MACHINE LEARNING BASED VEHICLE PERFORMANCE ANALYZER

PROJECT REPORT

Submitted by

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CHAPTER 1
INTRODUCTION

1. Project Overview

Predicting the performance level of cars is an important and interesting problem. The main goal is to predict the performance of the car to improve certain behaviors of the vehicle. This can significantly help to improve the system's fuel consumption and increase efficiency.

The performance analysis of the car is based on the engine type, no of engine cylinders, fuel type, horsepower, etc. These are the factors on which the health of the car can be predicted. It is an ongoing process of obtaining, researching, analyzing, and recording health based on the above three factors. The performance objectives like mileage, dependability, flexibility and cost can be grouped together to play a vital role in the prediction engine and engine management system. This approach is a very important step towards understanding the vehicle's performance.

2. Purpose

The purpose of the project is to be able to understand the problem to classify if it is a regression or a classification kind of problem. Also, it enables us to know how to pre-process/clean the data using different data pre-processing techniques. It also helps us to analyze or get insights into data through visualization. It serves as a platform to gain an understanding of IBM cloud, apply different algorithms according to the dataset and based on visualization. Finally, the project aids us to know how to build a web application using the Flask framework.

CHAPTER 2

LITERATURE SURVEY

This section presents previous work related to our proposed method.

1. **Performance of Motor Vehicle based on Driving and Vehicle Data using Machine Learning - Punith kumar**

Summary: The primary objective of the research was to develop a model using machine learning techniques which precisely predicts the fuel efficiency and to propose the optimum driving style and vehicle characteristics to achieve better fuel efficiency. Machine learning techniques like Multiple Linear Regression, Support Vector Machine, Artificial Neural Network and XGBoost were chosen to develop the model and 5 different models were built. Throttle position and speed were examined with the predicted fuel efficiency to evaluate their relationship with the fuel consumption. For better insights and recommendations to mitigate fuel consumption, Analysis on mass air flow rate, intake air temperature and other vehicle characteristics with the predicted fuel efficiency is also carried out.

2. **Machine Learning Based Real-Time Vehicle Data Analysis for Safe Driving Modeling**
   - Pamul Yadav, Sangsu Jung, Dhananjay Singh

Summary: This paper identifies a necessity to evaluate the Meta features of vehicles which could be helpful in improving the vehicle driver's skill to prevent accidents and also evaluate the change in the quality of cars over passing time. This paper does an analysis of the vehicle data using supervised learning based linear regression model that is used as an estimator for Driver's Safety Metrics and Economic Driving Metrics. The results have proven to be approximately 80% fitting the given features and are very helpful to be used in different use cases such as a parameter in finding the driver's driving performance in a driving

school, as a good estimate for finding an optimal price for a used car that can be based on several factors which we have analyzed in this paper etc.

3. Performance Analysis of Vehicle-Specific Methods and Sensors for Autonomous Vehicles

- Ernst Pucher, Andreas Gruber, Mathias Innerkofler, and Marco Buhmann

Summary: This article deals with the performance of modern sensor systems for autonomous vehicles. The examined automobile was equipped with state-of-the art sensor technology and provides a solid basis for the further close-to-production development of the increasing requirements for environmental recognition. Further, it can be said that the automotive industry and the research institutes will develop on- and off-board sensors and more powerful electronics, bringing the announced automation levels of the vehicles onto the road in the foreseeable future.

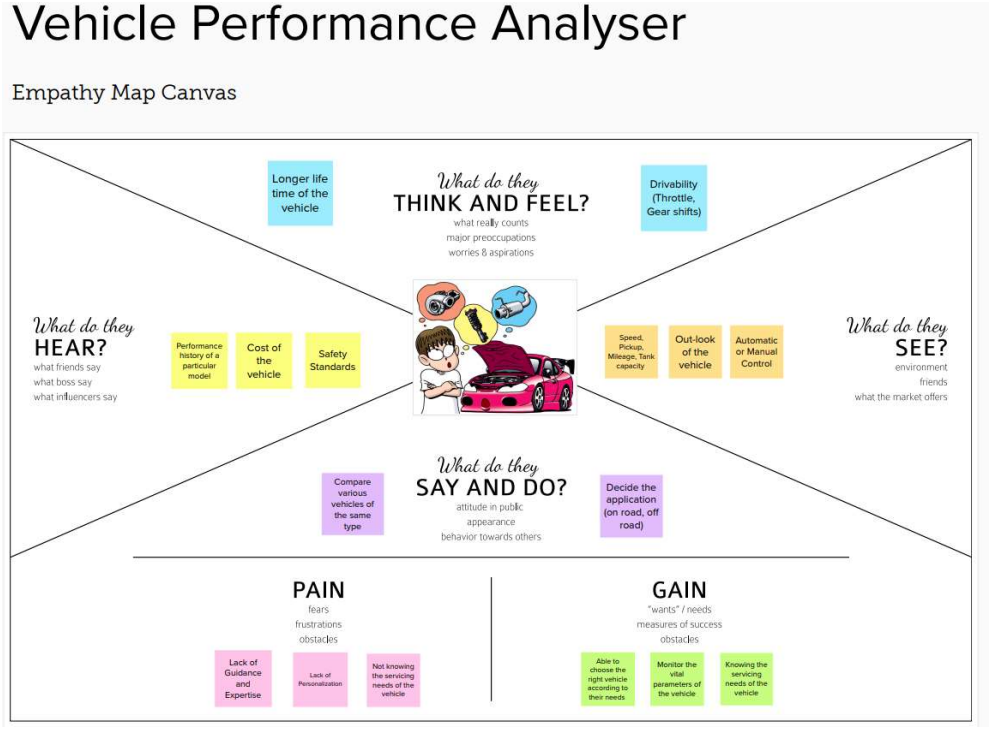
4. Automotive Performance Tests Based on Machine Learning Algorithms
- M. Geissler, J. Kunisch, C. Oikonomopoulos-Zachos and A. Friedrich

Summary: This paper suggests an innovative approach to define and perform tests in cars. The test concept requires the placement of the vehicle under test on a planar turntable in an anechoic chamber. Software-defined multimode transceiver modules, referred to as radio heads, are placed in a quarter circle or half circle around the car at an adequate distance. This setup allows flexible, realistic, reproducible and dynamic over-the-air testing of the cars in the sense of a virtual drive test. The derivation of realistic test cases via a machine learning (ML) approach is used instead of attempting to create a 1:1 mapping of real scenarios into the test chamber, i.e. use ML to identify and classify critical test cases via analysis of key performance indicators (KPI) of test data and from this create representative synthetic test cases.

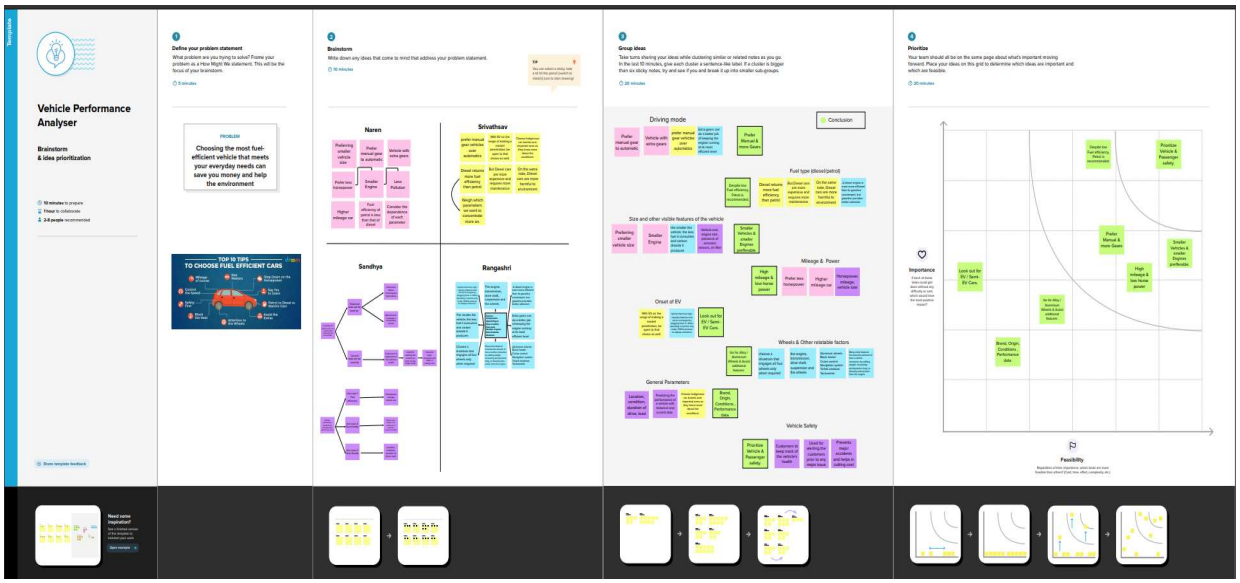
CHAPTER 3

IDEATION & PROPOSED SOLUTION

1. Empathy Map Canvas



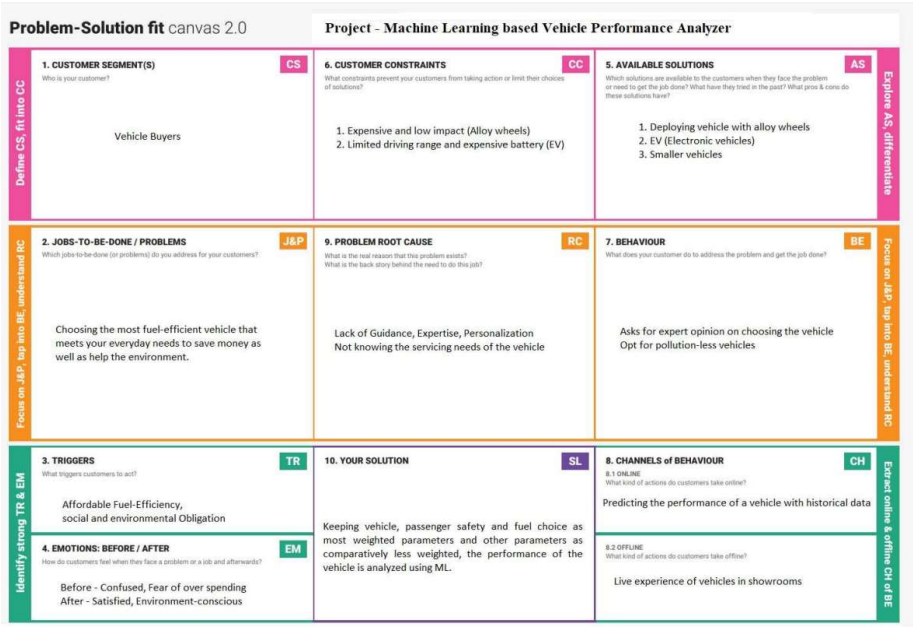
2. Ideation & Brainstorming



3. Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Choosing the most fuel-efficient vehicle that meets your everyday needs to save money as well as help the environment.
2.	Idea / Solution description	Keeping vehicle, passenger safety and fuel choice as most weighted parameters and other parameters as comparatively less weighted, the performance of the vehicle is analyzed using ML.
3.	Novelty / Uniqueness	In addition to optimizing the cost for a fuel-efficient vehicle, we also consider Environmental factors.
4.	Social Impact / Customer Satisfaction	Customers will be able to learn more about their own vehicles. The vehicle being comparatively environment friendly will also optimize the cost.
5.	Business Model (Revenue Model)	Profitable for the automobile industry as with the analysis they get, they can plan and improve their future models.
6.	Scalability of the Solution	High scalability. The model will help the customers to wisely choose the vehicle as per their feasibility and learn more about their vehicles.

4. Problem Solution fit



CHAPTER 4

REQUIREMENT ANALYSIS

1. Functional requirement

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Reset Password	Reset password through Gmail Reset password through Mobile number
FR-4	Feedback	The user can submit the feedback through a contact form on the website or through Gmail.

2. Non-Functional requirements

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

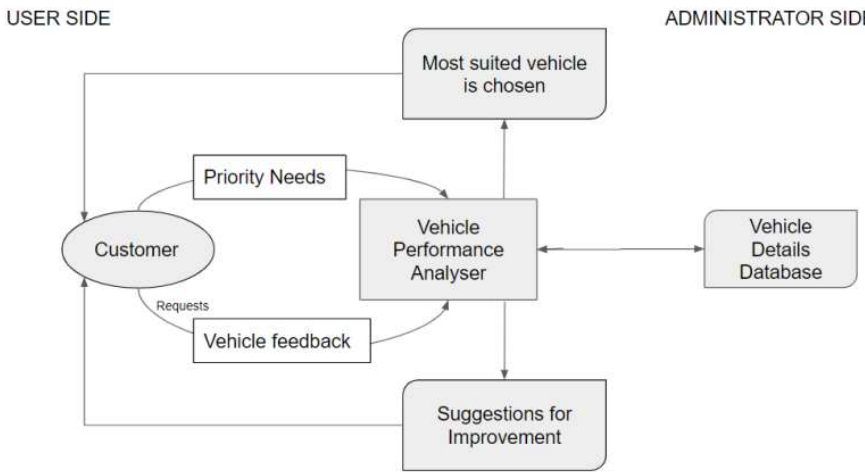
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Used to compare different car models under different metrics according to user priority.
NFR-2	**Security**	The models compared by the users are secured and not disclosed to the manufacturers.
NFR-3	**Reliability**	Only present data is collected from reliable sources and the same is updated periodically.
NFR-4	**Performance**	Keeping vehicle, passenger safety and fuel choice as most weighted parameters and other parameters as comparatively less weighted, the performance of the vehicle is analyzed using ML.
NFR-5	**Availability**	The data required is collected from reliable sources and this data can be used to provide better results.
NFR-6	**Scalability**	High scalability. The model will help the customers to wisely choose the vehicle as per their feasibility and learn more about their vehicles.

CHAPTER 5

PROJECT DESIGN

1. Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored



2. Solution & Technical Architecture

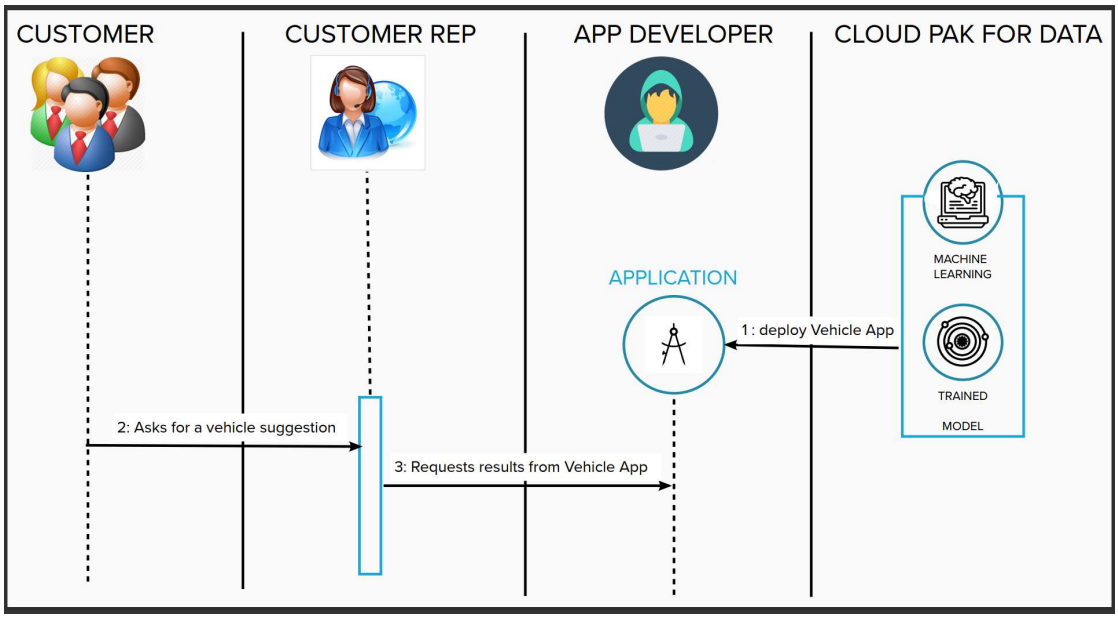


Fig. Solution Architecture

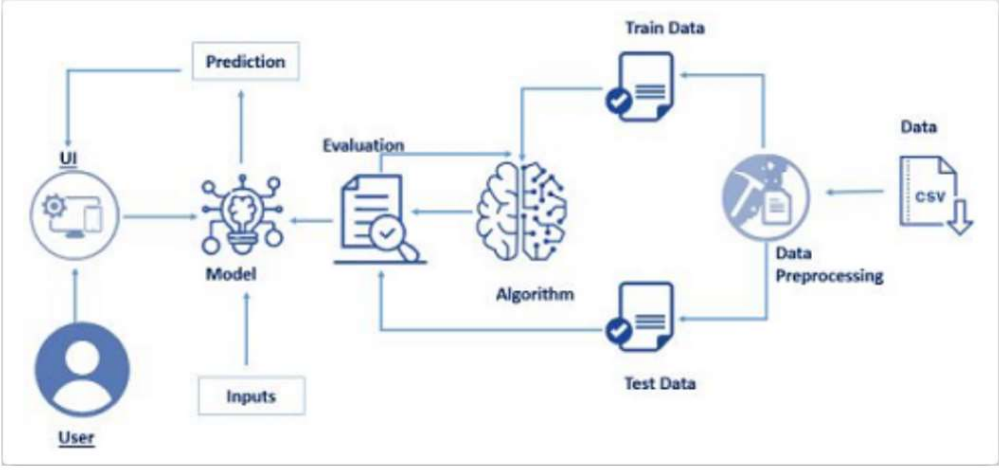


Fig. Technology Architecture

3. User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Registration	1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint - 1
		2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint - 2
		3	As a user, I can register for the application through Gmail		Medium	Sprint - 1
	Login	4	As a user, I can log into the application by entering email & password		High	Sprint - 2
	Dashboard	5	As a user, I can access all the facilities by the website		High	Sprint - 1
Administrator	Database	6	As an admin, I can manage the database		High	Sprint - 2

CHAPTER 6

PROJECT PLANNING & SCHEDULING

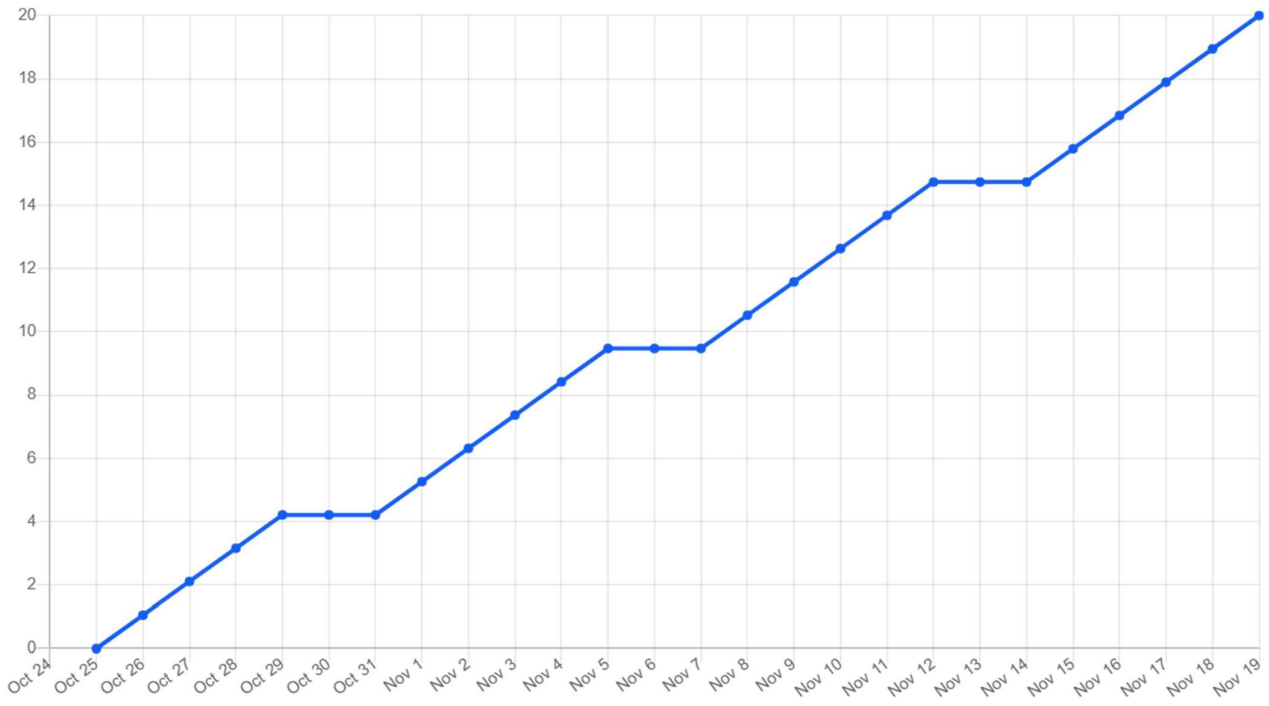
1. Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	Download the dataset	20	High	Narendiran(1), Srivathsav(2)
Sprint-2	Data Pre-processing	USN-2	Import libraries and read the dataset	4	Medium	Sandhya(3), Rangashri(4)
Sprint-2		USN-3	Handle the missing value and label the encoding	4	Medium	1,2
Sprint-2		USN-4	Split the dataset into Dependent and independent variables	6	Medium	3,4
Sprint-2		USN-5	Split the dataset into train and test data	6	Medium	1,2
Sprint-3	Model Building	USN-6	Train the datasets to run smoothly and see an incremental improvement in the prediction rate for the available Machine Learning algorithms.	5	Low	3,4
Sprint-3		USN-7	Build The Model with Random Forest Algorithm	6	Low	1,2
Sprint-3		USN-8	Predict The Values	5	Low	3,4
Sprint-3		USN-9	Model Evaluation	4	Low	1,2
Sprint-4	Application Building	USN-10	Building An Index. Html File	5	Low	1,3
Sprint-4		USN-11	Build Python Code	5	Low	2,4
Sprint-4		USN-12	Run the app using flask	5	Low	1,2,3,4
Sprint-4		USN-13	Output	5	Low	1,2,3,4

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	30 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	06 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	14 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	20 Nov 2022

3. Reports from JIRA (Burndown Chart)



CHAPTER 7

CODING & SOLUTIONING

Feature 1

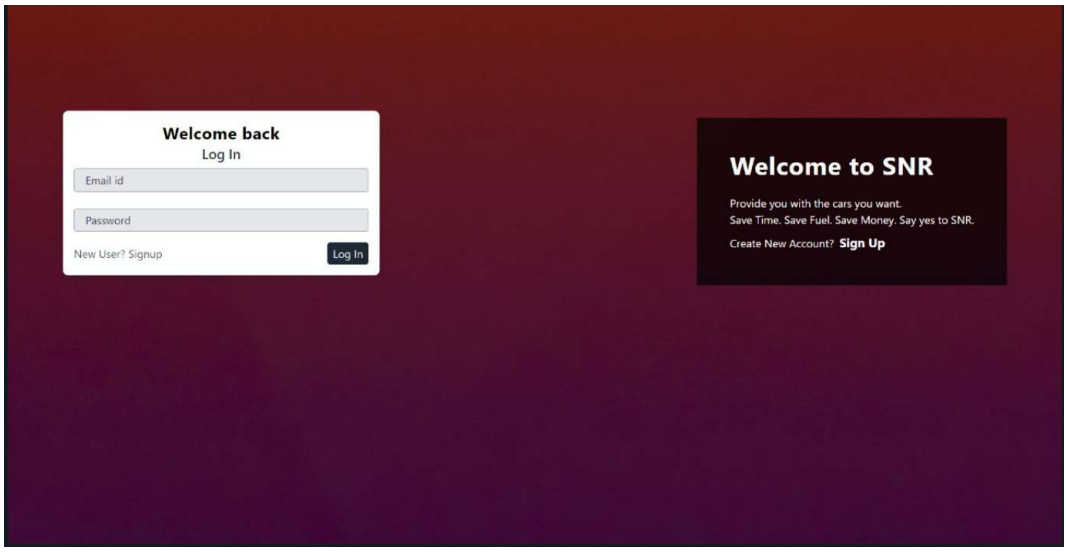


Fig. Login Page

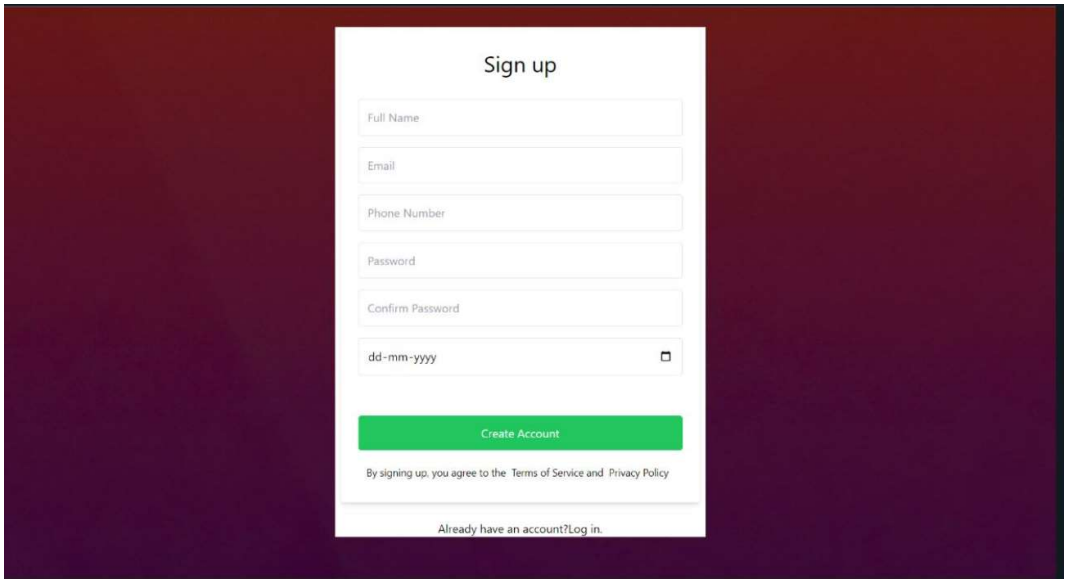


Fig. Signup Page

Feature 2

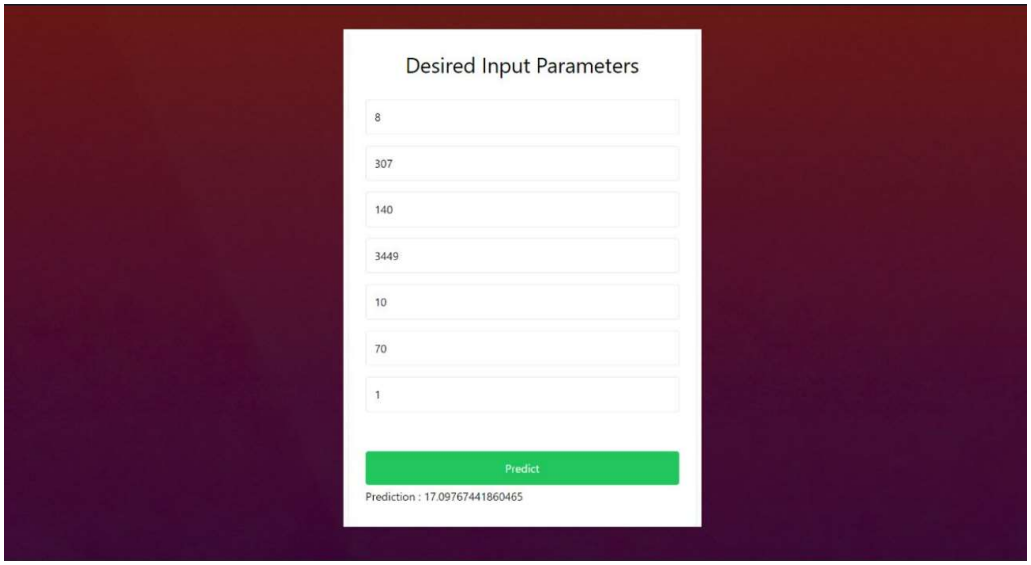


Fig. Prediction Page

Database Schema

```
CREATE TABLE USERS(
    email varchar(255) not null primary key,
    password varchar(255),
);
```

CHAPTER 8

TESTING

1. Test Cases

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Test data	Expected Result	Actual Result	Status
LoginPage_TC_1	Functional	Home Page	Verify user is able to see the Login/Signup page when user clicked on Log In/Signup hyperlink	1.Enter URL and click go 2.Click on Log In/Signup hyperlink 3.Verify login/Singup page displayed or not	Web application URL	Login/Signup page should display	Working as expected	Pass
LoginPage_TC_2	UI	Home Page	Verify the UI elements in Login/Signup popup	1.Enter URL and click go 2.Click on Log In/Signup hyperlink 3.Verify login/Singup page with below UI elements: a.email id text box b.password text box c.Login button d.New User? Create account link	Web application URL	Application should show below UI elements: a.email id text box b.password text box c.Login button with dark bluecolour d.New User? Create account link	Working as expected	Pass
LoginPage_TC_3	Functional	Home page	Verify user is able to log into application with Valid credentials	1.Enter URL and click go 2.Click on Log In hyperlink 3.Enter Valid email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username : abcde@gmail.com Password : abcdefg	User should navigate to dashboard	Working as expected	Pass
LoginPage_TC_4	Functional	Login page	Verify user is able to log into application with InValid credentials	1.Enter URL and click go 2.Click on Log In hyperlink 3.Enter invalid email in Email text box 4.Enter valid password	Username : abcdefg@gmail.com Password : abcdefg	Application should show 'Please check your inputs'	Working as expected	Pass

				in password text box 5.Click on login button		validation message.		
LoginPage_TC_5	Functional	Login page	Verify user is able to log into application with InValid credentials	1.Enter URL and click go 2.Click on Log In hyperlink 3.Enter Valid email in Email text box 4.Enter invalid password in password text box 5.Click on login button	Username : abcde@gmail.com Password : abcdefghijk	Application should show 'Please check your inputs' validation message.	Working as expected	Pass
LoginPage_TC_6	Functional	Login page	Verify user is able to log into application with InValid credentials	1.Enter URL and click go 2.Click on Log In hyperlink 3.Enter invalid email in Email text box 4.Enter invalid password in password text box 5.Click on login button	Username : abcdegh@gmail.com Password : abcdefghijk	Application should show 'Please check your inputs' validation message.	Working as expected	Pass
SignupPage_TC_7	Functional	Signup page	Verify user is able to Signup into application with Valid credentials	1.Enter URL and click go 2.Click on Signup hyperlink 3.Enter Full Name in Full Name text box 4.Enter valid email in Email text box 5.Enter valid password in password text box 6.Enter same password in confirm password text box 7.Enter date in Calendar box 8.Click on Create Account button	Full name: Abcde Email: abcd@gmail.com Phone number: 1234567890 Password: abcd Confirm password: abcd dd-mm-yyyy:19-11-2022	User should navigate to dashboard	Working as expected	Pass
SignupPage_TC_8	Functional	Signup page	Verify user is able to Signup into application with invalid credentials	1.Enter URL and click go 2.Click on Signup hyperlink 3.Enter Full Name in Full Name text box 4.Enter invalid email in Email text box (without @/ .com) 5.Enter valid password in password text box 6.Enter same password in confirm password	Full name: Abcde Email: abcdgmail.com Phone number: 1234567890 Password: abcd Confirm password:	The page gets reloaded and the credentials has to be filled again	Working as expected	Pass

				text box 7.Enter date in Calendar box 8.Click on Create Account button	abcd dd-mm-yyyy:19-11-2022			
SignupPage_TC_9	Functional	Signup page	Verify user is able to Signup into application with InValid credentials	1.Enter URL and click go 2.Click on Signup hyperlink 3.Enter Full Name in Full Name text box 4.Enter valid email in Email text box 5.Enter valid password in password text box 6.Enter different password in confirm password text box 7.Enter date in Calendar box 8.Click on Create Account button	Full name: Abcde Email: abcd@gmail.com Phone number: 1234567890 Password: abcd Confirm password: abcde dd-mm-yyyy:19-11-2022	The page gets reloaded and the credentials has to be filled again	Working as expected	Pass
SignupPage_TC_10	Functional	Signup page	Verify user is able to Signup into application with InValid credentials	1.Enter URL and click go 2.Click on Signup hyperlink 3.Enter Full Name in Full Name text box 4.Enter valid email in Email text box 5.Enter valid password in password text box 6.Enter same password in confirm password text box 7.Enter date in Calendar box (any date) (not mandatory field) 8.Click on Create Account button	Full name: Abcde Email: abcd@gmail.com Phone number: 1234567890 Password: abcd Confirm password: abcde dd-mm-yyyy:20-11-2023	User should navigate to dashboard	Working as expected	Pass
Dashboard_TC_11	Functional	Dashboard	Verify whether user is able to get the prediction by entering input values	1.Enter URL and click go 2. Click on Log In hyperlink 3.Enter Valid email in Email text box 4.Enter invalid password in password text box 5.Click on login button 6. Enter values in Field 1	Username : abcde@gmail.com Password : abcdef Field 1: 8 Field 2: 307 Field 3: 140 Field 4: 3449 Field 5: 10	17.09767	Working as expected	Pass

				to 7 7. Click on Predict Button	Field 6: 70 Field 7: 1			
Dashboard_TC_12	Functional	Dashboard	Verify whether user is able to get the prediction by entering negative input values	1.Enter URL and click go 2. Click on Log In hyperlink 3.Enter Valid email in Email text box 4.Enter invalid password in password text box 5.Click on login button 6. Enter values in Field 1 to 7 7. Click on Predict Button	Username : abcde@gmail.com Password : abcdef Field 1: -7 Field 2: 50 Field 3: 698 Field 4: -7981 Field 5: 60 Field 6: 72 Field 7: 2	22.52	Working as expected	Pass
Dashboard_TC_13	Functional	Dashboard	Verify whether user is able to get the prediction by entering input values	1.Enter URL and click go 2. Click on Log In hyperlink 3.Enter Valid email in Email text box 4.Enter invalid password in password text box 5.Click on login button 6. Enter values in Field 1 to 7 7. Click on Predict Button	Username : abcde@gmail.com Password : abcdef Field 1: 0 Field 2: 0 Field 3: 0 Field 4: 0 Field 5: 0 Field 6: 0 Field 7: 0	0	Working as expected	Pass
Dashboard_TC_14	Functional	Dashboard	Verify whether user is able to get the prediction by entering input values	1.Enter URL and click go 2. Click on Log In hyperlink 3.Enter Valid email in Email text box 4.Enter invalid password in password text box 5.Click on login button 6. Enter values in Field 1 to 7 7. Click on Predict Button	Username : abcde@gmail.com Password : abcdef Field 1: abc Field 2: def Field 3: 1 Field 4: 2 Field 5: 3 Field 6: xyz Field 7: wer	prediction value	Working as expected	Pass

2. **User Acceptance Testing**

Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the Vehicle Performance Analyzer project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Severity index:

0 = I don't agree that this is a usability problem at all

1 = Cosmetic problem only: need not be fixed unless extra time is available on project

2 = Minor usability problem: fixing this should be given low priority

3 = Major usability problem: important to fix, so should be given high priority

4 = Usability catastrophe: imperative to fix this before product can be release

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	6	4	2	5	17
Duplicate	0	1	3	0	4
External	1	3	1	1	6
Fixed	11	2	4	25	42
Not Reproduced	0	0	1	0	1
Skipped	0	2	1	1	4
Won't Fix	0	5	2	3	8
Totals	18	17	14	35	84

Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
Login page	6	0	0	6
Signup page	4	0	0	4
Dashboard	4	0	0	4

CHAPTER 9

RESULTS

Performance Metrics

Accuracy: *90%*

Mean Absolute Error (MAE): *1.79858139534883724*

Mean Square Error (MSE): *5.939570173066526*

Root Mean Square Error (RMSE): *2.4371233397320142*

R Squared (R2) score: *0.9064006323446798*

CHAPTER 10
ADVANTAGES & DISADVANTAGES

Advantages:

The main advantage of the model is that the user will be able to choose the right vehicle according to their needs. Also, the vital parameters of the vehicle can be monitored using the model. It gives the customers; the knowledge of their own vehicle and they would know the servicing needs of the vehicle. The model has very high accuracy of about 90%.

Disadvantages:

Few disadvantages include the customers' lack of guidance, expertise and personalization (in some cases). Dataset limited to conventional vehicles. Could be extended to EVs. The user needs to know about the vehicle's horsepower, no of cylinders etc. to enter in the application. The analysis is based on 7 variables, however it could use more variables i.e. more factors that could affect the performance of a vehicle.

CHAPTER 11
CONCLUSION

The performance analysis of the car is based on the engine type, no of engine cylinders, fuel type, horsepower, etc. These are the factors on which the health of the car were predicted. The project involved obtaining, researching, analyzing, and recording health based on the above three factors. The performance objectives like mileage, dependability, flexibility and cost were grouped together to play a vital role in the prediction engine and engine management system. Understanding the vehicle's performance helps to improve the system's fuel consumption and increase efficiency.

CHAPTER 12
FUTURE SCOPE

A similar model can be deployed to analyse the engine performance of other kinds of transportation modes such as two wheelers, transport trucks etc. Further improvising the current model by considering more variables such as terrain, weather, fuel rate and other environmental or economic factors. The model works better if other models are explored so that could yield an even higher accuracy than the already efficient random forest regressor which gave an accuracy of 90 percent. Another future scope could be making the application more customisable and user friendly where they can give more specifications to help choose a tailor-made vehicle. The current data could be diversified by adding EV to the database and it could also be used to compare the performance of EVs and conventional vehicles.

CHAPTER 13

APPENDIX

1. Source Code

Index.html

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

<head>
  <meta charset="utf-8" />
  <link rel="icon" href="%PUBLIC_URL%/favicon.ico" />
  <meta name="viewport" content="width=device-width, initial-scale=1" />
  <meta name="theme-color" content="#000000" />
  <meta name="description" content="Web site created using create-react-app" />
  <link rel="apple-touch-icon" href="%PUBLIC_URL%/logo192.png" />
  <link rel="preconnect" href="https://fonts.googleapis.com">
  <link rel="preconnect" href="https://fonts.gstatic.com" crossorigin>
  <link
href="https://fonts.googleapis.com/css2?family=Montserrat:wght@200;400&display=
swap" rel="stylesheet">
  <link rel="manifest" href="%PUBLIC_URL%/manifest.json" />
  <title>SNR - Vehicle Performance Analyzer</title>
</head>

<body>
  <noscript>You need to enable JavaScript to run this app.</noscript>
  <div id="root"></div>
</body>
</html>
```

index.js

```
import React from 'react';
import ReactDOM from 'react-dom/client';
import './index.css';
import App from './App';
import reportWebVitals from './reportWebVitals';

const root = ReactDOM.createRoot(document.getElementById('root'));
root.render(
  <React.StrictMode>
    <App />
  </React.StrictMode>
);
reportWebVitals();
```

index.css

```
@tailwind base;
@tailwind components;
@tailwind utilities;

html {
  font-family: 'Montserrat', sans-serif;
  min-height: 100vh;
  background: url("./assets/bgimg.jpeg") !important;
  background-repeat:no-repeat;
  background-size:cover;
  background-position:center;

}

body {
  margin: 0;
  background: linear-gradient(rgba(0,0,0,0.4),rgba(0,0,0,0.4)) !important;
  min-height: 100vh;
  font-family: -apple-system, BlinkMacSystemFont, 'Segoe UI', 'Roboto', 'Oxygen',
    'Ubuntu', 'Cantarell', 'Fira Sans', 'Droid Sans', 'Helvetica Neue',
    sans-serif;
  -webkit-font-smoothing: antialiased;
  -moz-osx-font-smoothing: grayscale;
}

code {
  font-family: source-code-pro, Menlo, Monaco, Consolas, 'Courier New',
    monospace;
}
```

App.js

```
import { history } from "./history";
import { Route, Router } from "react-router-dom";
import Login from "./pages/Login";
import Feed from "./pages/Feed";
import Signup from "./pages/Signup";

const App = () => {
  return (
    <>
      {sessionStorage.getItem('@user') ?
        <>
          <Router history={history}>
            <Route path="/Feed" exact component={Feed} />
          </Router>
        </> :
        <Router history={history}>
          <Route path="/" exact component={Login} />
```

```
        <Route path="/signup" exact component={Signup} />
      </Router>
    }
   </>
  );
}

export default App;
```

Login.js

```
import React, { useState } from 'react';
import { Link ,Redirect} from 'react-router-dom';
import Feed from './Feed';

class Login extends React.Component {
  constructor(props) {
    super(props);
    this.state = {
      name: '',
      email: '',
      phone: '',
      password: '',
      confirm_password: '',
      dob: '',
      error: ''
    }
  }

  onChangeEmail = (e) => {
    this.setState({ email: e.target.value })
  }

  onChangePassword = (e) => {
    this.setState({ password: e.target.value })
  }

  onSubmit = (e) => {
    console.log("success")
    let { history } = this.props
    let ele;
    e.preventDefault()
    let olddata = localStorage.getItem('formdata')
    //console.log(olddata)
    let oldArr = JSON.parse(olddata)
    //console.log(oldArr[])

    oldArr.map(arr => {
      if (this.state.email.length > 0 && this.state.password.length > 0) {
        //console.log("a")
        if (arr.email == this.state.email && (arr.password == this.state.password)) {
```

```
        console.log(arr)
        let user = this.state.email;
        sessionStorage.setItem("@user", true)
        history.push({ pathname: "/Feed", user: this.state.email });
        window.location.reload()
       } else {
        this.setState({ error: 'Please check your inputs' })
       }
      }
     }
     )
    }

    render() {
     return (
      <>
       <div className="w-full flex items-center justify-between">

        <div className="pt-40 pl-20">
         <div className="card bg-white shadow-md rounded-lg px-4 py-4 mb-6 ">
          <form onSubmit={this.onSubmit}>
           <p className="error">
            {this.state.error}
           </p>

           <div className="flex items-center justify-center">
            <h2 className="text-2xl font-bold tracking-wide">
             Welcome back
            </h2>
           </div>
           <h2 className="text-xl text-center font-semibold text-gray-800 mb-2">
            Log In
           </h2>
           <input
            onChange={this.onChangeEmail}
            value={this.state.email}
            type="text"
            className="rounded px-4 w-full py-1 bg-gray-200  border border-gray-
400 mb-6 text-gray-700 placeholder-gray-700 focus:bg-white focus:outline-none"
            placeholder="Email id"
            required
           />
           <input
            onChange={this.onChangePassword}
            type="password"
            value={this.state.password}
            className="rounded px-4 w-full py-1 bg-gray-200  border border-gray-
400 mb-4 text-gray-700 placeholder-gray-700 focus:bg-white focus:outline-none"
            placeholder="Password"
            required
           />
```

```
            <div className="flex items-center justify-between">
              <Link
                to="/signup"
                className="text-gray-600"
              >
                New User? Signup
              </Link>

              <button type="submit" className="bg-gray-800 text-gray-200  px-2 py-1
rounded" onClick={this.props.onLogin}>
                Log In
              </button>
            </div>
          </form>
        </div>
      </div>
      <div
        className="mr-20 mt-40 p-12"
        style={{
          background:
            "linear-gradient(rgba(0,0,0,0.7),rgba(0,0,0,0.7))",
        }}
      >
        <h1 className="text-4xl font-bold text-white tracking-wide">
          Welcome to SNR
        </h1>
        <h1 className="text-5xl py-2 font-bold text-white tracking-wide">

        </h1>
        <p className="text-white py-2">
          Provide you with the cars you want. <br /> Save Time. Save Fuel. Save
Money. Say yes to SNR.
        </p>
        <span className="text-white">
          Create New Account?
          <Link
            to="/signup"
            className="text-white text-lg ml-2 font-bold hover:text-red-500"
          >
            Sign Up
          </Link>
        </span>
      </div>
    </div>
  </>
 )
 }
}

export default Login;
```

Feed.js

```
import React, { useState } from "react";
import { Link, Redirect } from 'react-router-dom';
import axios from 'axios';
import { CgLogOut } from "react-icons/cg";

const Feed = (props) => {
  //console.log(this.props.location.user)
  const [cyl, setCyl] = useState();
  const [disp, setDisp] = useState();
  const [hpo, setHpo] = useState();
  const [weight, setWeight] = useState();
  const [accel, setAccel] = useState();
  const [modyr, setModyr] = useState();
  const [origin, setOrigin] = useState();
  const [prediction, setPrediction] = useState();

  const onlogout = (e) => {
    let { history } = this.props
    sessionStorage.setItem("@user", false)
    history.push({ pathname: "/"});
    window.location.reload()
  }

  const signupHandler = (e) => {
    e.preventDefault();
    if (!cyl || !disp || !hpo || !weight || !accel || !modyr || !origin) {
      return;
    }
    const payload = {
      inp: [
        parseInt(cyl),
        parseInt(disp),
        parseInt(hpo),
        parseInt(weight),
        parseInt(accel),
        parseInt(modyr),
        parseInt(origin)]
    }
    axios.get("http://127.0.0.1:5000/get-key").then((mlkey, err) => {

      fetch('http://127.0.0.1:5000/get-performance', {
        method: 'POST',
        mode: 'cors',
        redirect: 'manual',
        body: JSON.stringify(payload),
        headers: {
          'Content-type': 'application/json',
          'Authorization': 'Bearer ' + mlkey.data
        }
```

```
    }).then((res) => {
      return res.json()
    }).then((result) => {
      setPrediction(result.predictions[0].values[0][0]);
    })
   })

 }
 return (
  <>
    <div className="min-h-screen flex flex-col">
      <div className="m-20 bg-white container max-w-lg mx-auto flex-1 flex flex-
col items-center justify-center px-2">
        <a onclick={onlogout} href="../login/"> <CgLogOut className='text-white
text-5xl float-right -mt-16' /></a>
        <div className="px-6 py-8 rounded shadow-md text-black w-full">
          <h1 className="mb-8 text-3xl text-center">Desired Input Parameters</h1>
          <input
            type="text"
            className="block border border-grey-light w-full p-3 rounded mb-4"
            name="cyl"
            placeholder="Cylinders"
            onChange={(e) => {
              setCyl(e.target.value);
            }}
          />
          <input
            type="text"
            className="block border border-grey-light w-full p-3 rounded mb-4"
            name="disp"
            placeholder="Displacement"
            onChange={(e) => {
              setDisp(e.target.value);
            }}
          />

          <input
            type="text"
            className="block border border-grey-light w-full p-3 rounded mb-4"
            name="hpo"
            placeholder="Horsepower"
            onChange={(e) => {
              setHpo(e.target.value);
            }}
          />

          <input
            type="text"
            className="block border border-grey-light w-full p-3 rounded mb-4"
            name="weight"
            placeholder="weight"
```

```
            onChange={(e) => {
              setWeight(e.target.value);
            }}
          />
          <input
            type="text"
            className="block border border-grey-light w-full p-3 rounded mb-4"
            name="accel"
            placeholder="acceleration"
            onChange={(e) => {
              setAccel(e.target.value);
            }}
          />

          <input
            type="text"
            className="block border border-grey-light w-full p-3 rounded mb-4"
            name="modyr"
            placeholder="Model Year"
            onChange={(e) => {
              setModyr(e.target.value);
            }}
          />

          <input
            type="text"
            className="block border border-grey-light w-full p-3 rounded mb-4"
            name="origin"
            placeholder="Origin"
            onChange={(e) => {
              setOrigin(e.target.value);
            }}
          />

          <button
            type="submit"
            onClick={signupHandler}
            className="mt-10 w-full text-center py-3 rounded bg-green-500 text-white
hover:bg-green-dark focus:outline-none my-1"
          >Predict</button>
          {prediction ?
            <h1>Prediction : {prediction}</h1>
            : null}
        </div>
      </div>
    </div>
  </>
 )
}

export default Feed;
```

App.py

```
from flask import Flask, request, Response, send_from_directory
import requests
import json
from flask_cors import CORS

app = Flask(_name_)
CORS(app)

NEWS_API_KEY = 'https://us-south.ml.cloud.ibm.com/ml/v4/deployments/b8dff1f1-
05ce-4820-9be7-b9db8d2ba1d9/predictions?version=2022-11-19'



@app.route('/health-check', methods=['GET'])
def health_check_for_user():
    return Response("Running")


@app.route('/get-key', methods=['GET'])
def get_key():
    API_KEY = "vB02Z4ylw9hc5-F6OX0_0FdqqaXlwIVoFw_Tp-hjoQS8"
    token_response = requests.post('https://iam.cloud.ibm.com/identity/token',
data={"apikey":
                                                    API_KEY, "grant_type":
'urn:ibm:params:oauth:grant-type:apikey'})
    mltoken = token_response.json()["access_token"]
    return Response(mltoken)


@app.route('/', methods=['GET'])
def get_users():
    return "hello"

@app.route('/get-performance', methods=['POST'])
def get_performance_for_user():
    print(request.args)
    query = request.get_json()
    print(query)
    inp = query.get('inp')
    payload_scoring = {"input_data": [{"field": [["cylinders", "displacement",
"horsepower", "weight", "acceleration", "model year", "origin"]], "values": [
        inp]}]}
    API_KEY = "vB02Z4ylw9hc5-F6OX0_0FdqqaXlwIVoFw_Tp-hjoQS8"
    token_response = requests.post('https://iam.cloud.ibm.com/identity/token',
data={"apikey":
                                                    API_KEY, "grant_type":
'urn:ibm:params:oauth:grant-type:apikey'})
    mltoken = token_response.json()["access_token"]
```

```
    header = {'Content-Type': 'application/json',
            'Authorization': 'Bearer ' + mltoken}
    url = NEWS_API_KEY
    api_response = requests.post(url=url, json=payload_scoring, headers=header)
    return Response(api_response)

if _name_ == '_main_':
    app.run(debug=True)
```

2. GitHub & Project Demo Link

GitHub link: https://github.com/IBM-EPBL/IBM-Project-20562-1659755060

Project Demo Link:
https://drive.google.com/file/d/1B9nH-PoPWmiKCtgjM_D1sXmbqkPlgZGQ/view?usp=drivesdk

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