Week5: Cloud and API deployment

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Introduction

This assignment involves building and deploying a machine learning model for predicting real estate prices based on various features. The primary objectives are to:

1. Train a regression model using a provided real estate dataset.
2. Save the trained model using pickle for later use.
3. Create a web application using Flask to accept input data, predict the house price per unit area, and display the results.
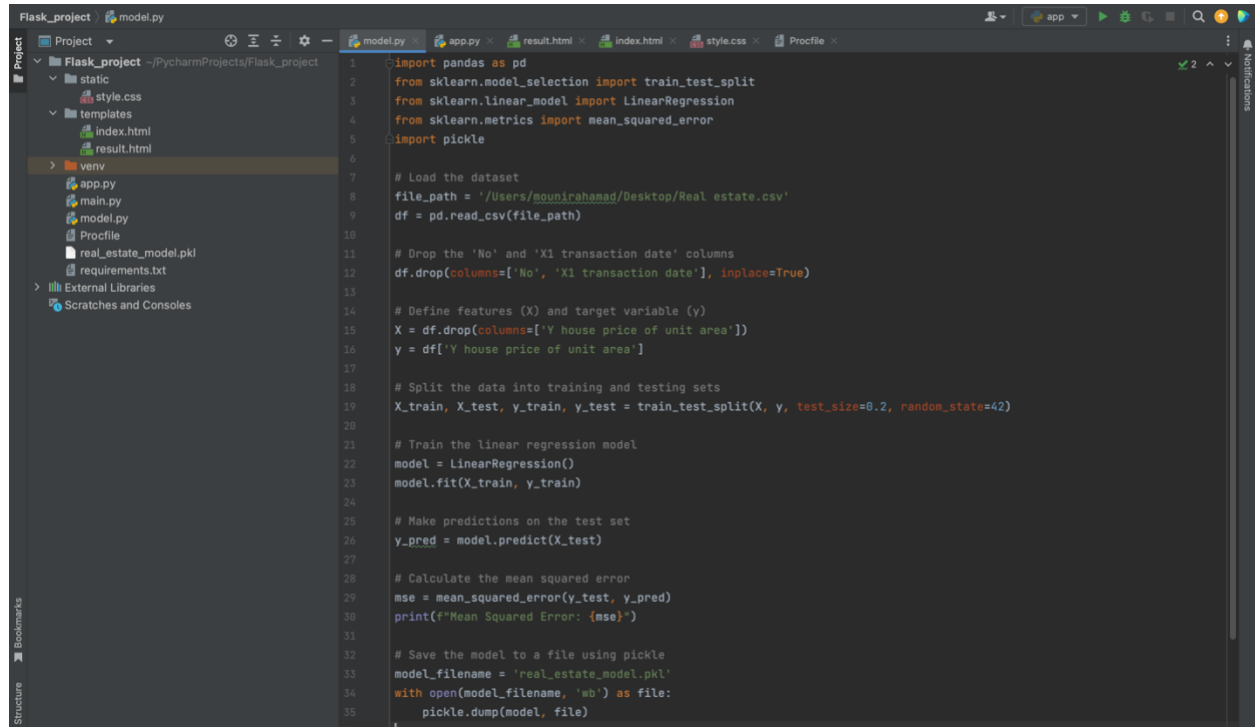4. Deploy the web application on Heroku for accessible and scalable usage.

The dataset consists of information about house transactions, including the age of the house, distance to the nearest MRT station, number of convenience stores nearby, and the geographical coordinates (latitude and longitude). The target variable is the house price per unit area.

To complete this assignment, the project is structured with separate files for training the model, setting up the Flask web application, and defining HTML templates and CSS for the user interface.

The web application allows users to input the necessary features, predicts the house price using the trained model, and displays the prediction on a results page. This assignment demonstrates the practical application of machine learning in a real-world scenario, integrating model training, persistence, and deployment in a user-friendly web interface hosted on Heroku.
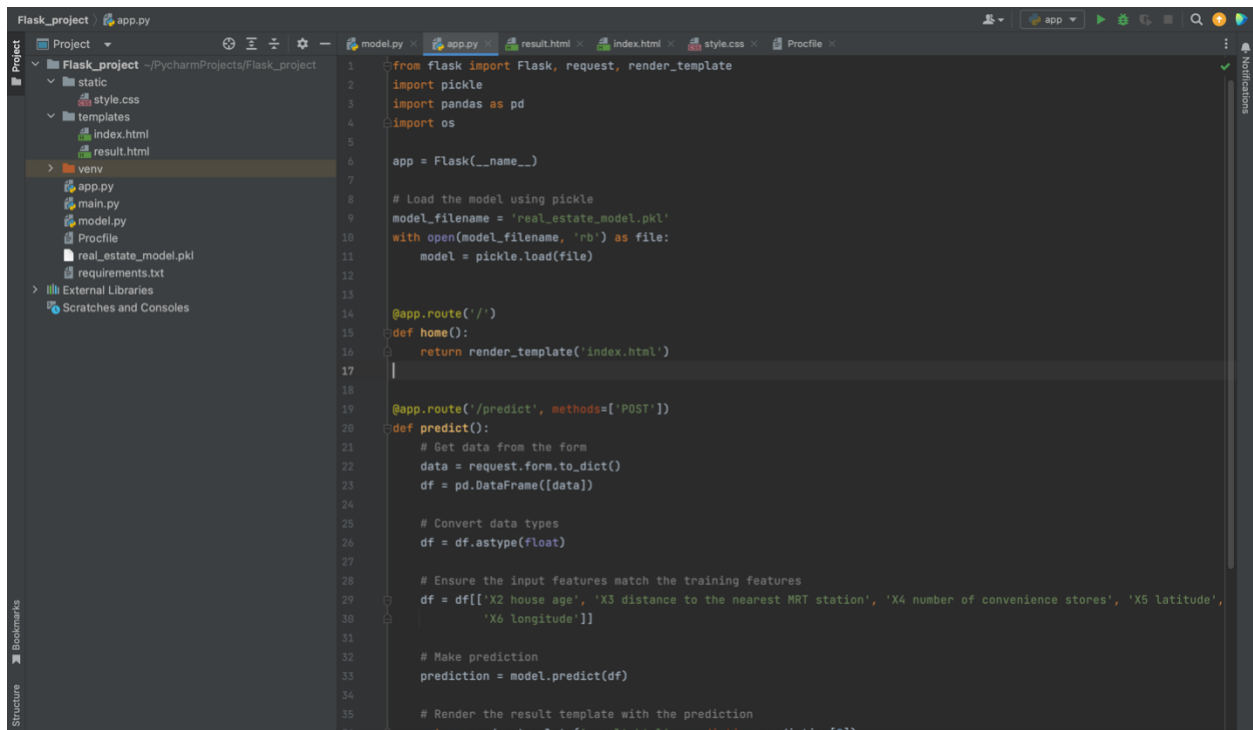
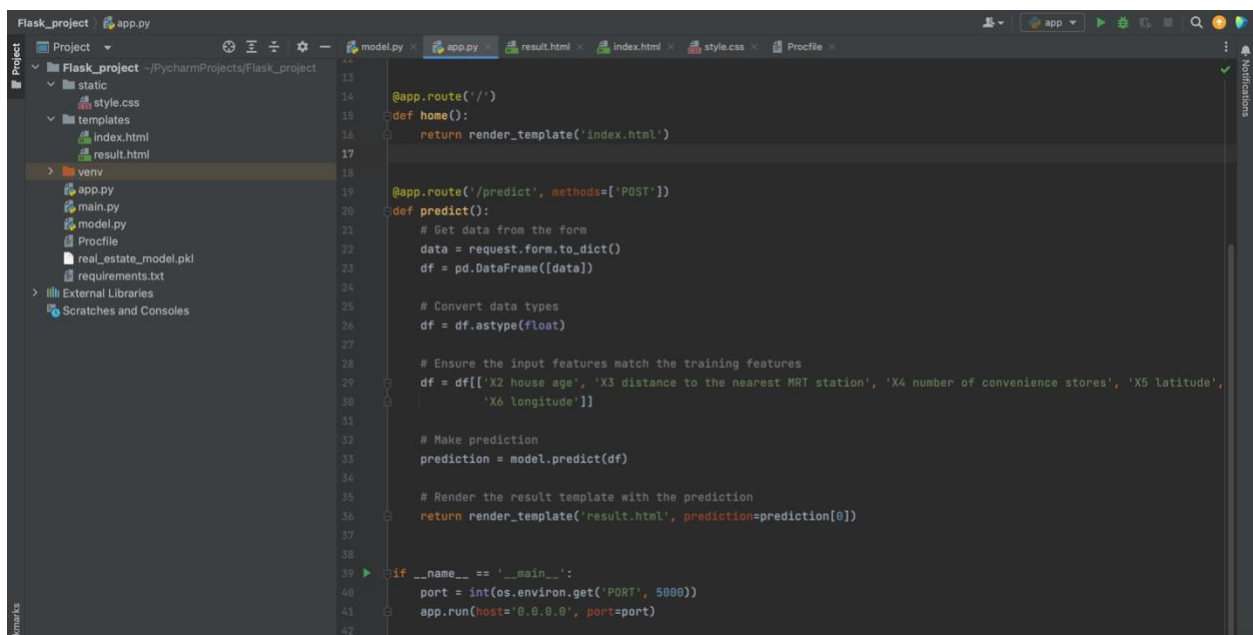# Snapshot of deployment steps:

1-model.py

2-app.py


```python
from flask import Flask, request, render_template
import pickle
import pandas as pd
import os


app = Flask(__name__)

# Load the model using pickle
model_filename = 'real_estate_model.pkl'
with open(model_filename, 'rb') as file:
    model = pickle.load(file)


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


@app.route('/predict', methods=['POST'])
def predict():
    # Get data from the form
    data = request.form.to_dict()
    df = pd.DataFrame([data])

    # Convert data types
    df = df.astype(float)

    # Ensure the input features match the training features
    df = df[['X2 house age', 'X3 distance to the nearest MRT station', 'X4 number of convenience stores', 'X5 latitude',
            'X6 longitude']]

    # Make prediction
    prediction = model.predict(df)

    # Render the result template with the prediction
```



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            'X6 longitude']]

    # Make prediction
    prediction = model.predict(df)

    # Render the result template with the prediction
    return render_template('result.html', prediction=prediction[0])


if __name__ == '__main__':
    port = int(os.environ.get('PORT', 5000))
    app.run(host='0.0.0.0', port=port)
```

3-index.html

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <link rel="stylesheet" href="{{ url_for('static', filename='style.css') }}">
    <title>Real Estate Price Prediction</title>
</head>
<body>
    <div class="container">
        <h1>Real Estate Price Prediction</h1>
        <form action="/predict" method="post">
            <label for="X2 house age">House Age:</label>
            <input type="text" id="X2 house age" name="X2 house age" required><br>

            <label for="X3 distance to the nearest MRT station">Distance to MRT:</label>
            <input type="text" id="X3 distance to the nearest MRT station" name="X3 distance to the nearest MRT station" r

            <label for="X4 number of convenience stores">Number of Convenience Stores:</label>
            <input type="text" id="X4 number of convenience stores" name="X4 number of convenience stores" required><br>

            <label for="X5 latitude">Latitude:</label>
            <input type="text" id="X5 latitude" name="X5 latitude" required><br>

            <label for="X6 longitude">Longitude:</label>
            <input type="text" id="X6 longitude" name="X6 longitude" required><br>

            <button type="submit">Predict</button>
        </form>
    </div>
</body>
</html>
```
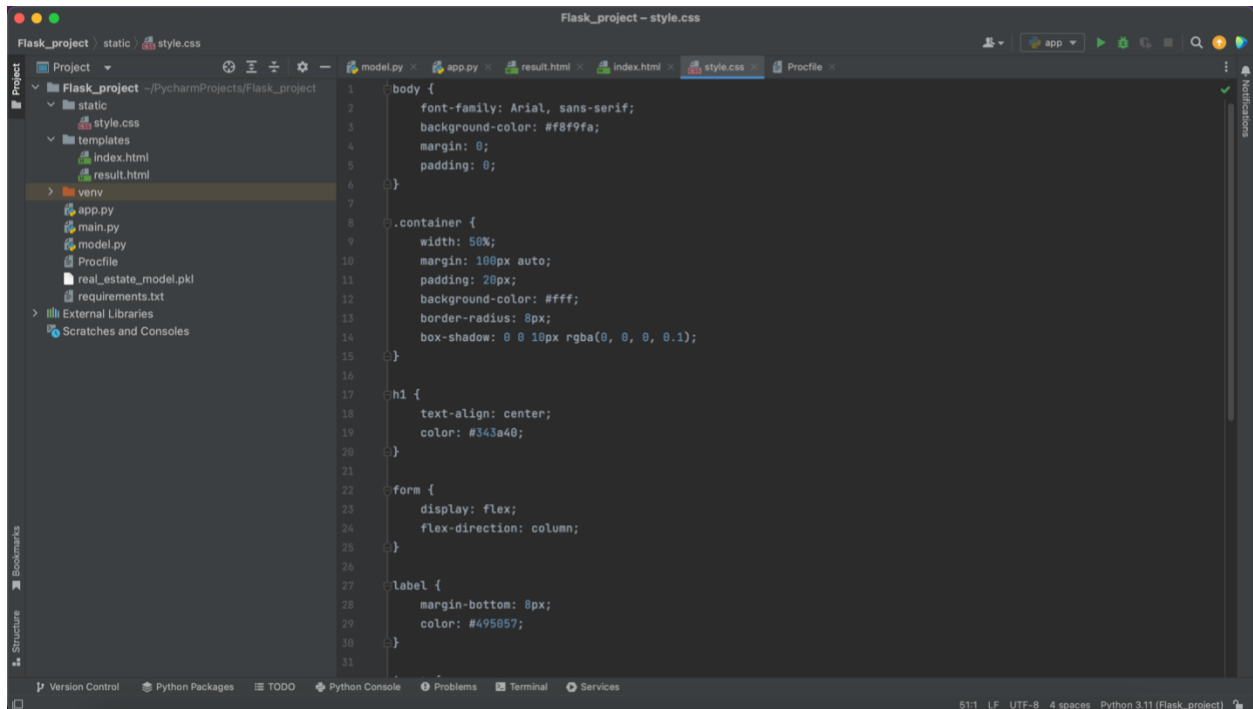
4-result.html

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <link rel="stylesheet" href="{{ url_for('static', filename='style.css') }}">
    <title>Prediction Result</title>
</head>
<body>
    <div class="container">
        <h1>Prediction Result</h1>
        <p>The predicted house price per unit area is: {{ prediction }}</p>
        <a href="/">Go back</a>
    </div>
</body>
</html>
```
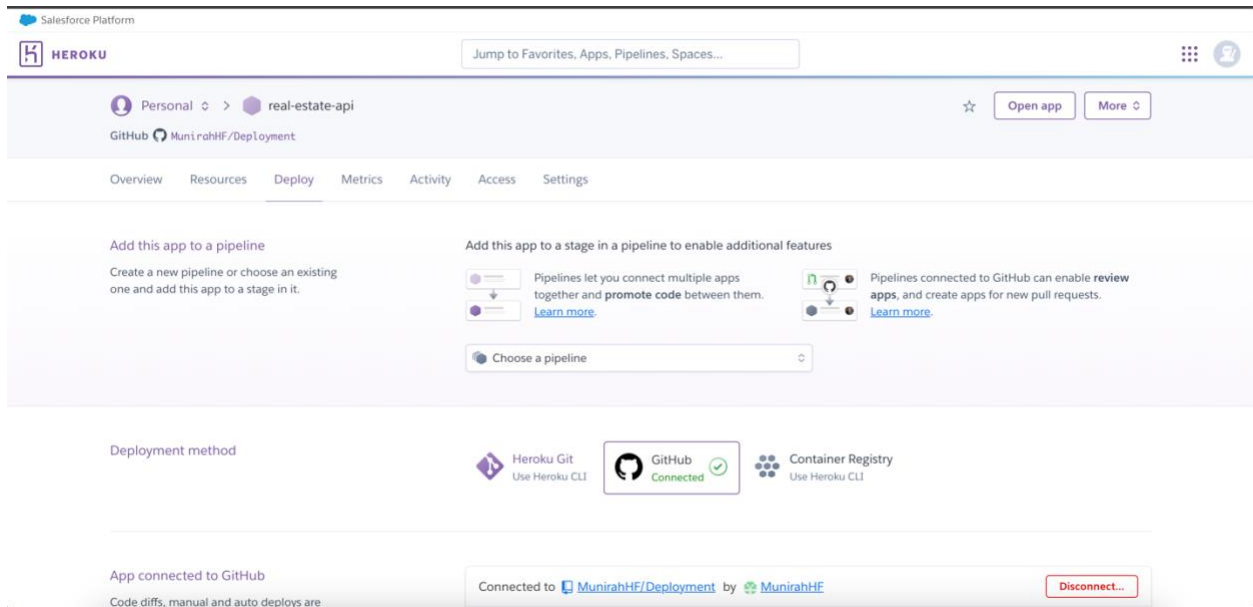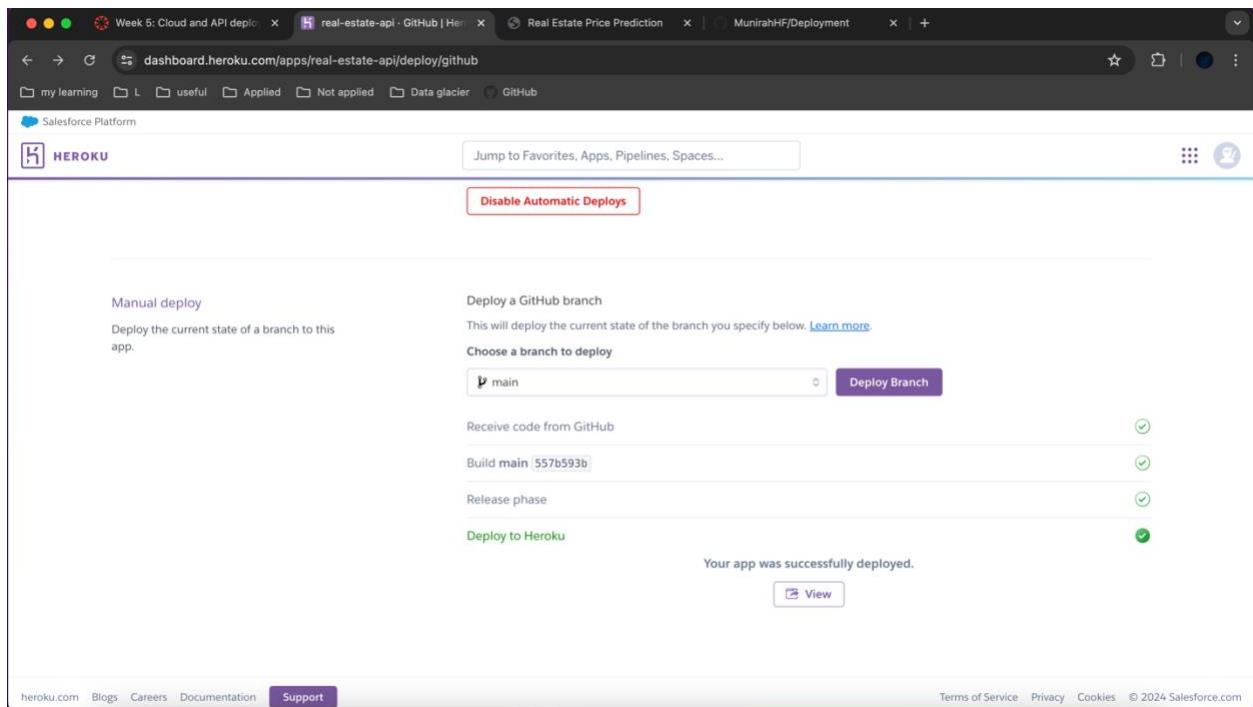
5-style.css

6-Deployment using Heroku

Preparing the repository
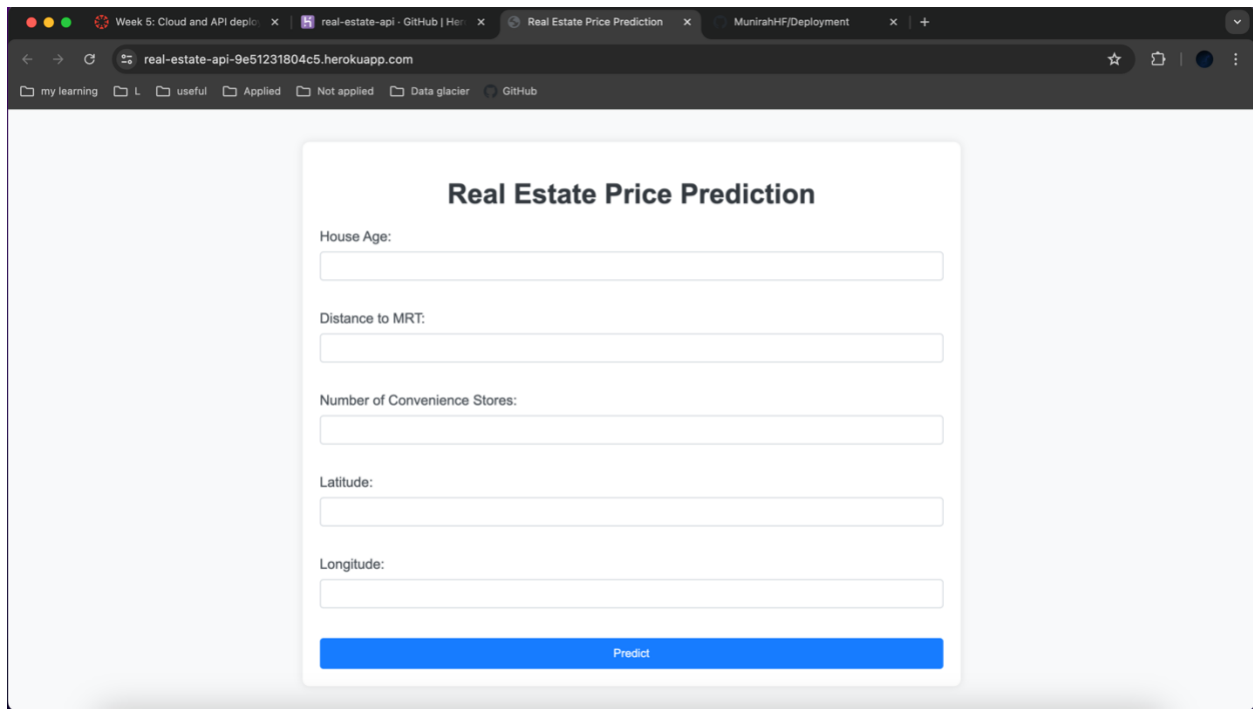
Connect to GitHub repository where code is I uploaded.

Deploy branch

https://real-estate-api-9e51231804c5.herokuapp.com/