DATA GLACIER VIRTUAL INTERNSHIP

Deployment Documentation for BTC Closing Price Prediction App

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Submitted To: Data Glacier

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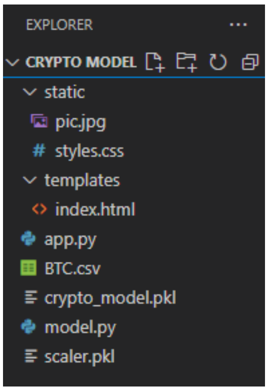
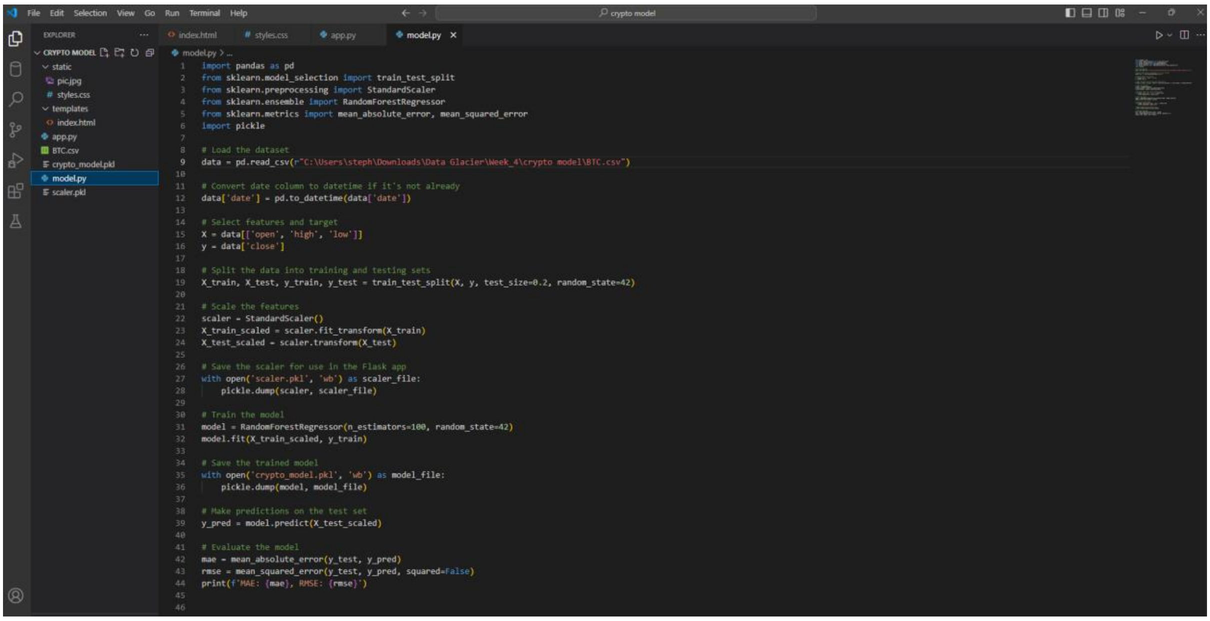
1. File Structure Setup



```
EXPLORER
CRYPTO MODEL
  static
    pic.jpg
    styles.css
  templates
    index.html
  app.py
  BTC.csv
  crypto_model.pkl
  model.py
  scaler.pkl
```

- *Description: This shows the organization of files within the project directory.*

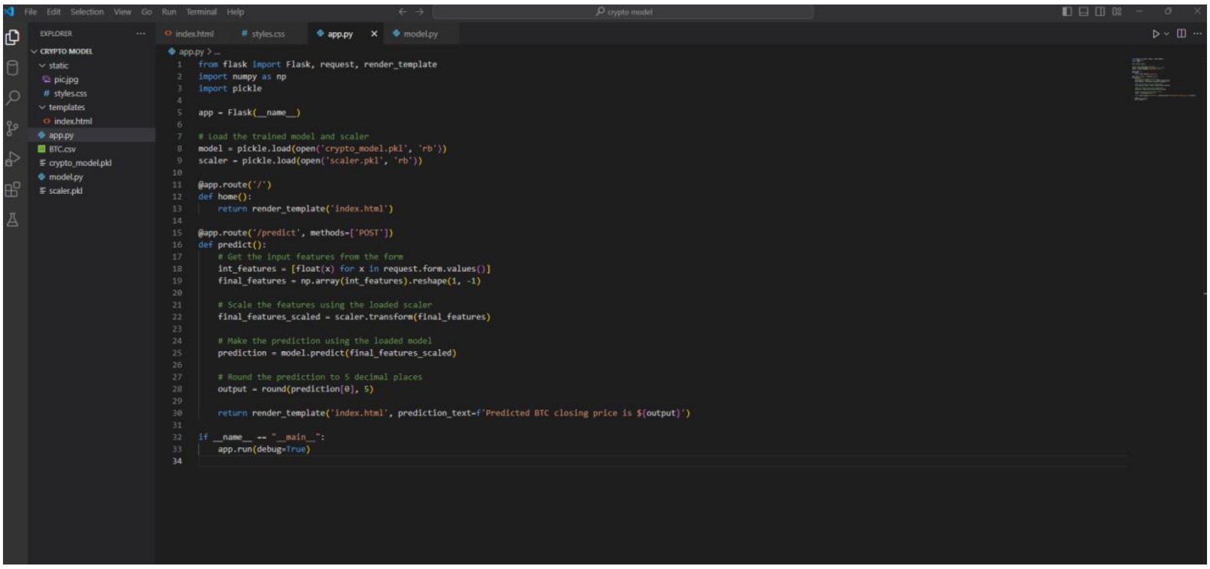
2. Model Training



```python
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_absolute_error, mean_squared_error
import pickle

# Load the dataset
data = pd.read_csv(r"C:\Users\steph\Downloads\Data Glacier\Week_4\crypto model\BTC.csv")

# Convert date column to datetime if it's not already
data['date'] = pd.to_datetime(data['date'])

# Select features and target
X = data[['open', 'high', 'low']]
y = data['close']

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Scale the features
scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)

# Save the scaler for use in the Flask app
with open('scaler.pkl', 'wb') as scaler_file:
    pickle.dump(scaler, scaler_file)

# Train the model
model = RandomForestRegressor(n_estimators=100, random_state=42)
model.fit(X_train_scaled, y_train)

# Save the trained model
with open('crypto_model.pkl', 'wb') as model_file:
    pickle.dump(model, model_file)

# Make predictions on the test set
y_pred = model.predict(X_test_scaled)

# Evaluate the model
mae = mean_absolute_error(y_test, y_pred)
rmse = mean_squared_error(y_test, y_pred, squared=False)
print(f'MAE: {mae}, RMSE: {rmse}')
```

- *Description: This captures the Python code used to train and save the model.*

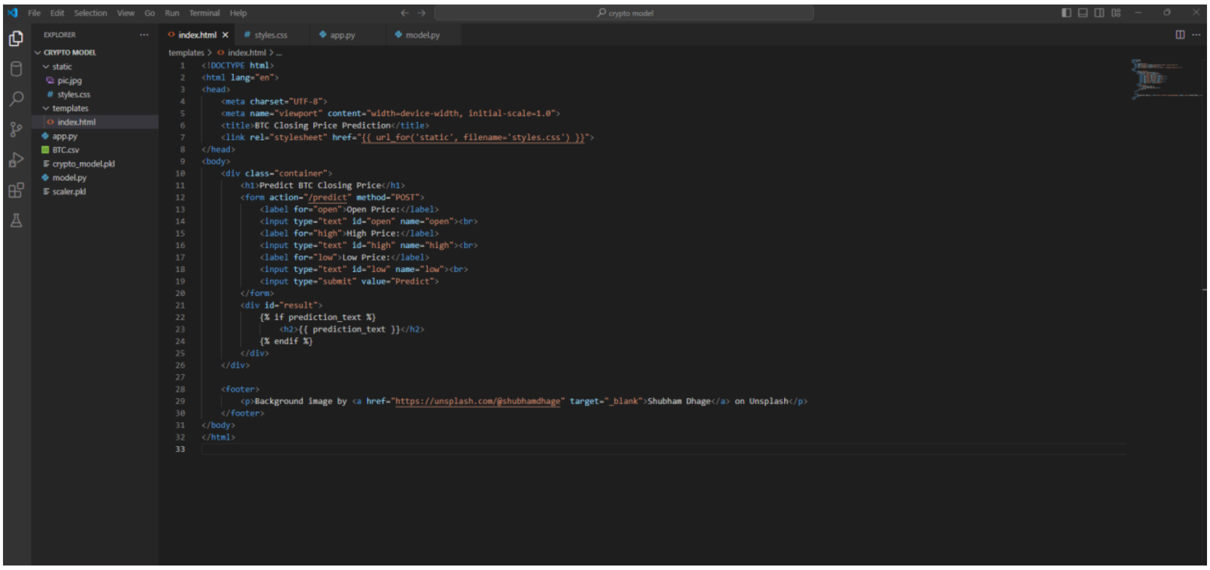
3. Flask App Setup



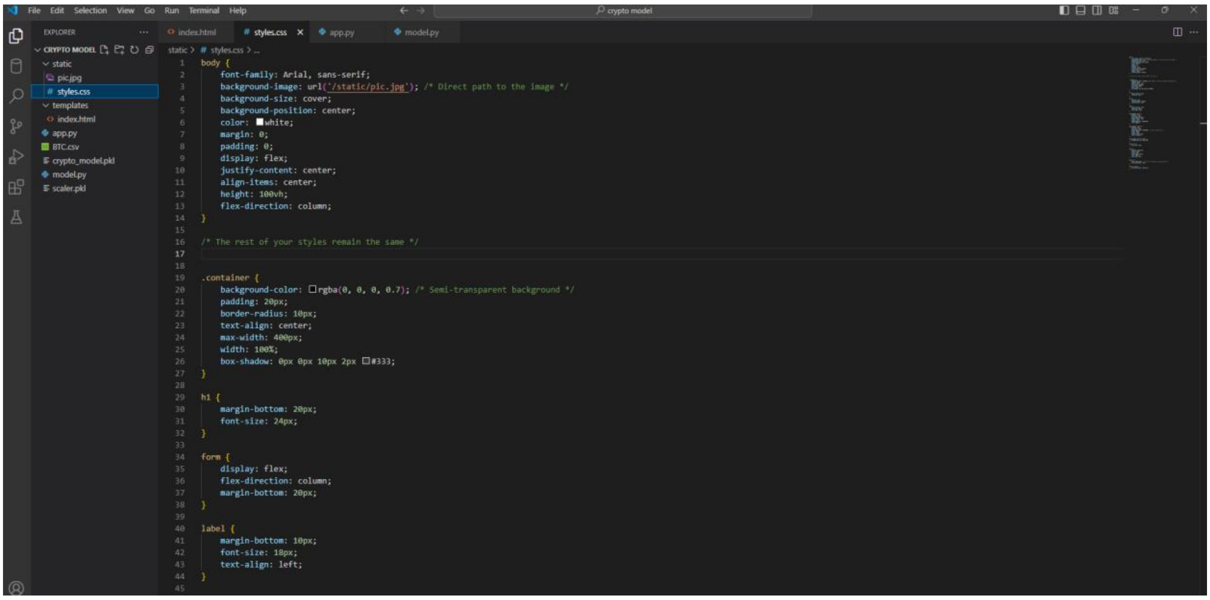
```python
from flask import Flask, request, render_template
import numpy as np
import pickle

app = Flask(__name__)

# Load the trained model and scaler
model = pickle.load(open('crypto_model.pkl', 'rb'))
scaler = pickle.load(open('scaler.pkl', 'rb'))

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

@app.route('/predict', methods=['POST'])
def predict():
    # Get the input features from the form
    int_features = [float(x) for x in request.form.values()]
    final_features = np.array(int_features).reshape(1, -1)

    # Scale the features using the loaded scaler
    final_features_scaled = scaler.transform(final_features)

    # Make the prediction using the loaded model
    prediction = model.predict(final_features_scaled)

    # Round the prediction to 5 decimal places
    output = round(prediction[0], 5)

    return render_template('index.html', prediction_text=f'Predicted BTC closing price is ${output}')

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

- *Description: This shows the Flask application code in app.py.*

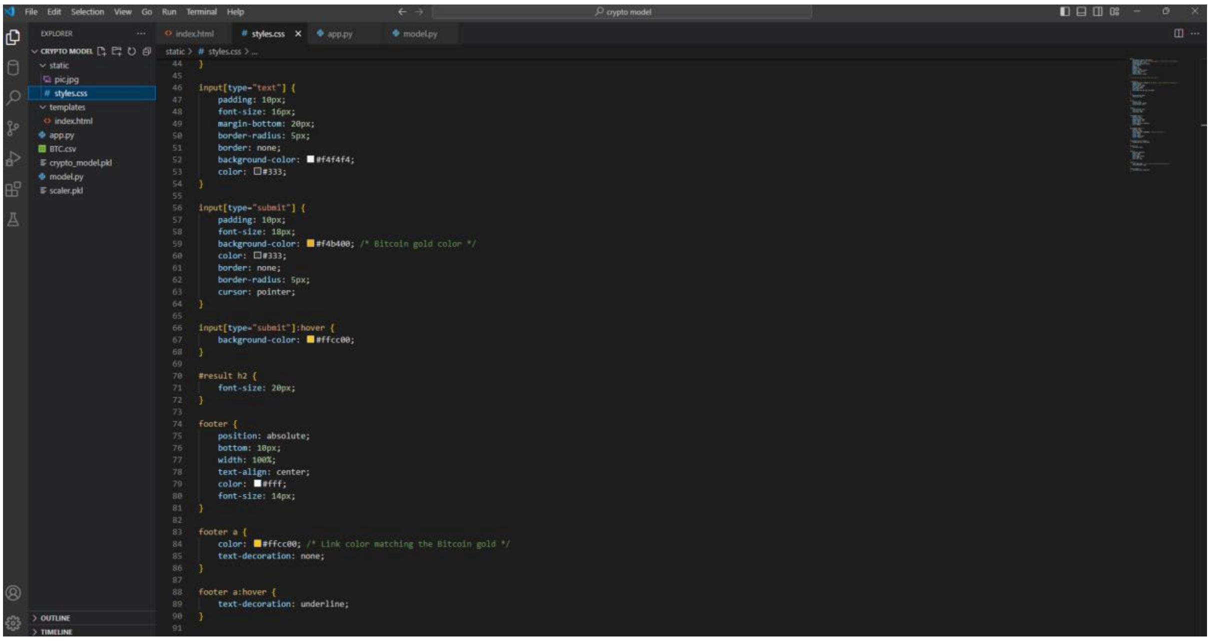
4. HTML and CSS Setup



```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>BTC Closing Price Prediction</title>
    <link rel="stylesheet" href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>
    <div class="container">
        <h1>Predict BTC Closing Price</h1>
        <form action="/predict" method="POST">
            <label for="open">Open Price:</label>
            <input type="text" id="open" name="open"><br>
            <label for="high">High Price:</label>
            <input type="text" id="high" name="high"><br>
            <label for="low">Low Price:</label>
            <input type="text" id="low" name="low"><br>
            <input type="submit" value="Predict">
        </form>
        <div id="result">
            {% if prediction_text %}
                <h2>{{ prediction_text }}</h2>
            {% endif %}
        </div>
    </div>

    <footer>
        <p>Background image by <a href="https://unsplash.com/@shubhamdhage" target="_blank">Shubham Dhage</a> on Unsplash</p>
    </footer>
</body>
</html>
```



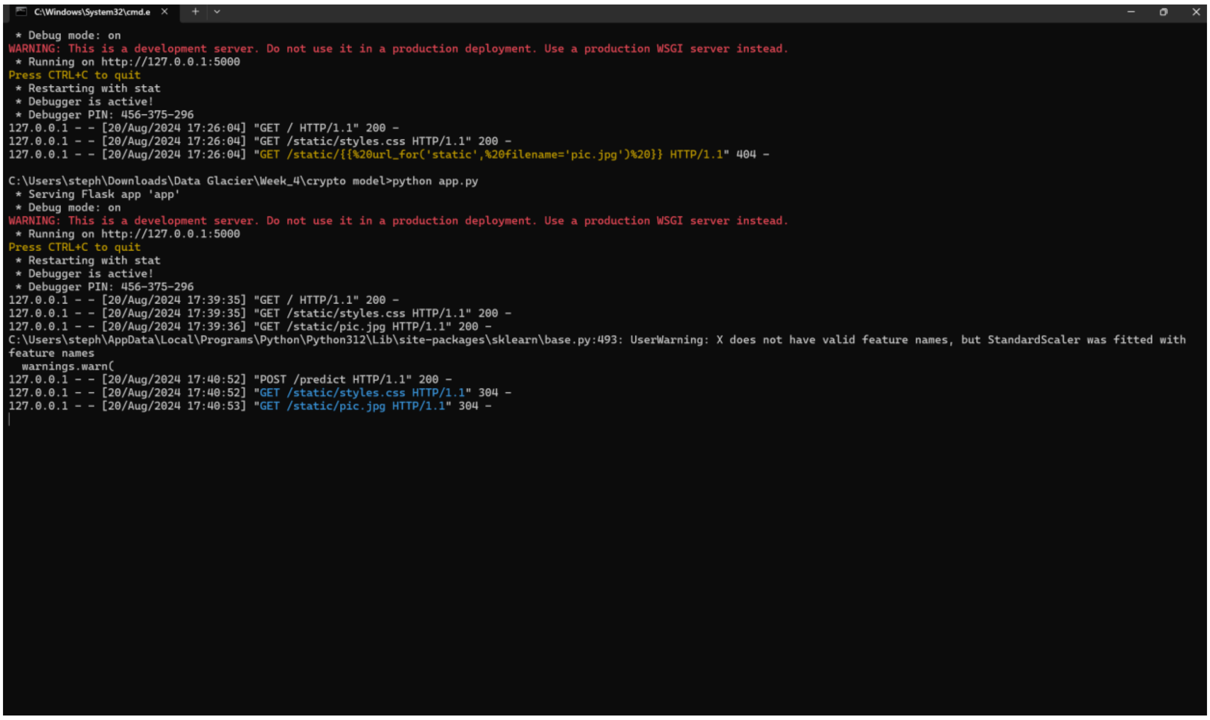
```css
body {
    font-family: Arial, sans-serif;
    background-image: url('/static/pic.jpg'); /* Direct path to the image */
    background-size: cover;
    background-position: center;
    color: white;
    margin: 0;
    padding: 0;
    display: flex;
    justify-content: center;
    align-items: center;
    height: 100vh;
    flex-direction: column;
}

/* The rest of your styles remain the same */


.container {
    background-color: rgba(0, 0, 0, 0.7); /* Semi-transparent background */
    padding: 20px;
    border-radius: 10px;
    text-align: center;
    max-width: 400px;
    width: 100%;
    box-shadow: 0px 0px 10px 2px #333;
}

h1 {
    margin-bottom: 20px;
    font-size: 24px;
}

form {
    display: flex;
    flex-direction: column;
    margin-bottom: 20px;
}

label {
    margin-bottom: 10px;
    font-size: 18px;
    text-align: left;
}

```



```css
}

input[type="text"] {
    padding: 10px;
    font-size: 16px;
    margin-bottom: 20px;
    border-radius: 5px;
    border: none;
    background-color: #f4f4f4;
    color: #333;
}

input[type="submit"] {
    padding: 10px;
    font-size: 18px;
    background-color: #f4b400; /* Bitcoin gold color */
    color: #333;
    border: none;
    border-radius: 5px;
    cursor: pointer;
}

input[type="submit"]:hover {
    background-color: #ffcc00;
}

#result h2 {
    font-size: 20px;
}

footer {
    position: absolute;
    bottom: 10px;
    width: 100%;
    text-align: center;
    color: #fff;
    font-size: 14px;
}

footer a {
    color: #ffcc00; /* Link color matching the Bitcoin gold */
    text-decoration: none;
}

footer a:hover {
    text-decoration: underline;
}

```

- *Description: This shows the structure of the HTML file and the styling applied via CSS.*

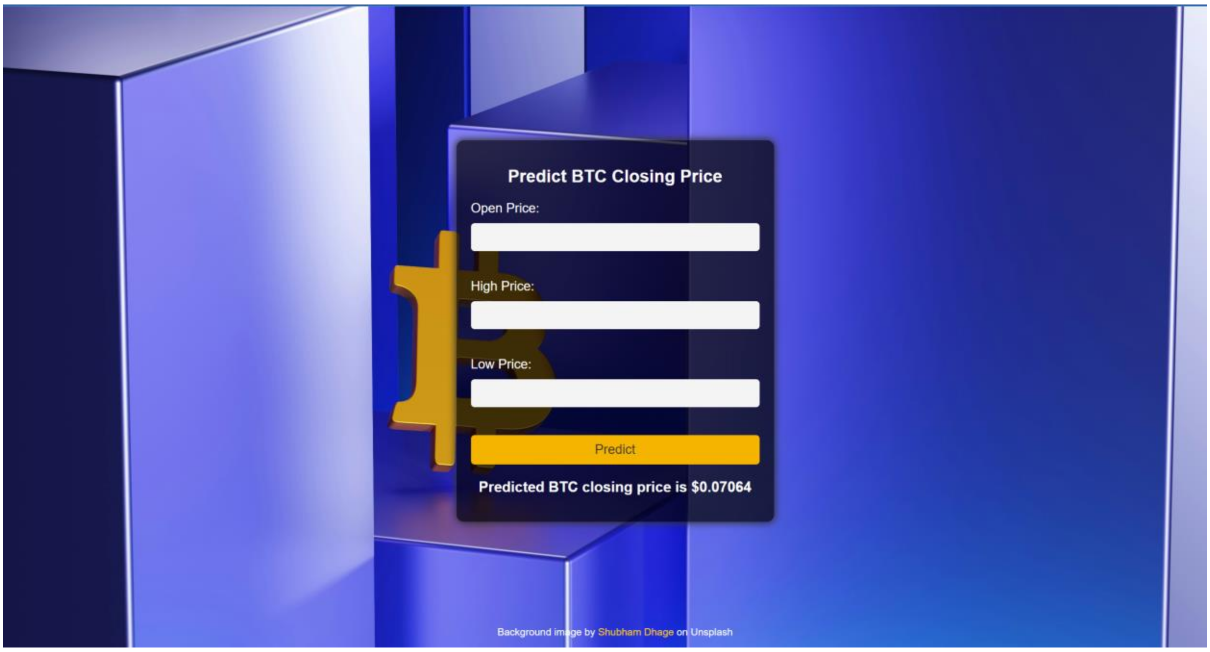
5. Running the Flask App



```
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 456-375-296
127.0.0.1 - - [20/Aug/2024 17:26:04] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [20/Aug/2024 17:26:04] "GET /static/styles.css HTTP/1.1" 200 -
127.0.0.1 - - [20/Aug/2024 17:26:04] "GET /static/{{%20url_for('static',%20filename='pic.jpg')%20}} HTTP/1.1" 404 -

C:\Users\steph\Downloads\Data Glacier\Week_4\crypto model>python app.py
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 456-375-296
127.0.0.1 - - [20/Aug/2024 17:39:35] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [20/Aug/2024 17:39:35] "GET /static/styles.css HTTP/1.1" 200 -
127.0.0.1 - - [20/Aug/2024 17:39:36] "GET /static/pic.jpg HTTP/1.1" 200 -
C:\Users\steph\AppData\Local\Programs\Python\Python312\Lib\site-packages\sklearn\base.py:493: UserWarning: X does not have valid feature names, but StandardScaler was fitted with
feature names
  warnings.warn(
127.0.0.1 - - [20/Aug/2024 17:40:52] "POST /predict HTTP/1.1" 200 -
127.0.0.1 - - [20/Aug/2024 17:40:52] "GET /static/styles.css HTTP/1.1" 304 -
127.0.0.1 - - [20/Aug/2024 17:40:53] "GET /static/pic.jpg HTTP/1.1" 304 -
```

- *Description: This captures the terminal output showing the Flask app running.*

6. Final Webpage



Predict BTC Closing Price

Predicted BTC closing price is $0.07064

Background image by Shubham Dhage on Unsplash

- *Description: This shows the final webpage with the app running in the browser.*