Machine Learning Approach For Employee Performance Prediction

1. INTRODUCTION

1.1 Overview

In this project we are going to analyse and predict the performance of employees in an organization on the basis of various factors, including, but not limited to, individual and domain specific characteristics, nature and level of schooling, socioeconomic status and different psychological factors.

1.2 Purpose

The purpose of this project is to predict the performance of employee.

2. PROJECT INITIALIZATION AND PLANNING PHASE

2.1 Define Problem Statement

Please reffer to our Define Problem Statement Document for a comprehensive overview of our project's problem statements.

Link: click here

2.2 Project proposal (Proposed Solution)

Please reffer to our Project Proposal (Proposed Solution) Document for a comprehensive overview of our Project Proposal.

Link: click here

2.3 Initial Project Planning Report

Please reffer to our Initial Project Planning Report Document for a comprehensive overview of our Initial Project Planning.

Link: click here

3. DATA COLLECTION AND PREPROCESSING PHASE

3.1 Data Collection Plan & Raw Data Sources Identification Report

Please reffer to our Data Collection Plan & Raw Data Sources Identification Report Document for a comprehensive overview of our Data Collection Plan & Raw Data Sources Identification

Link: click here

3.2 Data Quality Report

Please reffer to our Data Quality Report Document for a comprehensive overview of our Data Quality.

Link: click here

3.3 Data Exploration & Preprocessing Report

Please reffer to Preprocessing Report Document for a comprehensive overview of our Data Exploration And Preprocessing.

Link: click here

4. MODEL DEVELOPMENT PHASE

4.1 Feature Selection Report

Please reffer to Feature Selection Report Document for a comprehensive overview of our Feature Selection.

Link: click here

4.2 Model Selection Report

Please reffer to Model Selection Report Document for a comprehensive overview of our Model Selection.

Link: Click Here

4.3 Initial Model Training Code,Model Validation And Evaluation Report

Please reffer Initial Model Training Code,Model Validation And Evaluation Report Document for a comprehensive overview of our Initial Model Training Code,Model Validation And Evaluation.

Link: click here

5.MODEL OPTIMIZATION AND TUNING PHASE

5.1 Hyperparameter Tuning documentation

Please reffer Model Optimization and Tuning Report Document for a comprehensive overview of our Hyperparameter Tuning.

Link: click here

5.2 Performance Metrics Classification Report

Please reffer Performance Metrics Classification Report Document for a comprehensive overview of our Performance Metrics Classification.

Link: click here

5.3 Final Model Selection Justification

Please reffer Final Model Selection Justification Report Document for a comprehensive overview of our Final Model Selection Justification.

Link: click here

6. RESULT

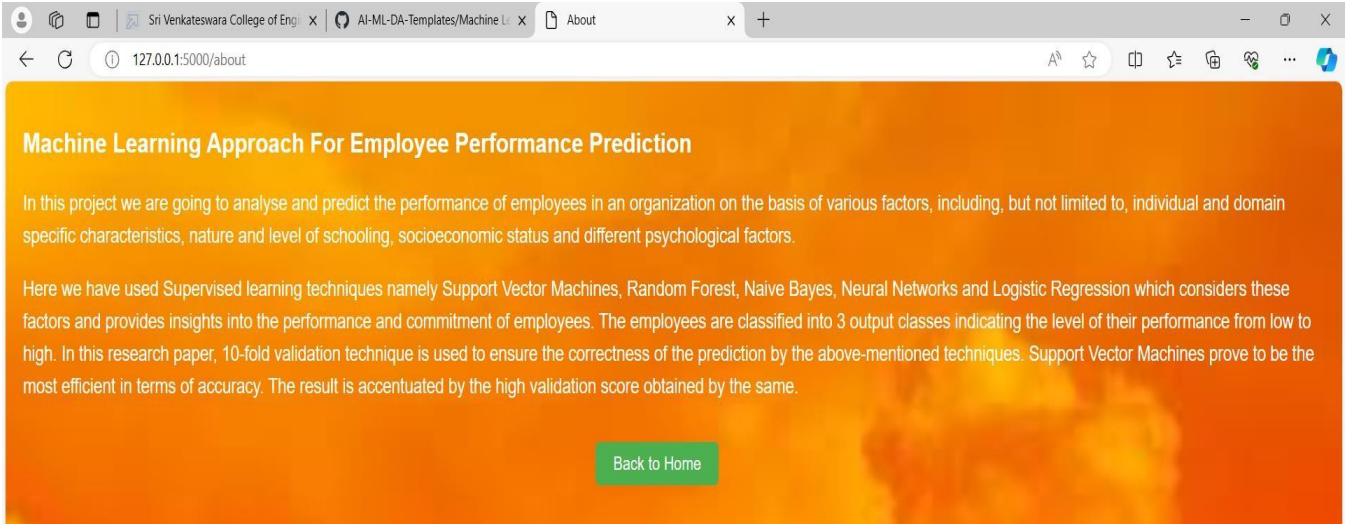
5.1 Output Screenshots

Home Page:

→When we click on the "Predict" button which is on the top right of my web page it will redirects to the another page where we can give inputs to our model.

→When we click on "About" button which is on the top right of my web page it will redirects to the another page where we find some details about my web page.

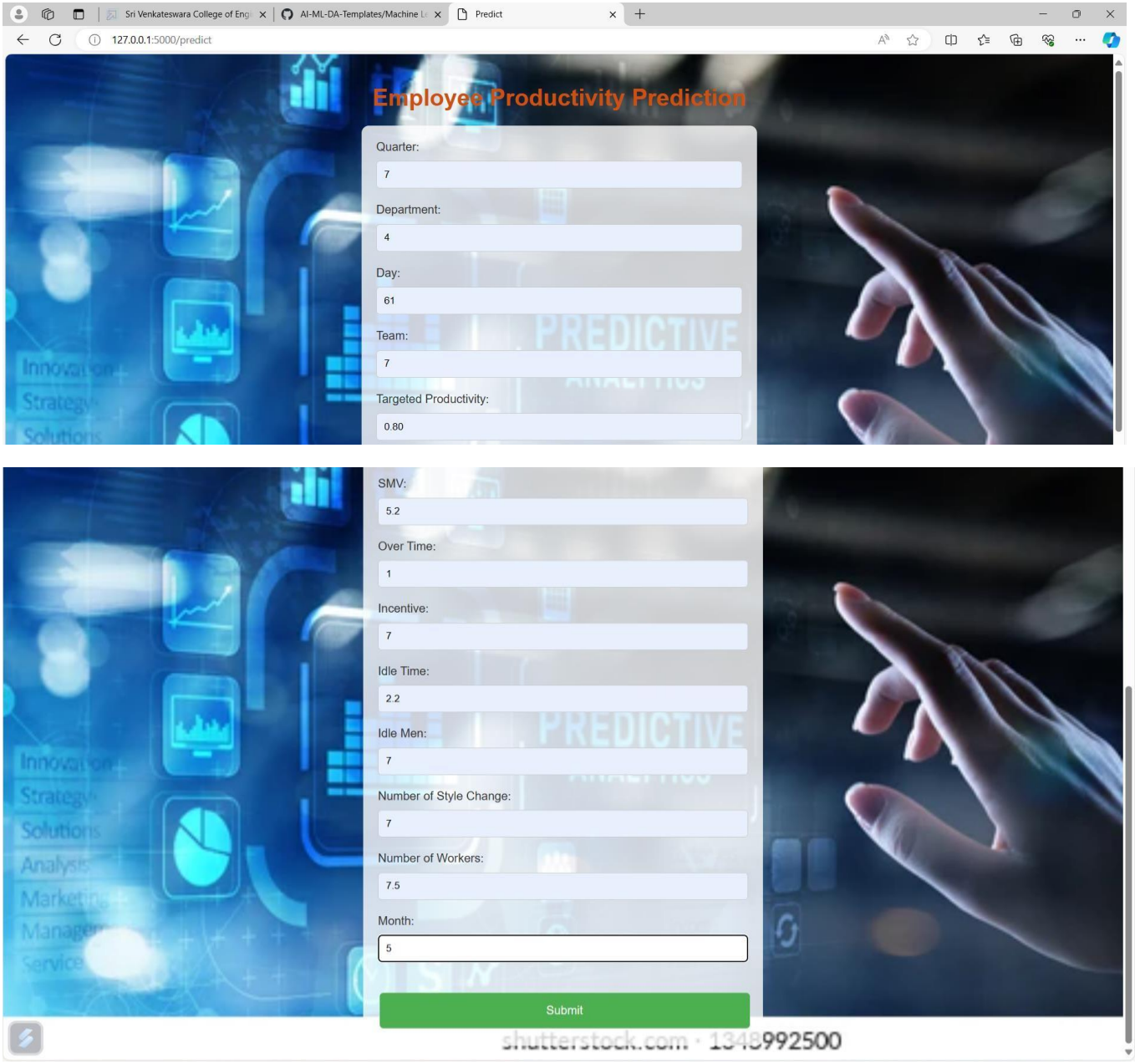
About page:



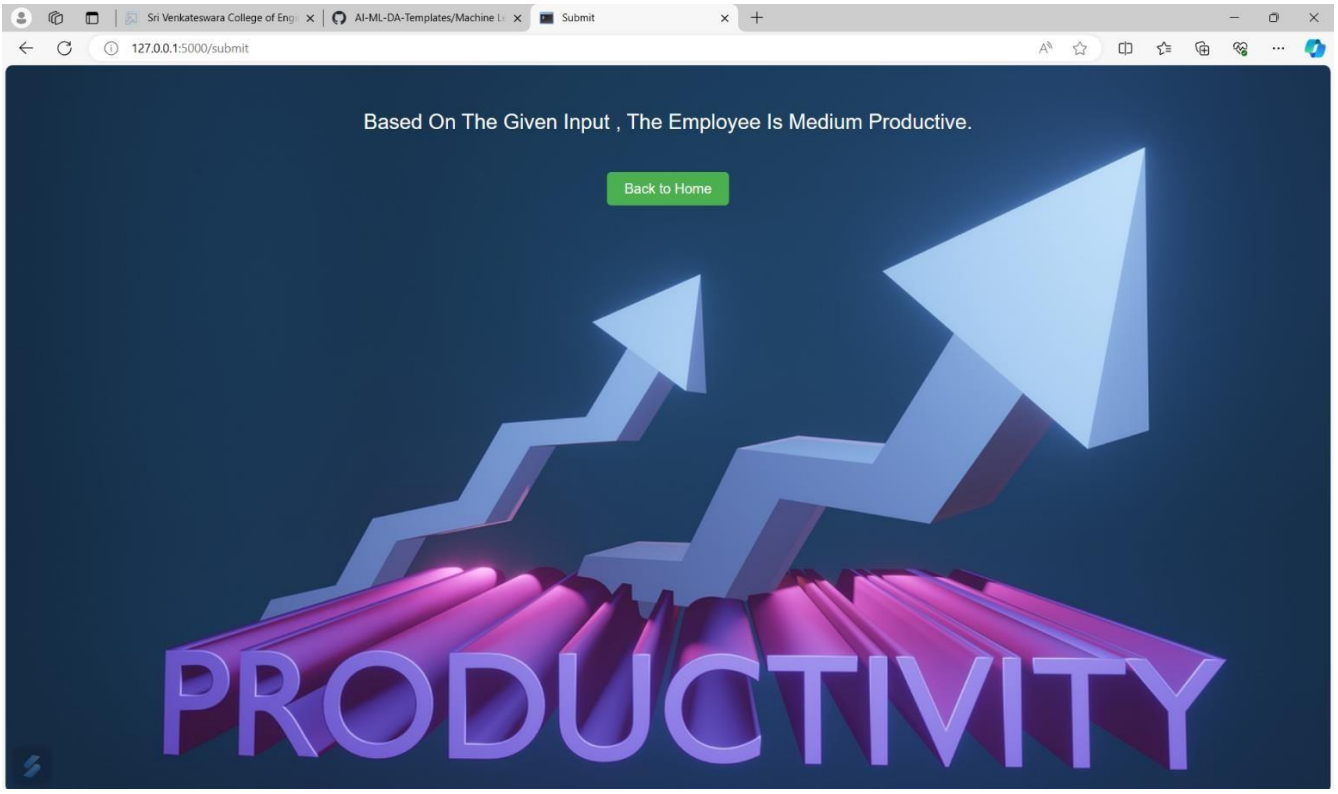
→When we click on "Back to Home" button which is on the bottom of the content of my web page it will redirects to the home page again.

→When we click on the "Predict" button which is on the top right of home page of my web page it will redirects to the another page where we can give inputs to our model.

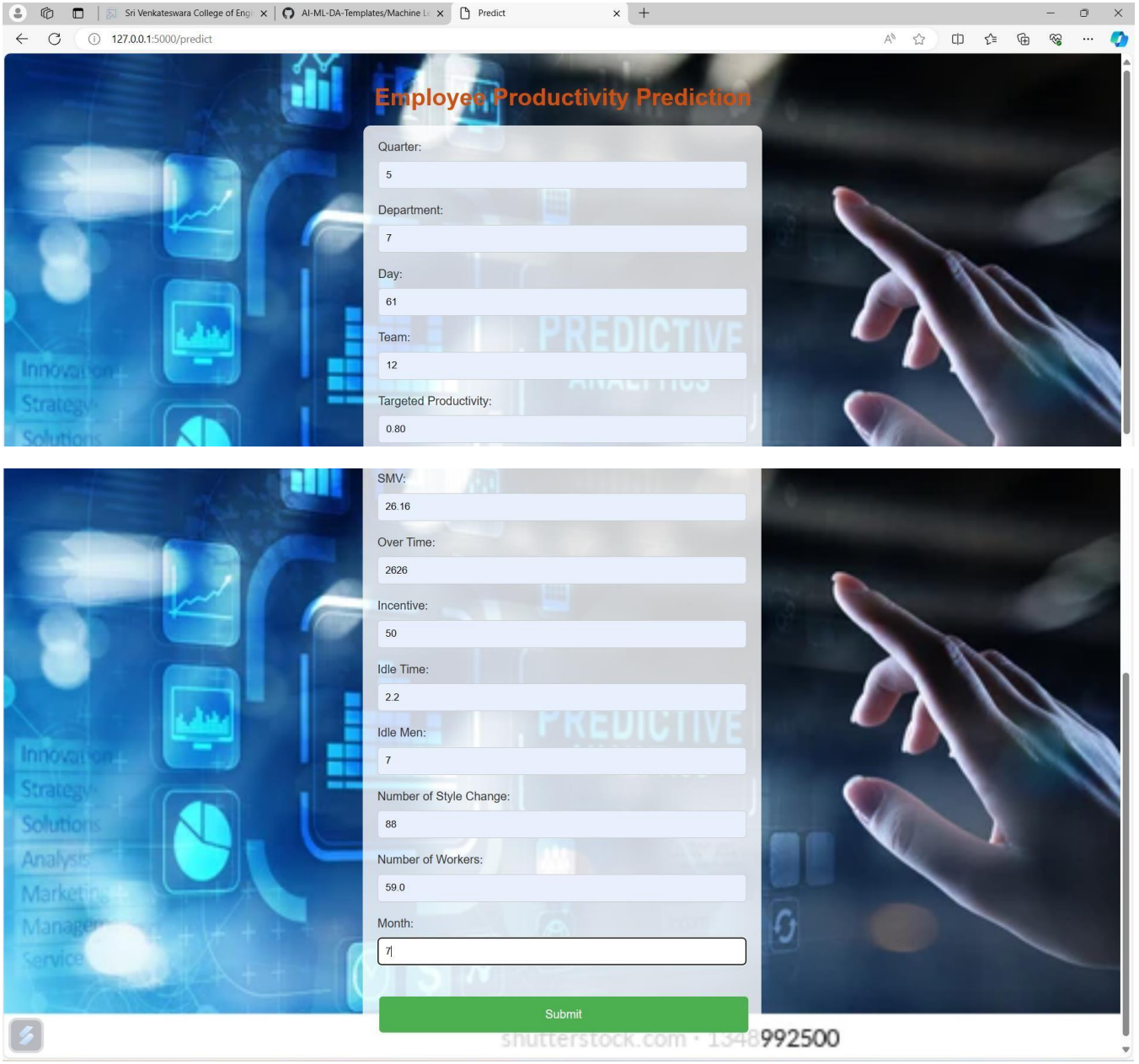
Input 1:



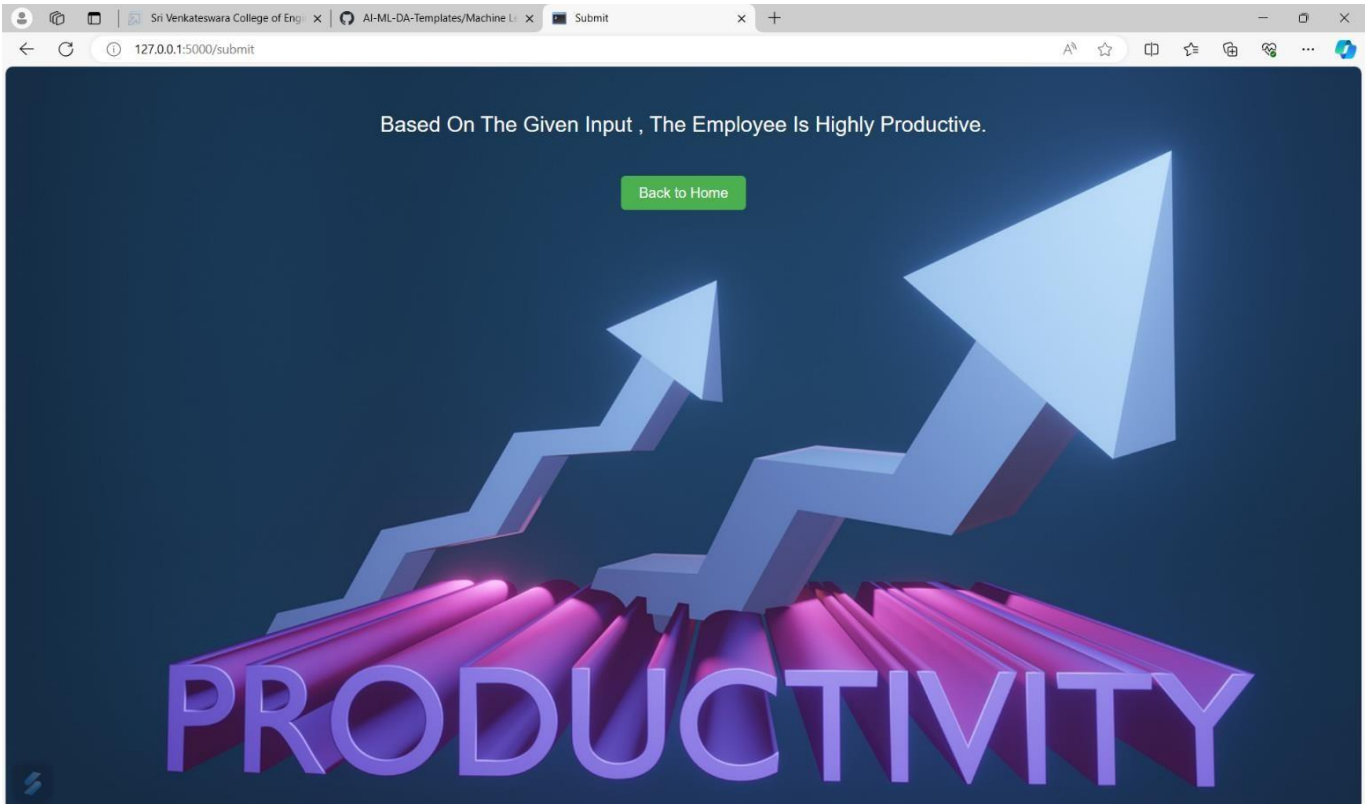
Output 1:


Sri Venkateswara College of Eng
AI-ML-DA-Templates/Machine L
Submit
127.0.0.1:5000/submit
Based On The Given Input , The Employee Is Medium Productive.
Back to Home
PRODUCTIVITY

Input 2:


Sri Venkateswara College of Engi
AI-ML-DA-Templates/Machine L
Predict
127.0.0.1:5000/predict
Employee Productivity Prediction
Quarter:
5
Department:
7
Day:
61
Team:
12
Targeted Productivity:
0.80
SMV:
26.16
Over Time:
2626
Incentive:
50
Idle Time:
2.2
Idle Men:
7
Number of Style Change:
88
Number of Workers:
59.0
Month:
7
Submit
shutterstock.com · 1348992500

Output 2:



→When we click on "Back to Home" button which is on the bottom of the result of my web page it will redirects to the home page again.

7. ADVANTAGES & DISADVANTAGES

7.1 Advantages

1. Provides clarity
2. Enhances efficiency
3. Promotes job satisfaction
4. Increases motivation
5. Enables objective decision-making
6. Helps plan for training needs

7.2 Dis Advantages

1. The absence of goal setting and defined milestones
2. Using performance management solely as a measurement tool
3. Establishing trust

4. Untrained managers

5. It's an annual activity

8. CONCLUSION

This project analyse and predict the performance of employees in an organization on the basis of various factors, including, but not limited to, individual and domain specific characteristics, nature and level of schooling, socioeconomic status and different psychological factors. The performance is evaluated successfully.

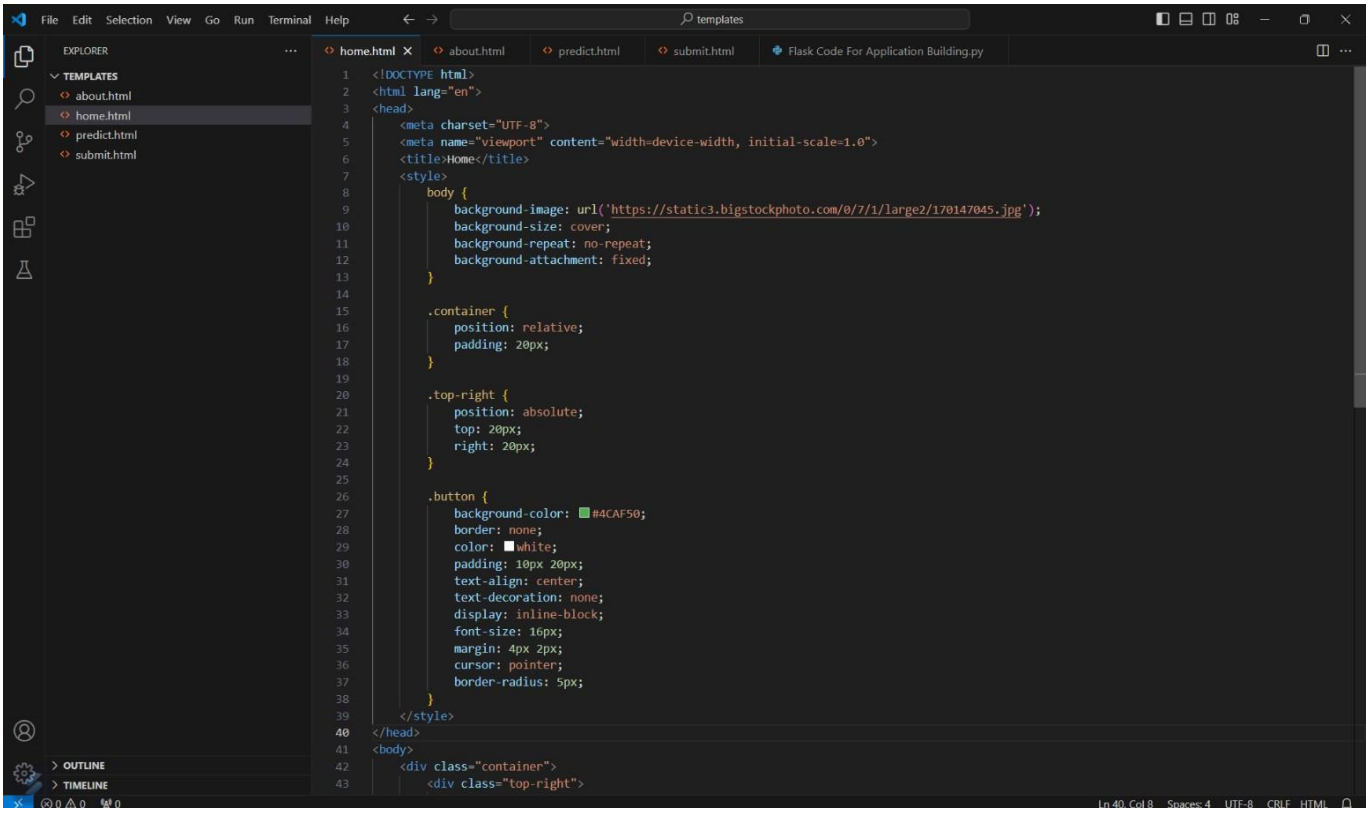
9. FUTURE SCOPE

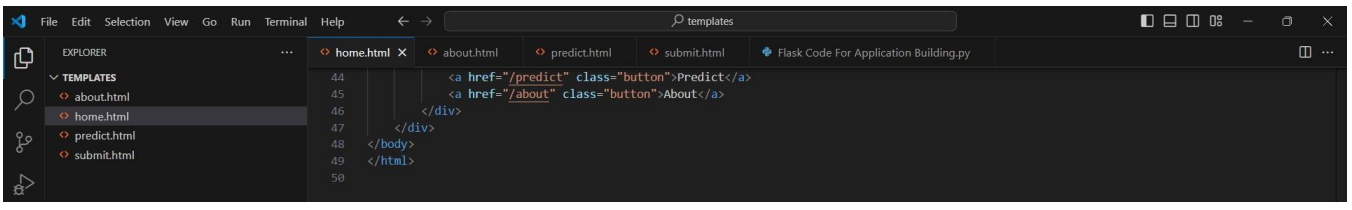
Provide employees with a better understanding of their role and responsibilities. Increase confidence through recognizing strengths while identifying training needs to improve weaknesses.

10. APPENDIX

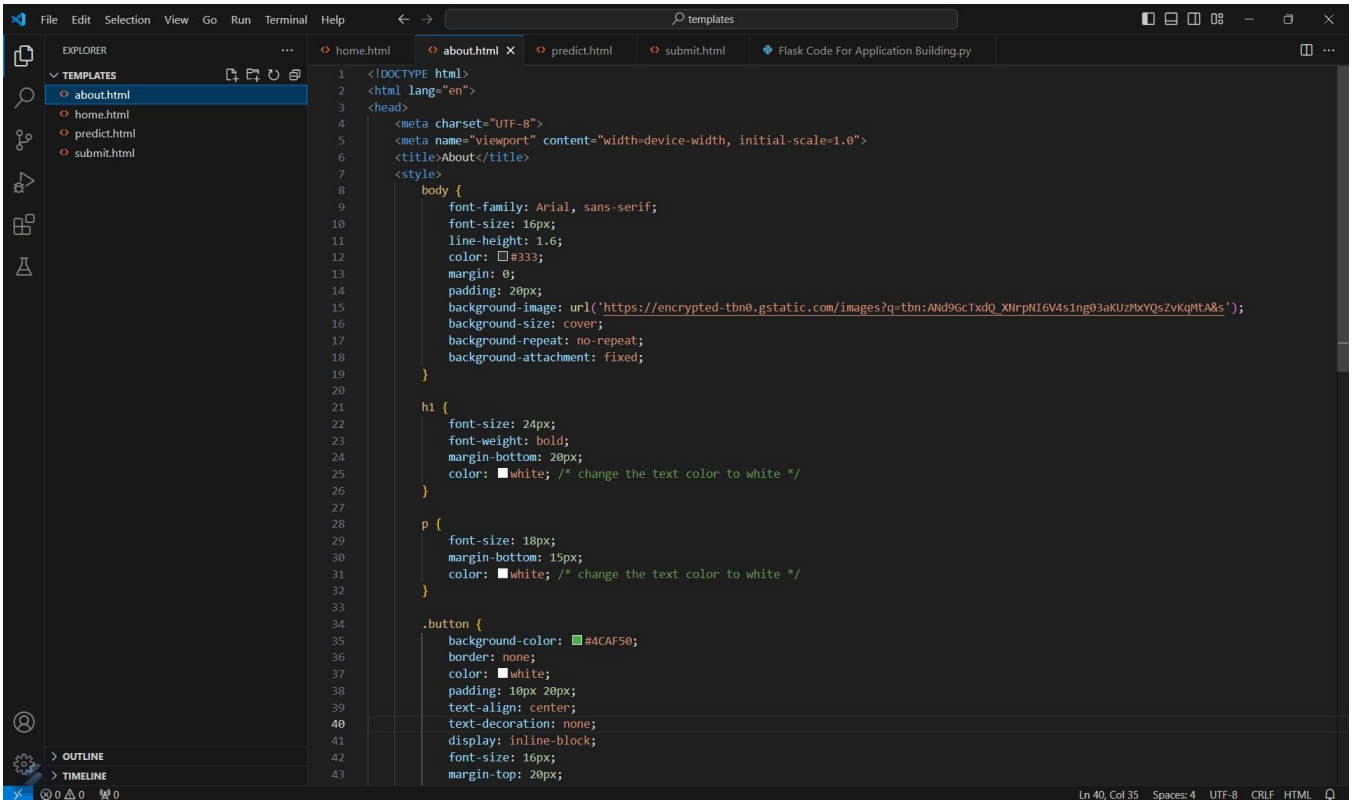
10.1 Source Code

home.html

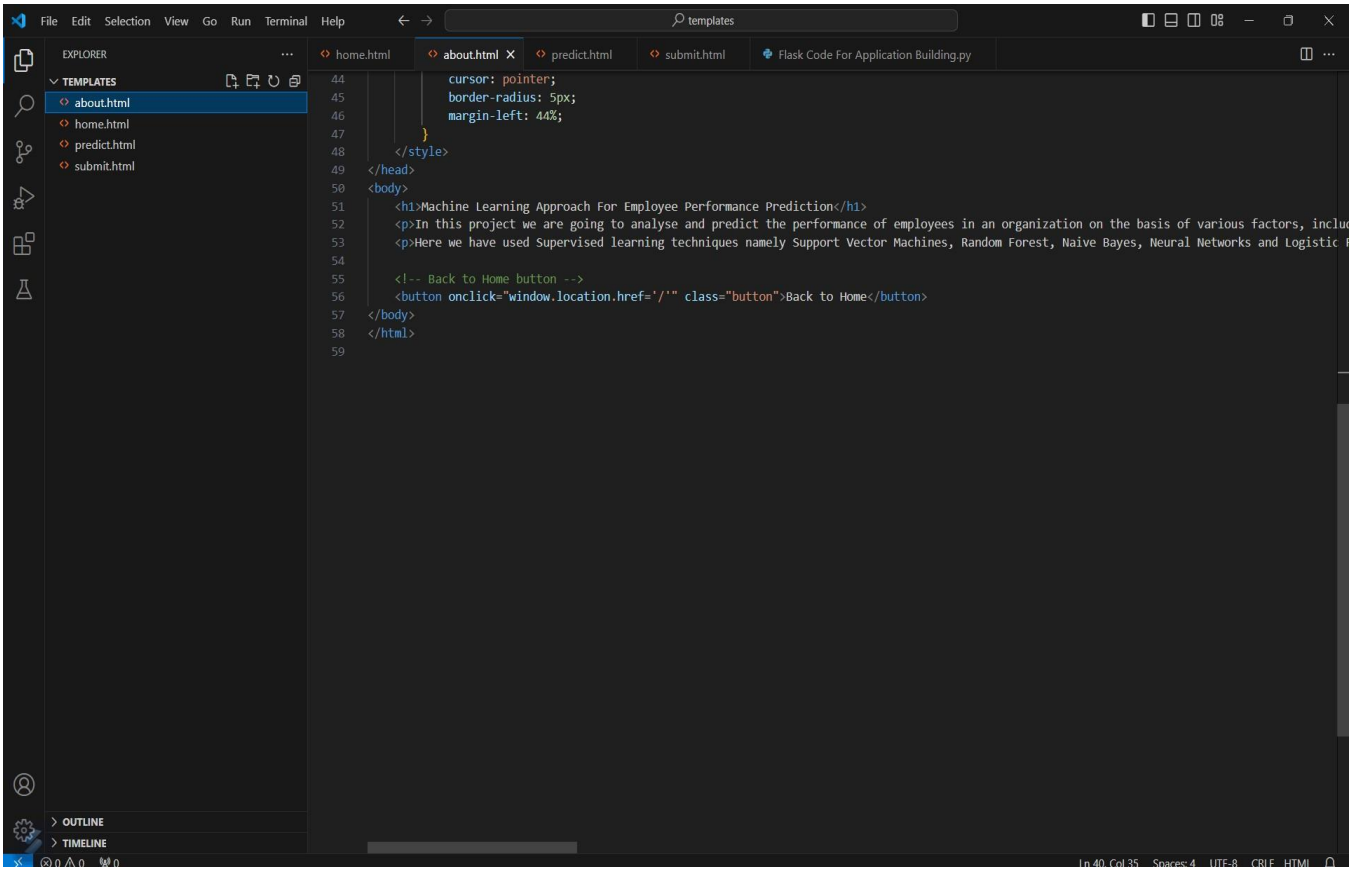




about.html

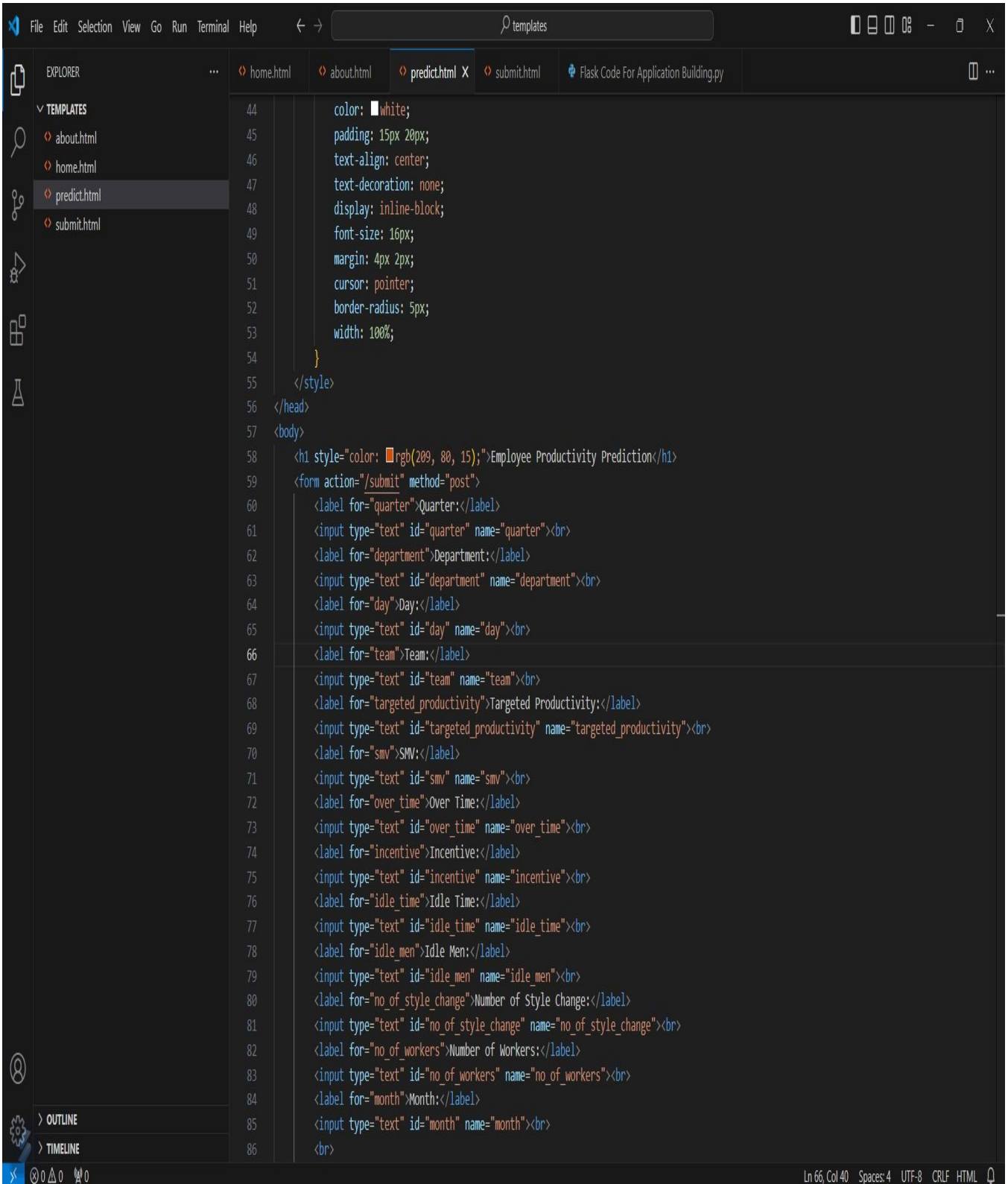


```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>About</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            font-size: 16px;
            line-height: 1.6;
            color: #333;
            margin: 0;
            padding: 20px;
            background-image: url('https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcTxdQ_XNrpNI6V4s1ng03aKUzMxYQsZvKqMtA&s');
            background-size: cover;
            background-repeat: no-repeat;
            background-attachment: fixed;
        }

        h1 {
            font-size: 24px;
            font-weight: bold;
            margin-bottom: 20px;
            color: white; /* change the text color to white */
        }

        p {
            font-size: 18px;
            margin-bottom: 15px;
            color: white; /* change the text color to white */
        }

        .button {
            background-color: #4CAF50;
            border: none;
            color: white;
            padding: 10px 20px;
            text-align: center;
            text-decoration: none;
            display: inline-block;
            font-size: 16px;
            margin-top: 20px;
```

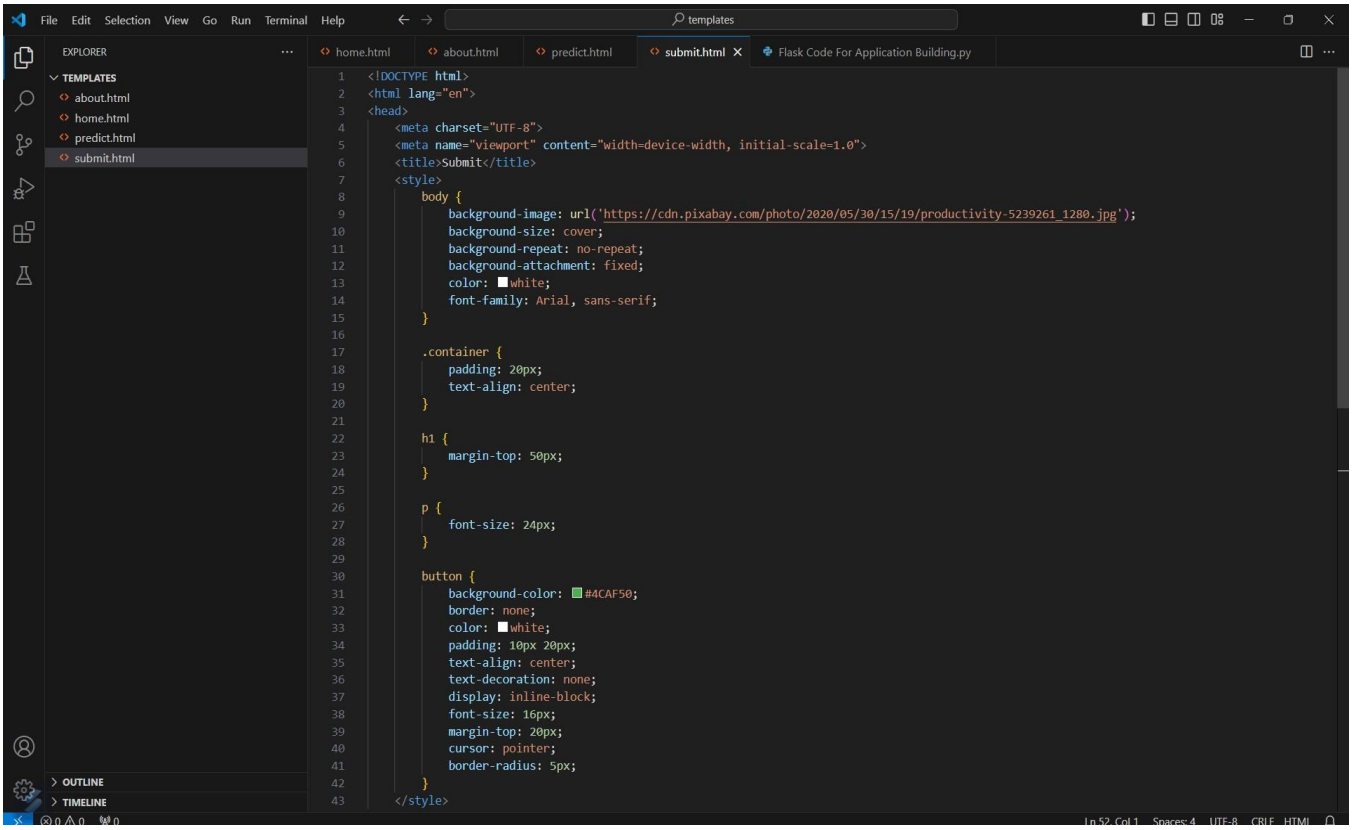


```
            cursor: pointer;
            border-radius: 5px;
            margin-left: 44%;
        }
    </style>
</head>
<body>
    <h1>Machine Learning Approach For Employee Performance Prediction</h1>
    <p>In this project we are going to analyse and predict the performance of employees in an organization on the basis of various factors, includ
    <p>Here we have used Supervised learning techniques namely Support Vector Machines, Random Forest, Naive Bayes, Neural Networks and Logistic

    <!-- Back to Home button -->
    <button onclick="window.location.href='/'" class="button">Back to Home</button>
</body>
</html>
```

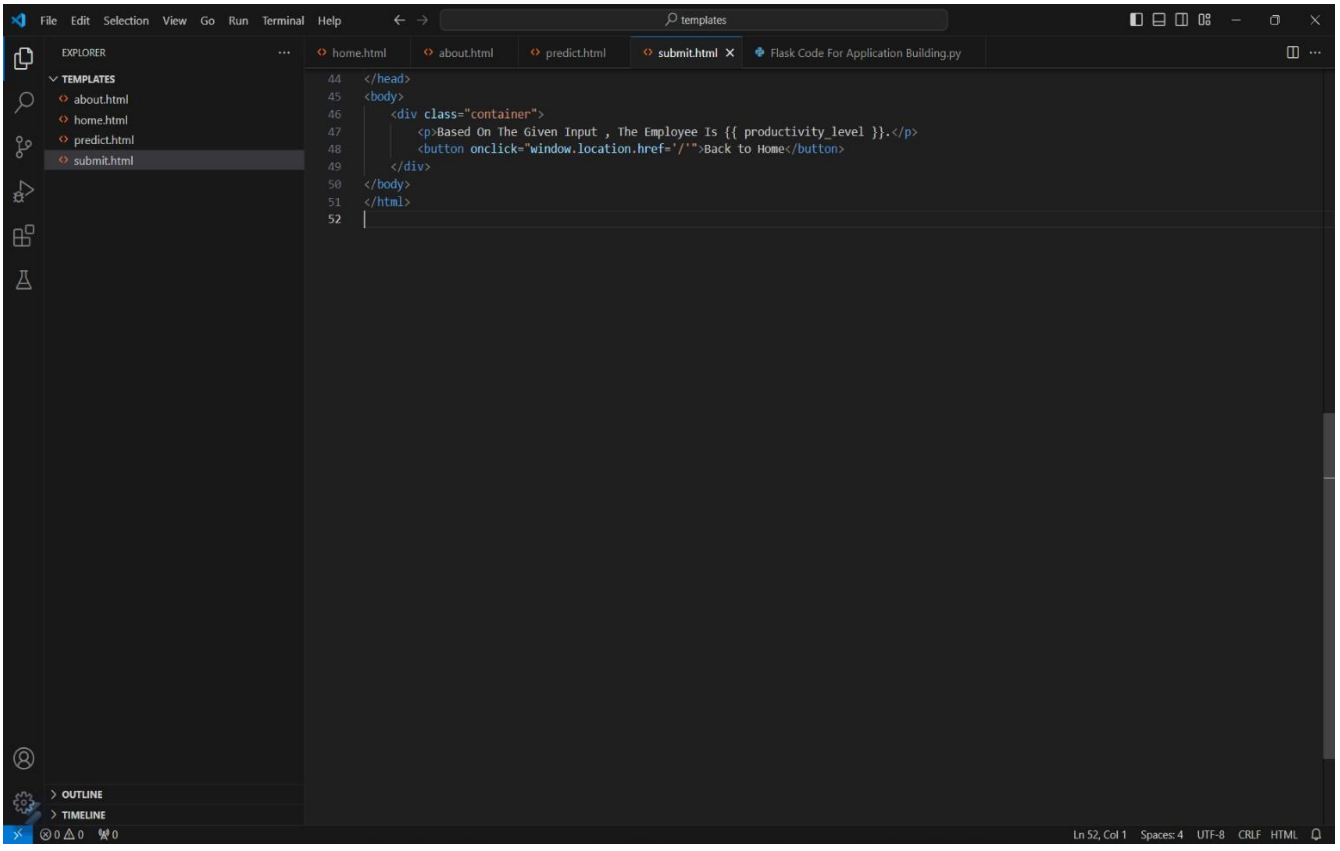
Predict.html



Submit.html

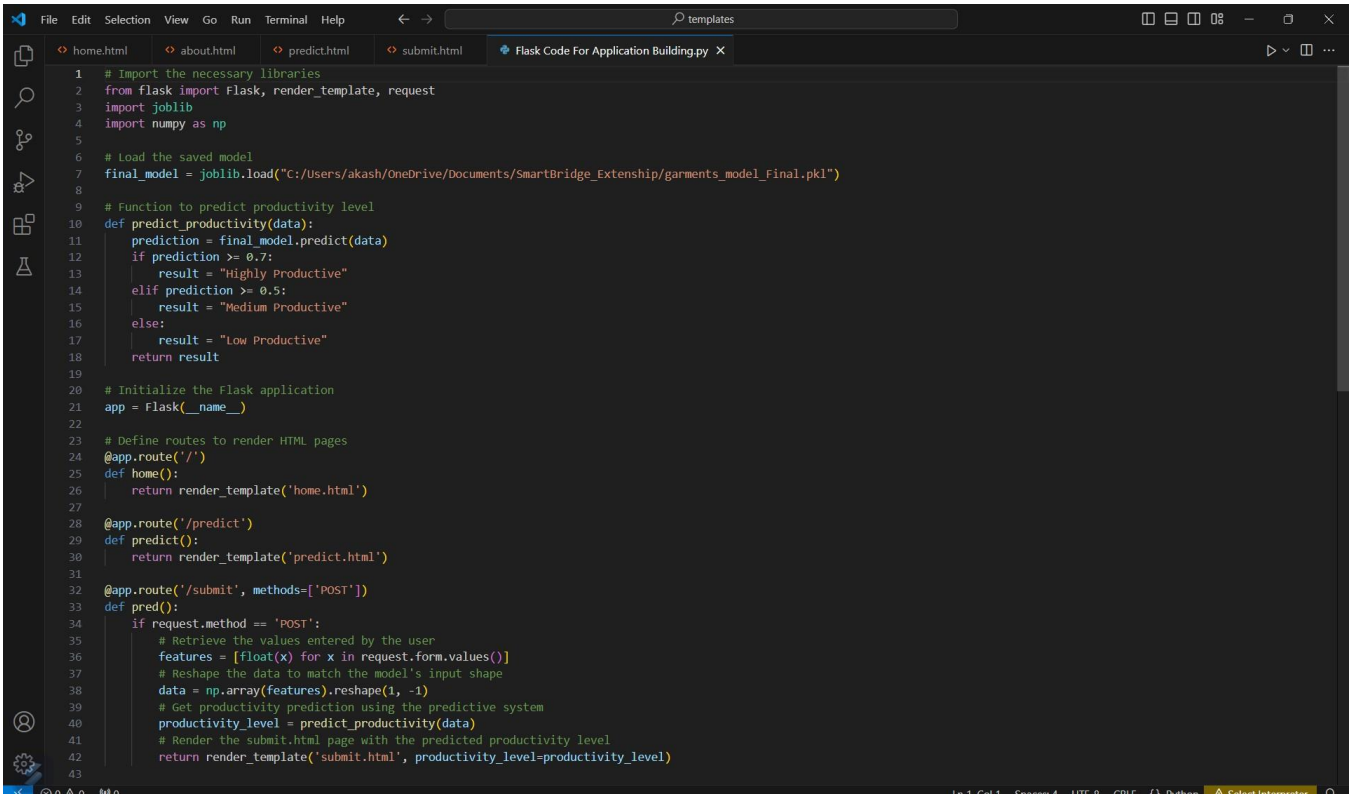



```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Submit</title>
    <style>
        body {
            background-image: url('https://cdn.pixabay.com/photo/2020/05/30/15/19/productivity-5239261_1280.jpg');
            background-size: cover;
            background-repeat: no-repeat;
            background-attachment: fixed;
            color: white;
            font-family: Arial, sans-serif;
        }

        .container {
            padding: 20px;
            text-align: center;
        }

        h1 {
            margin-top: 50px;
        }

        p {
            font-size: 24px;
        }

        button {
            background-color: #4CAF50;
            border: none;
            color: white;
            padding: 10px 20px;
            text-align: center;
            text-decoration: none;
            display: inline-block;
            font-size: 16px;
            margin-top: 20px;
            cursor: pointer;
            border-radius: 5px;
        }
    </style>
```

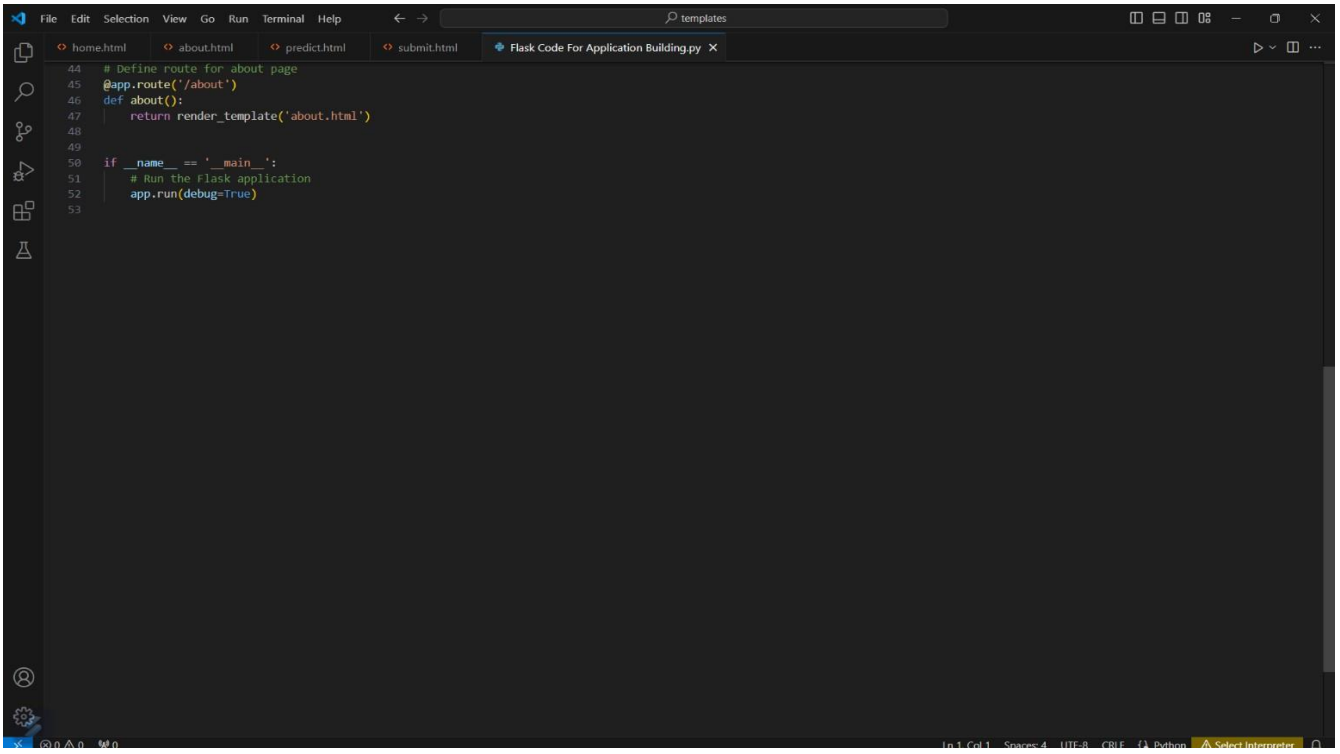



```
</head>
<body>
    <div class="container">
        <p>Based On The Given Input , The Employee Is {{ productivity_level }}.</p>
        <button onclick="window.location.href='/'">Back to Home</button>
    </div>
</body>
</html>
```

Flask Code For Application Building.py



```python
# Import the necessary libraries
from flask import Flask, render_template, request
import joblib
import numpy as np

# Load the saved model
final_model = joblib.load("C:/Users/akash/OneDrive/Documents/SmartBridge_Extenship/garments_model_Final.pkl")

# Function to predict productivity level
def predict_productivity(data):
    prediction = final_model.predict(data)
    if prediction >= 0.7:
        result = "Highly Productive"
    elif prediction >= 0.5:
        result = "Medium Productive"
    else:
        result = "Low Productive"
    return result

# Initialize the Flask application
app = Flask(__name__)

# Define routes to render HTML pages
@app.route('/')
def home():
    return render_template('home.html')

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

@app.route('/submit', methods=['POST'])
def pred():
    if request.method == 'POST':
        # Retrieve the values entered by the user
        features = [float(x) for x in request.form.values()]
        # Reshape the data to match the model's input shape
        data = np.array(features).reshape(1, -1)
        # Get productivity prediction using the predictive system
        productivity_level = predict_productivity(data)
        # Render the submit.html page with the predicted productivity level
        return render_template('submit.html', productivity_level=productivity_level)
```



```python
# Define route for about page
@app.route('/about')
def about():
    return render_template('about.html')


if __name__ == '__main__':
    # Run the Flask application
    app.run(debug=True)
```

10.2 GitHub & Project Demo Link

GitHub Link: click here

Project Demo Link: click here