industry. Ultimately, the goal is to empower both customers and businesses with data-driven information for more informed and efficient car purchasing decisions.

2. LITERATURE SURVEY

2.1 Existing problem:

The existing problem that seeks to address is the uncertainty and lack of personalized guidance that potential car buyers often face. When individuals are in the market for a car, they may struggle to assess their own preferences, budget constraints, and the most suitable options available to them. This uncertainty can lead to prolonged decision-making processes, potential buyer hesitation, and sometimes dissatisfaction with the chosen vehicle after the purchase.

Furthermore, automotive businesses also face challenges in efficiently allocating their marketing resources. Without accurate insights into potential customers' likelihood to make a purchase, they may invest resources in targeting individuals who are less likely to convert, resulting in wasted time and resources.

2.2 References:

1.https://www.temjournal.com/content/81/TEMJournalFebruary2019_113_118.pdf

2.https://issuu.com/ijraset/docs/price_prediction_for_second_hand_cars_using_machin

3.https://www.researchgate.net/publication/335799148_Car_Price_Prediction_Using_Machine_Learning

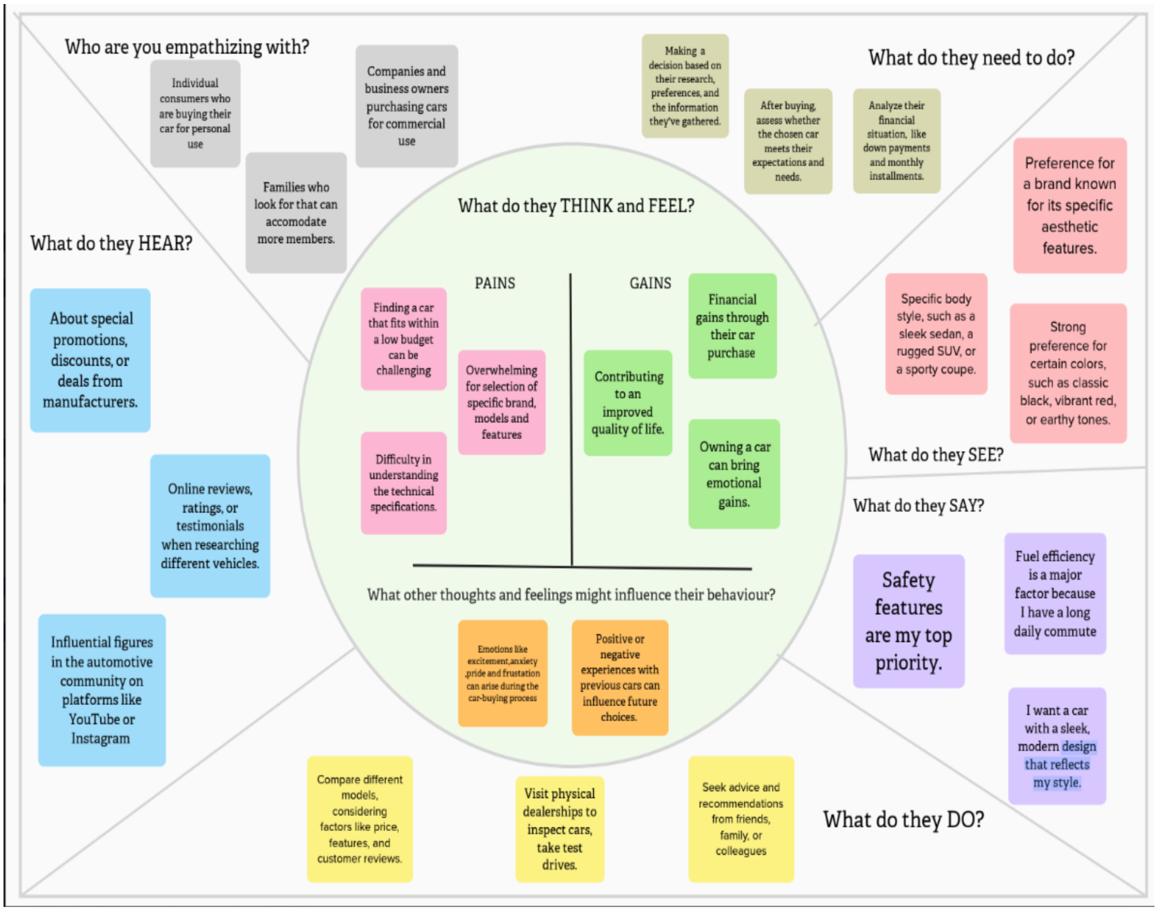
4.https://towardsdatascience.com/predicting-car-price-using-machine-learning-8d2df3898f16

2.3 Problem Statement Definition:

The goal of this project is to develop a machine learning model that accurately predicts the likelihood of a potential customer making a car purchase. Leveraging features such as age, income, and historical purchase patterns, the model aims to provide valuable insights to assist potential buyers in their decision-making process. The project seeks to revolutionize the automotive industry by offering tailored marketing strategies, enhancing customer experiences, and optimizing dealership targeting through data-powered predictions. This problem statement clearly defines the objective, the features to be used, and the expected outcomes of the project. It provides a clear roadmap for the development and implementation of the machine learning solution.

3. IDEATION & PROPOSED SOLUTION

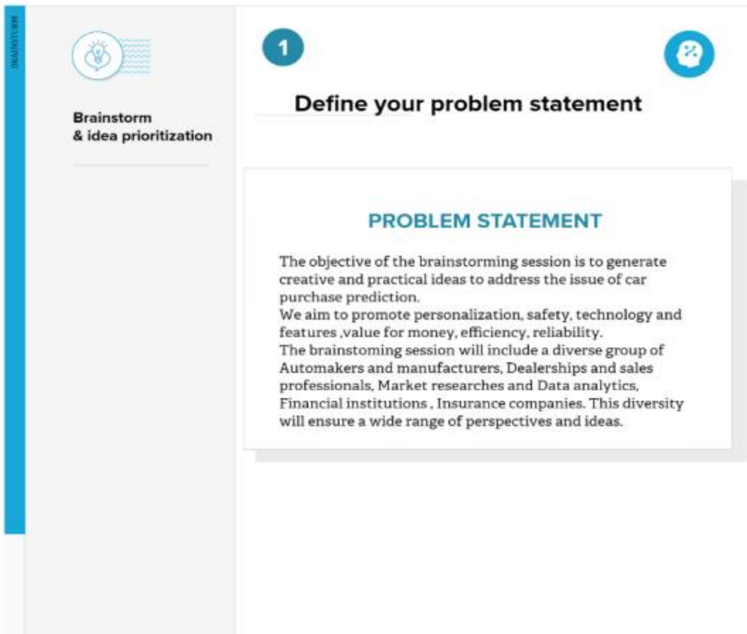
3.1 Empathy Map Canvas:



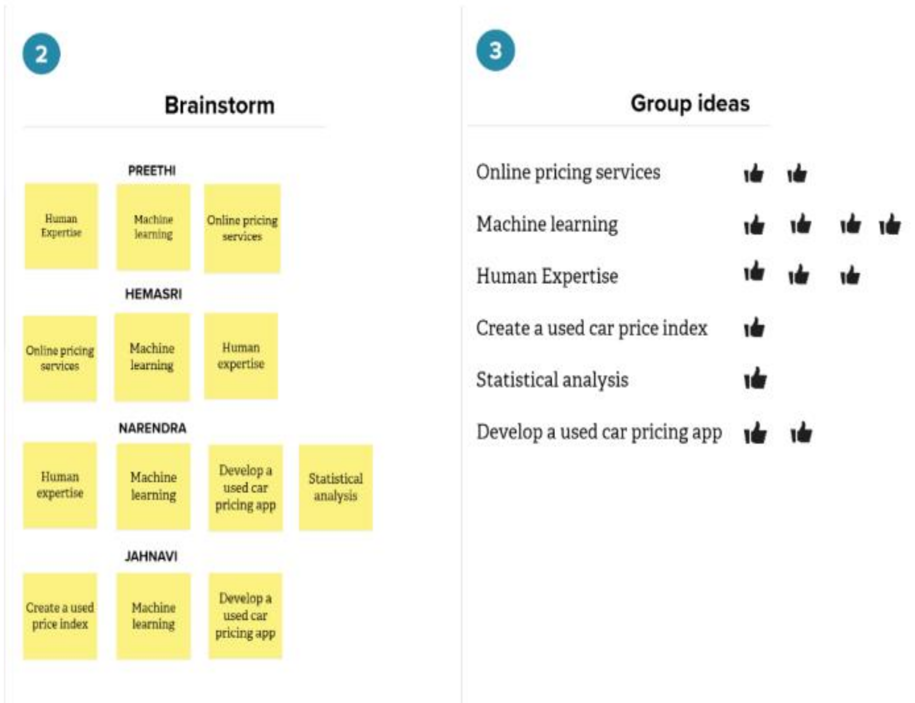
3.2 <u>Ideation & Brainstorming:</u>

Brainstorming for Car purchase Prediction

Step-1: Team Gathering and Select the Problem Statement.



Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization

<u>Description as to why we have chosen ML as the first priority:</u>

The automotive industry generates and collects an enormous amount of data and ML can effectively analyse and make sense of this data to provide valuable insights.ML can provide data-driven insights that go beyond human intuition. By analysing historical data, it can identify patterns and correlations. This can help buyers find the most cost-effective options by considering factors such as long-term ownership costs, fuel efficiency, and resale value. It provide a competitive edge. Predictive models can help dealerships and manufacturers stay ahead of market trends and offer buyers the best options. It can promote eco-friendly car choices by recommending hybrid or electric vehicles, contributing to sustainability efforts. In summary, using Machine Learning for car purchase prediction is a logical choice because it leverages data, personalization, and advanced algorithms while helping businesses stay competitive in a rapidly evolving industry. It enhances decision-making, takes advantage of vast data resources, and aligns with the growing emphasis on data-driven insights and personalization in the modern world.

4. REQUIREMENT ANALYSIS

4.1 Functional requirements:

In the realm of predicting car purchases, the process of requirement analysis involves a meticulous examination of both functional and non-functional aspects to ensure the development of an effective and efficient predictive model. Functionally, the system must possess the capability to accurately forecast and analyse the factors influencing a customer's decision to purchase a particular car. This involves the identification and integration of key variables such as the customer's financial status, preferences, past purchasing behaviour, and current market trends. The functional requirements extend to the seamless processing of data, employing machine learning algorithms to identify patterns, and providing a user-friendly interface for both customers and administrators.

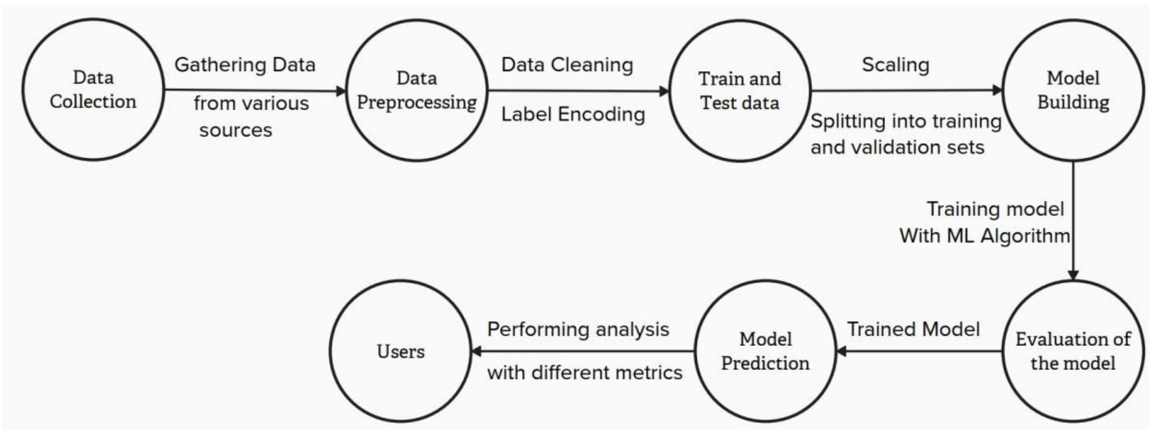
4.2 Non-Functional requirements:

On the non-functional side, the analysis delves into aspects that define the system's performance, security, and usability. Performance considerations include the speed and accuracy of the predictive model, ensuring that it can handle a diverse range of input data efficiently. Security measures are paramount, safeguarding sensitive customer information and ensuring compliance with data protection regulations. Usability encompasses the user interface's intuitiveness, making it accessible for users with varying levels of technical expertise.Moreover, reliability and scalability are essential non-functional elements. The predictive model should consistently deliver accurate results, instilling confidence in users. Scalability is crucial to accommodate potential growth in data volume and user interactions, ensuring the system's longevity and adaptability to evolving market dynamics.

5. PROJECT DESIGN

5.1 Data Flow Diagrams & User Stories:

Data Flow Diagram:



User Stories:

User type	Functional Requirement	User Story Number	User story/task	Acceptancecriteria	Priority	Release
Car Salesperson	Project setup& infrastructure	USN -1	Set up the development environment with the requiredtools and frameworks to start the car purchase prediction project.	Succesfully configured with all necessary toolsand frame works.	High	Sprint 1
Car	Development	USN-2	Gather a diverse dataset of data for	Gathered a	High	Sprint 1

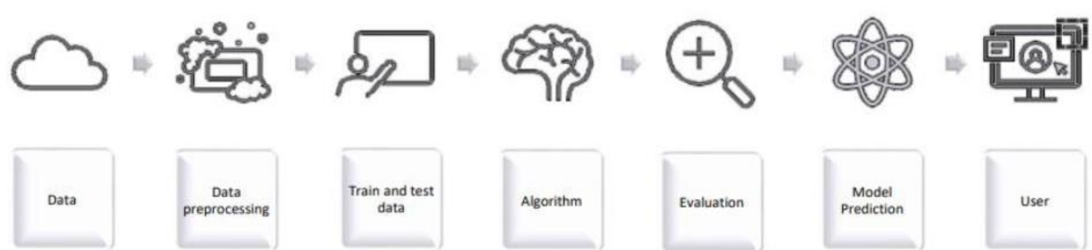
Dealership	environment		training the machine learning model.	diverse datasetof data depicting various factorssuch as age,income etc..		
Car Buyers	Data collection	USN-3	Preprocess the collected dataset by cleaning the data,label encoding and splitting it into training and validation sets.	Preproces sed the dataset	High	Sprint 2
Researchers and Academics	Data preprocessing	USN-4	Explore and evaluate different machine learning architectures (e.g., Linear regression) to select the most suitable model for car purchase prediction.	We could explor e various ML models	High	Sprint 2
System administrator	Model development	USN-5	Train the selected machine learning model using the preprocessed dataset and monitor its performance on the validation set.	We could do validatio n	High	Sprint 3
Educational Institutions	Training	USN-6	Implement data augmentation techniques (e.g., rotation, flipping) to improve the model's robustness and accuracy.	We could do testing.	Medium	Sprint 3
	Model Deployment & Integration	USN-7	Deploy the trained machine learning model as an API or web service to make it accessible for car purchase prediction. Integrate the model's API into a user-friendly web interface for users to input their data and check for the car purchase prediction results.	We could check the scalabi lity	Medium	Sprint 4

	Testing & quality assurance	USN-8	Conduct thorough testing of themodel and web interface to identify and report any issues or bugs. Fine-tune the model hyperparameters and optimize itsperformance based on user feedback and testing results.	We could create web applicatio n	Medium	

5.2 Solution Architecture:

It optimizes the car purchase prediction process by leveraging Linear regression for real-time data preprocessing. It not only enhances price prediction but also contributes to interpretability, feature selection, price trend analysis. It also improves the data-driven negotiation and risk mitigation. Our solution leverages Linear Regression to address the car purchase prediction problem effectively:

- Data Gathering.
- Data Preprocessing.
- Model Building.
- Car Purchase Prediction.
- Real Time Analysis.



6. PROJECT PLANNING & SCHEDULING

6.1 Technical Architecture:

The Deliverable shall include the architectural diagrams below and the information as per the table1& table 2.

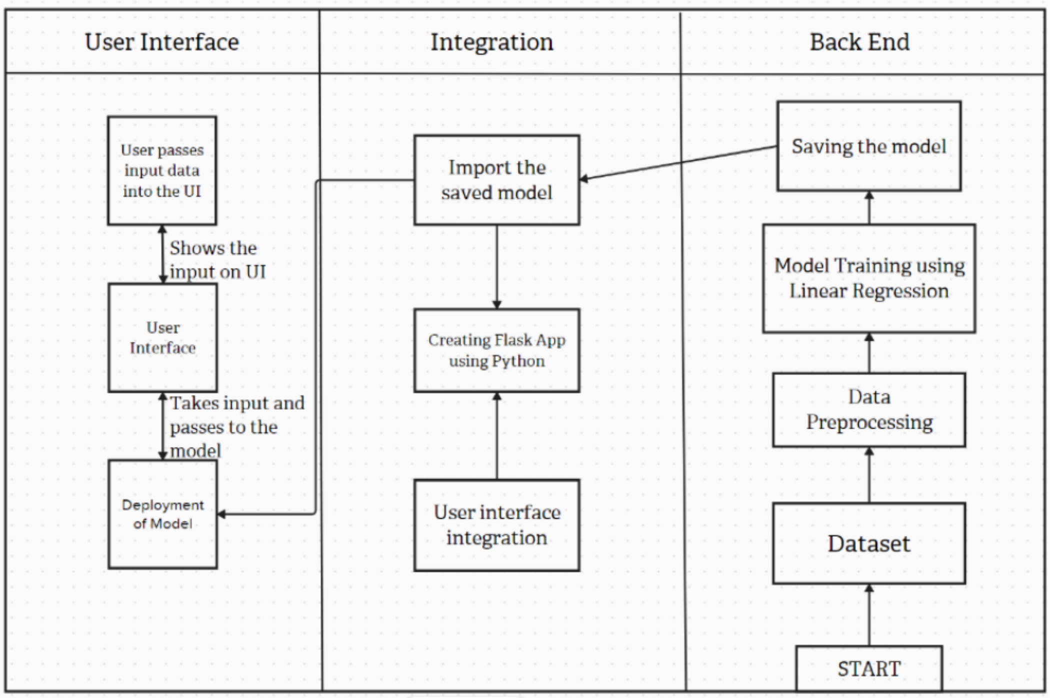


Table-1 : Components &Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI	HTML, CSS, JavaScript / Angular Js /ReactJs etc.
2.	Application Logic-1	Logic for a process in the application	Java / Python
3.	Database	Collect the Dataset Based on the Problem Statement	File Manager, MySQL, NoSQL, etc.
4.	File Storage/ Data	File storage requirements for Storing the dataset	Local System, Google Drive Etc
5.	Frame Work	Used to Create a web Application, Integrating Frontend and Back End	Python Flask,Django etc
6.	Deep Learning Model	Purpose of Model	Logic regression, ridge regression etc.
7.	Infrastructure (Server / Cloud)	Application Deployment on Local System / CloudLocal ServerConfiguration: Cloud Server Configuration :	Local, CloudFoundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	The open source frameworks used are scikit-learn,tensor flow,keras,pytorch,pandas,sea born and mathplotlib and jupyter notebook.	Python's Flask
2.	Security Implementations	Security implementations used are Data Encryption, Secure APIs,Authentication and Authorization,Input Validation,Regular Security Audits and Penetration Testing.	e.g. SHA-256, Encryptions, IAM Controls, OWASP etc.
3.	Scalable Architecture	Scalable Architectures used are microservices	Technology used

6.2 Sprint Planning & Estimation:

Sprint	Functional Requirement	User Story Number	User Story/Task	Story points	Priority	Team Members
Sprint 1	Project setup &Infrastructure	USN-1	Set up the development environmentwith the required tools and frameworks to start the car purchaseprediction.	5	High	Jahnavi
Sprint 1	Development environment	USN-2	Gather a diverse dataset of data for training the machine learning model.	5	High	Hemasri
Sprint 2	Data collection	USN-3	Preprocess the collected dataset bycleaning the data, label encoding and splitting it into training and validation sets.	5	High	Preethi
Sprint 2	Data preprocessing	USN-4	Explore and evaluate different machine learning architectures (e.g., Linear regression) to selectthe most suitable model for car purchase prediction.	5	High	Narendra
Sprint 3	Model development	USN-5	Train the selected machine learning model using the preprocessed datasetand monitor its performance on the validation set.	10	High	Narendra
Sprint 3	Training	USN-6	Implement data augmentation techniques (e.g., rotation, flipping)to improve the model's robustness and accuracy.	5	Medium	Jahnavi
Sprint 4	Model Deployment & Integration	USN-7	Deploy the trained machine learning model as an API or web service to make it accessible for car purchase prediction. Integratethe model's API into a user-friendly web interface for users to	10	Medium	Hemasri

			input their data and check for the car purchase prediction results.			
Sprint 5	Testing & quality assurance	USN-8	Conduct thorough testing of the model and web interface to identify and report any issues or bugs. Fine-tune the model hyperparameters and optimize its performance based on user feedback and testing results	5	Medium	Preethi

7. CODING & SOLUTIONING

Dataset:

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sb

df = pd.read_csv("car_data.csv")
df
```

Out[1]:

	User ID	Gender	Age	AnnualSalary	Purchased
0	385	Male	35	20000	0
1	681	Male	40	43500	0
2	353	Male	49	74000	0
3	895	Male	40	107500	1
4	661	Male	25	79000	0
...	...	...	...	...	...
995	863	Male	38	59000	0
996	800	Female	47	23500	0
997	407	Female	28	138500	1
998	299	Female	48	134000	1
999	687	Female	44	73500	0

1000 rows × 5 columns

Preprocessing:

In [9]:
```
#checking for null values

df.isnull().any()
```

Out[9]:
```
User ID          False
Gender           False
Age              False
AnnualSalary     False
Purchased        False
dtype: bool
```

In [10]:
```
df = df.drop(columns = ['User ID'],axis = 1)

df.head()
```

Out[10]:

	Gender	Age	AnnualSalary	Purchased
0	Male	35	20000	0
1	Male	40	43500	0
2	Male	49	74000	0
3	Male	40	107500	1
4	Male	25	79000	0

Encoding:

In [12]:
```
from sklearn.preprocessing import LabelEncoder

#label encoding
le = LabelEncoder()

df.Gender = le.fit_transform(df.Gender)
df
```

Out[12]:

	Gender	Age	AnnualSalary	Purchased
0	1	35	20000	0
1	1	40	43500	0
2	1	49	74000	0
3	1	40	107500	1
4	1	25	79000	0
...	...	...	...	...
995	1	38	59000	0
996	0	47	23500	0
997	0	28	138500	1
998	0	48	134000	1
999	0	44	73500	0

1000 rows × 4 columns

Scaling:

```
In [15]: #Scaling on independent variables

         from sklearn.preprocessing import MinMaxScaler
         scale =MinMaxScaler()

         X_scaled= pd.DataFrame(scale.fit_transform(X),columns =X.columns)
         X_scaled.head()
```

Out[15]:

	Gender	Age	AnnualSalary
0	1.0	0.377778	0.036364
1	1.0	0.488889	0.207273
2	1.0	0.688889	0.429091
3	1.0	0.488889	0.672727
4	1.0	0.155556	0.465455

```
In [16]: scalar = scale.fit_transform(X)
         scalar

Out[16]: array([[1.        , 0.37777778, 0.03636364],
                [1.        , 0.48888889, 0.20727273],
                [1.        , 0.68888889, 0.42909091],
                ...,
                [0.        , 0.22222222, 0.89818182],
                [0.        , 0.66666667, 0.86545455],
                [0.        , 0.57777778, 0.42545455]])
```

Splitting data and model building:

```
In [18]: # Train and test split

         from sklearn.model_selection import train_test_split
         X_train,X_test,Y_train,Y_test = train_test_split(X_scaled,Y,test_size=0.4,random_state=10)

In [19]: from sklearn.tree import DecisionTreeClassifier

         model1 = DecisionTreeClassifier(max_depth=4,splitter='best',criterion='entropy')
         model1.fit(X_train,Y_train)

Out[19]: DecisionTreeClassifier(criterion='entropy', max_depth=4)
```

Prediction:

```
In [20]: d_y_predict = model1.predict(X_test)
         d_y_predict

Out[20]: array([0, 0, 1, 1, 0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 0,
                1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 0,
                1, 1, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1,
                1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0,
                1, 0, 1, 0, 0, 1, 0, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 1, 1, 1, 0,
                1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0,
                0, 0, 1, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 1, 1, 0, 1, 1, 0, 0, 0, 0,
                0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 0,
                0, 1, 0, 1, 1, 0, 0, 1, 0, 1, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 1, 0,
                1, 1, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 1, 1, 0, 0, 0,
                0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0,
                1, 0, 1, 1, 1, 0, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 0,
                1, 0, 0, 1, 1, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 1, 0, 1, 0,
                1, 0, 1, 1, 1, 0, 1, 0, 1, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0, 1,
                0, 1, 1, 0, 0, 1, 1, 1, 1, 0, 0, 1, 0, 0, 0, 1, 1, 1, 0, 0, 0, 0,
                1, 1, 1, 0, 1, 1, 1, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0,
                0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1,
                1, 0, 1, 1, 1, 0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1,
                0, 0, 0, 0], dtype=int64)

In [21]: d_y_predict_train = model1.predict(X_train)
```

8. PERFORMANCE TESTING

8.1 Performance Metrics:

```
from sklearn.metrics import accuracy_score,classification_report,confusion_matrix

print('Testing Accuracy = ', accuracy_score(Y_test,d_y_predict))
print('Training Accuracy = ', accuracy_score(Y_train,d_y_predict_train))
```

```
Testing Accuracy =  0.895
Training Accuracy =  0.91
```

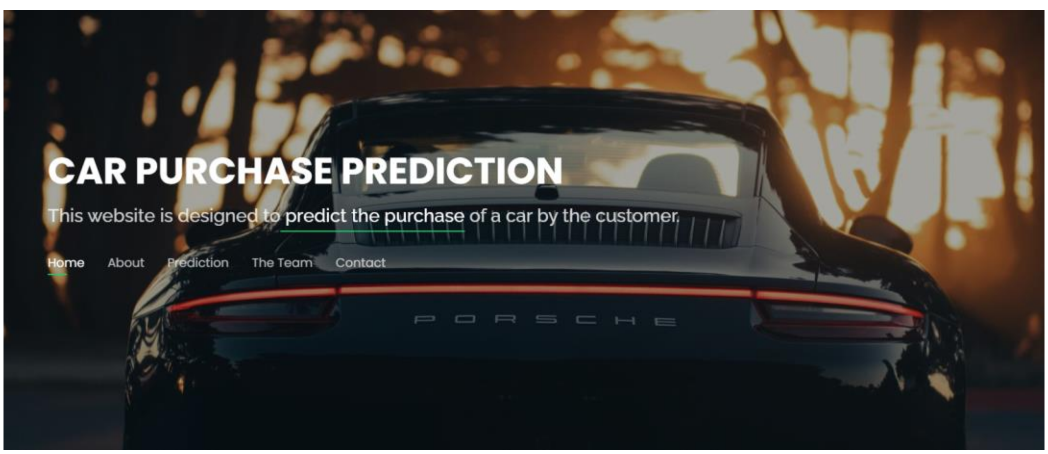
9. RESULTS

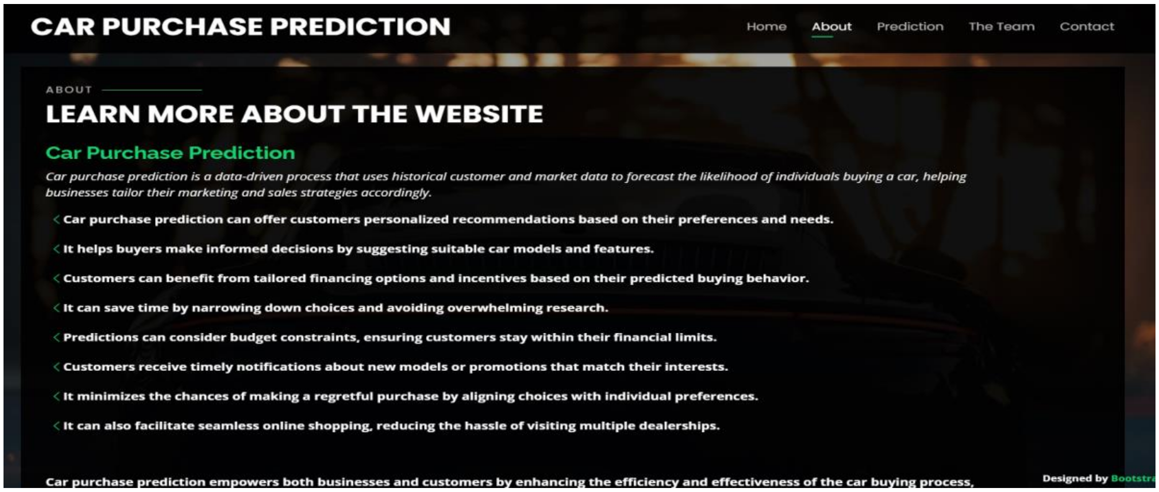
9.1 Output Screenshots:

Model prediction:

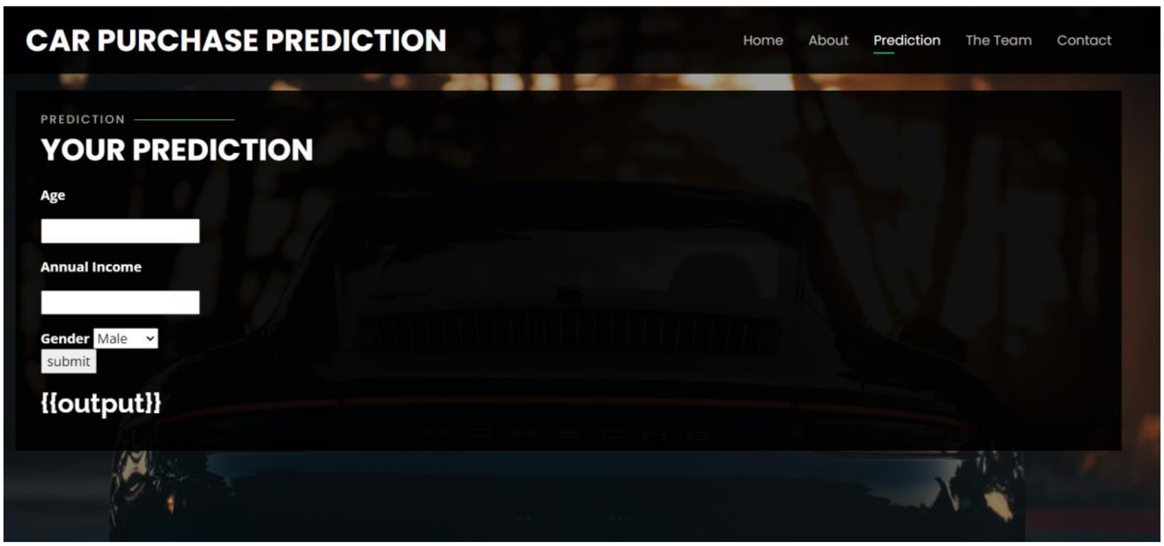
```
In [28]: from sklearn.tree import DecisionTreeClassifier

         DT_model = DecisionTreeClassifier()
         DT_model.fit(X_test,Y_test)

         prediction = DT_model.predict((np.array([[1.0,0.377778,0.036364]])))

         if prediction[0] == 1:
             print("Purchased")
         else:
             print("0")

         0
```

Website:





CAR PURCHASE PREDICTION
Home
About
Prediction
The Team
Contact
ABOUT
LEARN MORE ABOUT THE WEBSITE
Car Purchase Prediction
Car purchase prediction is a data-driven process that uses historical customer and market data to forecast the likelihood of individuals buying a car, helping businesses tailor their marketing and sales strategies accordingly.
Car purchase prediction can offer customers personalized recommendations based on their preferences and needs.
It helps buyers make informed decisions by suggesting suitable car models and features.
Customers can benefit from tailored financing options and incentives based on their predicted buying behavior.
It can save time by narrowing down choices and avoiding overwhelming research.
Predictions can consider budget constraints, ensuring customers stay within their financial limits.
Customers receive timely notifications about new models or promotions that match their interests.
It minimizes the chances of making a regretful purchase by aligning choices with individual preferences.
It can also facilitate seamless online shopping, reducing the hassle of visiting multiple dealerships.
Car purchase prediction empowers both businesses and customers by enhancing the efficiency and effectiveness of the car buying process,
Designed by



CAR PURCHASE PREDICTION
Home
About
Prediction
The Team
Contact
PREDICTION
YOUR PREDICTION
Age
Annual Income
Gender
Male
submit
{{output}}

10. ADVANTAGES & DISADVANTAGES

Advantages:

Market Understanding: Car purchase prediction can provide valuable insights into consumer behaviour and preferences. It helps car manufacturers, dealers, and marketers understand which models, features, or price points are in demand.

Financial Planning: Consumers can use car purchase predictions to plan their finances better. They can anticipate the cost of ownership, including monthly payments, insurance, and maintenance, and make informed decisions.

Reduction in Wasted Time and Effort: Car sales personnel can focus their efforts on potential buyers more likely to make a purchase, reducing the time and resources spent on customers who are less likely to buy.

Disadvantages:

Privacy Concerns: Predictive models often rely on personal data, raising concerns about privacy and data security. Consumers may be uncomfortable with the collection and use of their personal information for marketing purposes.

Accuracy and Uncertainty: No predictive model is perfect, and there is always a margin of error. Predictions can be inaccurate, leading to missed opportunities or unfulfilled expectations.

Overreliance on Data: Overreliance on predictive models can lead to overlooking intangible factors, such as a customer's emotional connection to a specific car brand or model.

Cost of Implementation: Developing and maintaining predictive models can be expensive. Small businesses or dealerships with limited resources may find it challenging to implement and update such systems.

11. CONCLUSION

In conclusion, predicting a car purchase is a complex and multi-faceted endeavour that relies on various factors and variables. These factors range from personal preferences and financial capabilities to economic conditions and technological advancements. While data-driven models and algorithms can aid in forecasting car purchases to a certain extent, it is crucial to recognize that human behaviour and decision-making are influenced by a multitude of intricate and often unpredictable factors.

In the long term, the accuracy and reliability of car purchase predictions may improve as technology advances and the availability of data continues to grow. Machine learning algorithms and artificial intelligence will likely play an increasingly significant role in analysing and interpreting the vast amounts of data generated by individuals and the automotive industry. This may lead to more personalized and targeted marketing efforts, as well as more efficient resource allocation for car manufacturers and dealerships.

Nonetheless, it is essential to remember that the human element in car purchasing decisions remains central. Emotions, individual preferences, lifestyle changes, and unforeseen external events can all sway someone's decision to buy a car. Therefore, while predictive models and data analytics can provide valuable insights, they should be used in conjunction with a deep understanding of the customer, their unique needs, and their evolving circumstances.

In summary, the future of car purchase prediction lies in a synergy of data-driven analysis and a nuanced understanding of the human factor. As we move forward, the automotive industry must continue to adapt to changes in consumer behaviour, technology, and economic conditions to make increasingly accurate predictions, ultimately improving the car buying experience for both consumers and industry professionals.

12. FUTURE SCOPE

The future scope of car purchase prediction holds immense promise, driven by a combination of technological advancements, data availability, and evolving consumer preferences. As we look ahead, several key trends and developments are likely to shape the landscape of car purchase prediction.

First and foremost, the proliferation of connected vehicles and the Internet of Things (IoT) will continue to generate an unprecedented amount of data. These data sources, ranging from in-car sensors to smartphone apps, will provide a wealth of real-time information on how individuals use their vehicles, their driving habits, and their preferences. This data will not only enhance the accuracy of car purchase predictions but also enable the development of highly personalized recommendations and offers for potential buyers.

Artificial intelligence and machine learning will play a pivotal role in harnessing this data. Advanced algorithms will be able to process and interpret vast datasets quickly, identifying subtle patterns and correlations that might elude human analysts. As these algorithms become more sophisticated, they will refine their predictive capabilities, considering not only historical data but also real-time factors, such as weather conditions, traffic patterns, and even the driver's current mood, to make more accurate recommendations.

In the long term, we can anticipate a convergence of all these trends, resulting in highly sophisticated car purchase prediction systems that seamlessly integrate AI-driven data analytics, AR/VR experiences, eco-friendly options, and personalized mobility solutions. These systems will not only benefit consumers by offering tailored recommendations but also empower the automotive industry to optimize production, marketing, and distribution, ultimately improving the overall car buying and ownership experience. However, it is essential to remember that with these advancements, issues related to data privacy, security, and ethical considerations must be addressed to ensure that car purchase prediction remains a positive force in the automotive industry's future.

13. APPENDIX

Source Code

HTML :

index1.html × app1.py

templates > index1.html > html > body > script

```html
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="utf-8">
  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title>Car Purchase Prediction</title>
  <meta content="" name="description">
  <meta content="" name="keywords">

  <!-- Favicons -->
  <link href="assets/img/favicon.png" rel="icon">
  <link href="assets/img/apple-touch-icon.png" rel="apple-touch-icon">

  <!-- Google Fonts -->
  <link href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Raleway:300,300i,400,400i,500,500i,600,600i,700,700i|Poppins:300,300i,

  <!-- Vendor CSS Files -->
  <link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
  <link href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">
  <link href="assets/vendor/boxicons/css/boxicons.min.css" rel="stylesheet">
  <link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
  <link href="assets/vendor/remixicon/remixicon.css" rel="stylesheet">
  <link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">

  <!-- Template Main CSS File -->
  <link href="assets/css/style.css" rel="stylesheet">

  <!-- =======================================================
  * Template Name: Personal
  * Updated: Sep 18 2023 with Bootstrap v5.3.2
  * Template URL: https://bootstrapmade.com/personal-free-resume-bootstrap-template/
  * Author: BootstrapMade.com
  * License: https://bootstrapmade.com/license/
  ======================================================== -->
```

```html

<body>

  <!-- ======= Header ======= -->
  <header id="header">
    <div class="container">

      <h1><a href="index.html">CAR PURCHASE PREDICTION</a></h1>
      <!-- Uncomment below if you prefer to use an image logo -->
      <!-- <a href="index.html" class="mr-auto"><img src="assets/img/logo.png" alt="" class="img-fluid"></a> -->
      <h2>This website is designed to<span> predict the purchase</span> of a car by the customer.</h2>

      <nav id="navbar" class="navbar">
        <ul>
          <li><a class="nav-link active" href="#header">Home</a></li>
          <li><a class="nav-link" href="#about">About</a></li>
          <li><a class="nav-link" href="#pred">Prediction</a></li>
          <li><a class="nav-link" href="#team">The Team</a></li>
          <li><a class="nav-link" href="#contact">Contact</a></li>
        </ul>
        <i class="bi bi-list mobile-nav-toggle"></i>
      </nav><!-- .navbar -->

    </div>
  </header><!-- End Header -->

  <!-- ======= About Section ======= -->
  <section id="about" class="about">

    <!-- ======= About Me ======= -->
    <div class="about-me container">

      <div class="section-title">
        <h2>About</h2>
        <p>Learn more about the website</p>
      </div>
        <div class="col-lg-11 pt-4 pt-lg-0 content" data-aos="fade-left">
```

```
<!-- ======= About Section ======= -->
<section id="about" class="about">

  <!-- ======= About Me ======= -->
  <div class="about-me container">

    <div class="section-title">
      <h2>About</h2>
      <p>Learn more about the website</p>
    </div>
      <div class="col-lg-11 pt-4 pt-lg-0 content" data-aos="fade-left">
        <h3>Car Purchase Prediction</h3>
        <p class="fst-italic">
          Car purchase prediction is a data-driven process that uses historical customer and market data to forecast the likelihood
          of individuals buying a car, helping businesses tailor their marketing and sales strategies accordingly.
        </p>
        <div class="row">
          <div class="col-lg-11">
            <ul>
              <li><i class="bi bi-chevron-left"></i> <strong>Car purchase prediction can offer customers personalized recommendations based on their preferences and nee
              <li><i class="bi bi-chevron-left"></i> <strong>It helps buyers make informed decisions by suggesting suitable car models and features.</li>
              <li><i class="bi bi-chevron-left"></i> <strong>Customers can benefit from tailored financing options and incentives based on their predicted buying behavi
              <li><i class="bi bi-chevron-left"></i> <strong>It can save time by narrowing down choices and avoiding overwhelming research.</li>
              <li><i class="bi bi-chevron-left"></i> <strong>Predictions can consider budget constraints, ensuring customers stay within their financial limits.</li>
              <li><i class="bi bi-chevron-left"></i> <strong>Customers receive timely notifications about new models or promotions that match their interests.</li>
              <li><i class="bi bi-chevron-left"></i> <strong>It minimizes the chances of making a regretful purchase by aligning choices with individual preferences.</l
              <li><i class="bi bi-chevron-left"></i> <strong>It can also facilitate seamless online shopping, reducing the hassle of visiting multiple dealerships.</li>
            </ul>
          </div>
        </div>
        <p>
          Car purchase prediction empowers both businesses and customers by enhancing the efficiency and effectiveness of the car buying process, leading to more satisf
          data-driven insights to create a win-win situation, optimizing the customer experience while improving sales and marketing strategies for automotive companies
        </p>
      </div>
    </div>
```

```
  <!-- ======= Programming Languages Used ======= -->
  <div class="skills container">

    <div class="section-title">
      <h2>Programming Languages Used</h2>
    </div>

    <div class="row skills-content">

      <div class="col-lg-6">

        <div class="progress">
          <span class="skill">Python, HTML, CSS, Javascript, PHP  </span>
        </div>

      </div>

    </div>

  </div><!-- End Languages -->

</section><!-- End About Section -->

<!-- ======= Prediction Section ======= -->
<section id="pred" class="pred">
  <div class="container">

    <div class="section-title">
      <h2>Prediction</h2>
      <p>Your Prediction</p>
    </div>


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

      <p>Age</p>
      <p><input type ="text" name ="age"/></p>
```

```
</section><!-- End About Section -->

<!-- ======= Prediction Section ======= -->
<section id="pred" class="pred">
  <div class="container">

    <div class="section-title">
      <h2>Prediction</h2>
      <p>Your Prediction</p>
    </div>


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

      <p>Age</p>
      <p><input type ="text" name ="age"/></p>

      <p>Annual Income</p>
      <p><input type ="text" name ="annualincome"/></p>

      <label for ="Gender">Gender</label>
      <select name = "gender">
      <option value =1>Male</option>
      <option value =0>Female</option>

      </select>

      <p><input type ="submit" value ="submit"/></p>

      <h2><b>{{output}}</b></h2>



  </form>
      </form>
```

```html
<!-- ======= The Team Section ======= -->
<section id="team" class="team">
  <div class="container">

    <div class="section-title">
      <h2>Members behind the Project</h2>
      <p>The Team</p>
    </div>

    <div class="testimonials-slider swiper" data-aos="fade-up" data-aos-delay="100">
      <div class="swiper-wrapper">

        <div class="swiper-slide">
          <div class="testimonial-item">
            <h3>Malladi Hemasri</h3>
            <h4>Team Leader</h4>
          </div>
        </div><!-- End testimonial item -->

        <div class="swiper-slide">
          <div class="testimonial-item">
            <h3>Kancharla Narendranath</h3>
            <h4>Team Memeber</h4>
          </div>
        </div><!-- End testimonial item -->

        <div class="swiper-slide">
          <div class="testimonial-item">
            <h3>Maddela Preethi</h3>
            <h4>Team Member</h4>
          </div>
        </div><!-- End testimonial item -->

        <div class="swiper-slide">
          <div class="testimonial-item">
            <h3>Singu Jahnavi</h3>
```

```html
            <h4>Team Member</h4>
          </div>
        </div><!-- End testimonial item -->
      </div>
      <div class="swiper-pagination"></div>
    </div>

    <div class="owl-carousel testimonials-carousel">

  </div>
</section><!-- End Portfolio Section -->

  <!-- ======= Contact Section ======= -->
  <section id="contact" class="contact">
    <div class="container">

      <div class="section-title">
        <h2>Contact</h2>
        <p>Contact Me</p>
      </div>

      <div class="row mt-2">

        <div class="col-md-6 d-flex align-items-stretch">
          <div class="info-box">
            <i class="bx bx-map"></i>
            <h3>My Address</h3>
            <p>A108 Adam Street, New York, NY 535022</p>
          </div>
        </div>

        <div class="col-md-6 mt-4 mt-md-0 d-flex align-items-stretch">
          <div class="info-box">
            <i class="bx bx-share-alt"></i>
            <h3>Social Profiles</h3>
            <div class="social-links">
              <a href="#" class="twitter"><i class="bi bi-twitter"></i></a>
```

```html
        </div>

        <div class="col-md-6 mt-4 d-flex align-items-stretch">
          <div class="info-box">
            <i class="bx bx-envelope"></i>
            <h3>Email Me</h3>
            <p>contact@example.com</p>
          </div>
        </div>
        <div class="col-md-6 mt-4 d-flex align-items-stretch">
          <div class="info-box">
            <i class="bx bx-phone-call"></i>
            <h3>Call Me</h3>
            <p>+1 5589 55488 55</p>
          </div>
        </div>
      </div>

      <form action="forms/contact.php" method="post" role="form" class="php-email-form mt-4">
        <div class="row">
          <div class="col-md-6 form-group">
            <input type="text" name="name" class="form-control" id="name" placeholder="Your Name" required>
          </div>
          <div class="col-md-6 form-group mt-3 mt-md-0">
            <input type="email" class="form-control" name="email" id="email" placeholder="Your Email" required>
          </div>
        </div>
        <div class="form-group mt-3">
          <input type="text" class="form-control" name="subject" id="subject" placeholder="Subject" required>
        </div>
        <div class="form-group mt-3">
          <textarea class="form-control" name="message" rows="5" placeholder="Message" required></textarea>
        </div>
        <div class="my-3">
          <div class="loading">Loading</div>
          <div class="error-message"></div>
          <div class="sent-message">Your message has been sent. Thank you!</div>
```

```html
          <div class="sent-message">Your message has been sent. Thank you!</div>
        </div>
        <div class="text-center"><button type="submit">Send Message</button></div>
      </form>

    </div>
  </section><!-- End Contact Section -->

  <div class="credits">
    <!-- All the links in the footer should remain intact. -->
    <!-- You can delete the links only if you purchased the pro version. -->
    <!-- Licensing information: https://bootstrapmade.com/license/ -->
    <!-- Purchase the pro version with working PHP/AJAX contact form: https://bootstrapmade.com/personal-free-resume-bootstrap-template/ -->
    Designed by <a href="https://bootstrapmade.com/">BootstrapMade</a>
  </div>

  <!-- Vendor JS Files -->
  <script src="assets/vendor/purecounter/purecounter_vanilla.js"></script>
  <script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>
  <script src="assets/vendor/glightbox/js/glightbox.min.js"></script>
  <script src="assets/vendor/isotope-layout/isotope.pkgd.min.js"></script>
  <script src="assets/vendor/swiper/swiper-bundle.min.js"></script>
  <script src="assets/vendor/waypoints/noframework.waypoints.js"></script>
  <script src="assets/vendor/php-email-form/validate.js"></script>

  <!-- Template Main JS File -->
  <script src="assets/js/main.js"></script>

</body>

</html>
```

CSS:

index1.html | # style.css × | app1.py

assets > css > # style.css > body

```css
body {
  font-family: "Open Sans", sans-serif;
  background-color: #040404;
  color: #fff;
  position: relative;
  background: transparent;
}

body::before {
  content: "";
  position: fixed;
  background: #040404 url("../img/myporsche.jpg") top right no-repeat;
  background-size: cover;
  left: 0;
  right: 0;
  top: 0;
  height: 100vh;
  z-index: -1;
}

@media (min-width: 1024px) {
  body::before {
    background-attachment: fixed;
  }
}

a {
  color: #18d26e;
  text-decoration: none;
}

a:hover {
  color: #35e888;
  text-decoration: none;
}

h1,
```

```css
h1,
h2,
h3,
h4,
h5,
h6 {
  font-family: "Raleway", sans-serif;
}

/*--------------------------------------------------------------
# Header
--------------------------------------------------------------*/
#header {
  transition: ease-in-out 0.3s;
  position: relative;
  height: 100vh;
  display: flex;
  align-items: center;
  z-index: 997;
  overflow-y: auto;
}

#header * {
  transition: ease-in-out 0.3s;
}

#header h1 {
  font-size: 48px;
  margin: 0;
  padding: 0;
  line-height: 1;
  font-weight: 700;
  font-family: "Poppins", sans-serif;
}

#header h1 a,
#header h1 a:hover {
```

```css

#header h1 a,
#header h1 a:hover {
  color: #fff;
  line-height: 1;
  display: inline-block;
}

#header h2 {
  font-size: 24px;
  margin-top: 20px;
  color: rgba(255, 255, 255, 0.8);
}

#header h2 span {
  color: #fff;
  border-bottom: 2px solid #18d26e;
  padding-bottom: 6px;
}

#header img {
  padding: 0;
  margin: 0;
}

#header .social-links {
  margin-top: 40px;
  display: flex;
}

#header .social-links a {
  font-size: 16px;
  display: flex;
  justify-content: center;
  align-items: center;
  background: rgba(255, 255, 255, 0.1);
```

```css
    }
}

/* Header Top */
#header.header-top {
  height: 80px;
  position: fixed;
  left: 0;
  top: 0;
  right: 0;
  background: rgba(0, 0, 0, 0.9);
}

#header.header-top .social-links,
#header.header-top h2 {
  display: none;
}

#header.header-top h1 {
  margin-right: auto;
  font-size: 36px;
}

#header.header-top img {
  max-height: 60px;
  margin-right: 20px !important;
}

#header.header-top .container {
  display: flex;
  align-items: center;
}

#header.header-top .navbar {
  margin: 0;
}
```

```css
/*--------------------------------------------------------------
# Navigation Menu
--------------------------------------------------------------*/
/**
* Desktop Navigation
*/
.navbar {
  padding: 0;
  margin-top: 35px;
}

.navbar ul {
  margin: 0;
  padding: 0;
  display: flex;
  list-style: none;
  align-items: center;
}

.navbar li {
  position: relative;
}

.navbar li+li {
  margin-left: 30px;
}

.navbar a,
.navbar a:focus {
  display: flex;
  align-items: center;
  justify-content: space-between;
  padding: 0;
  font-family: "Poppins", sans-serif;
  font-size: 16px;
  font-weight: 400;
```

```css
* Mobile Navigation
*/
.mobile-nav-toggle {
  color: #fff;
  font-size: 28px;
  cursor: pointer;
  display: none;
  line-height: 0;
  transition: 0.5s;
  position: fixed;
  right: 15px;
  top: 15px;
}

@media (max-width: 991px) {
  .mobile-nav-toggle {
    display: block;
  }

  .navbar ul {
    display: none;
  }
}

.navbar-mobile {
  position: fixed;
  overflow: hidden;
  top: 0;
  right: 0;
  left: 0;
  bottom: 0;
  background: rgba(0, 0, 0, 0.9);
  transition: 0.3s;
  z-index: 999;
  margin-top: 0;
}
```

```css
/*--------------------------------------------------------------
# Sections General
--------------------------------------------------------------*/
section {
  overflow: hidden;
  position: absolute;
  width: 100%;
  top: 140px;
  bottom: 100%;
  opacity: 0;
  transition: ease-in-out 0.4s;
  z-index: 2;
}

section.section-show {
  top: 100px;
  bottom: auto;
  opacity: 1;
  padding-bottom: 45px;
}

section .container {
  background: rgba(0, 0, 0, 0.9);
  padding: 30px;
}

@media (max-width: 768px) {
  section {
    top: 120px;
  }

  section.section-show {
    top: 80px;
  }
}
```

Flask app :

index1.html style.css app1.py

app1.py > ...

```python
from flask import Flask,render_template,request
import pickle
import numpy as np
from sklearn.preprocessing import MinMaxScaler
from waitress import serve

app = Flask(__name__)

model = pickle.load(open('Car prediction.pkl','rb'))
scale = pickle.load(open('MinMax.pkl','rb'))

@app.route('/')
def start():
    return render_template('index1.html')

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

def login():

    if request.method == "POST":
        age = request.form["age"]
        annual_income = request.form["annualincome"]
        gender = request.form["gender"]



    t =  np.array([[age,annual_income,gender]])

    t_scaled= scale.fit_transform(t)
    output =model.predict(t_scaled)
    print(output)

    if (output == 1):
        return render_template('index1.html', output="Purchasble")
    else:
        return render_template('index1.html', output="Not purchasble")
        return render_template("index1.html")
```

```python
        age = request.form["age"]
        annual_income = request.form["annualincome"]
        gender = request.form["gender"]



    t =  np.array([[age,annual_income,gender]])

    t_scaled= scale.fit_transform(t)
    output =model.predict(t_scaled)
    print(output)

    if (output == 1):
        return render_template('index1.html', output="Purchasble")
    else:
        return render_template('index1.html', output="Not purchasble")
        return render_template("index1.html")

    return render_template("index1.html")

if __name__ == '__main__' :

    app.run(debug=True)
```

GitHub & Project Demo Link:

https://github.com/smartinternz02/SI-GuidedProject-600765-1697471673