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LISUM11:30
Submission date: 8/4/2022
Submitted to: LISUM11:30

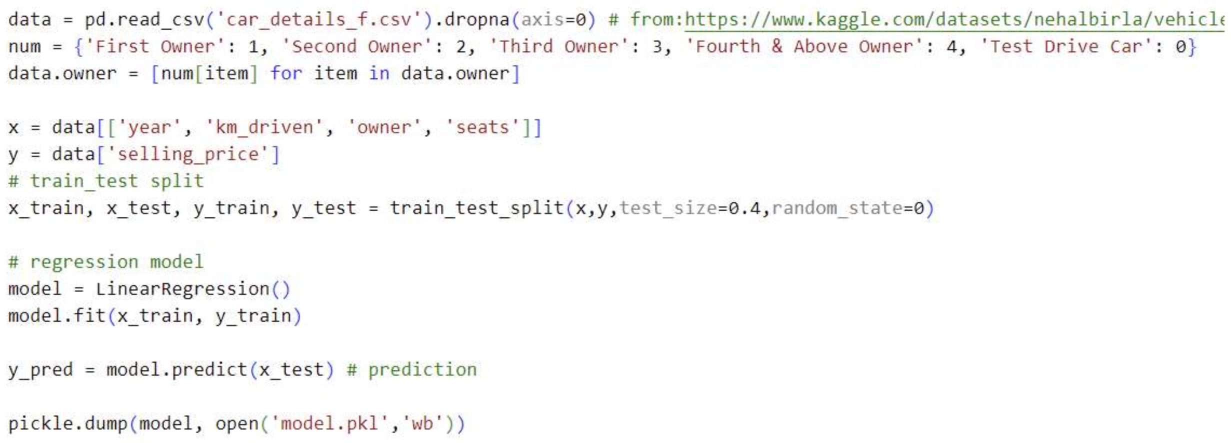
Week4: Deployment on Flask

Data

I used the car_details_v3.csv data downloaded from:
https://www.kaggle.com/datasets/nehalbirla/vehicle-dataset-from-cardekho?select=Car+details+v3.csv
Only used the features: year, selling_price, km_driven, owner, seats
I cleaned up the data by removing all nan rows and converting the number of owners from string to float type.

Model

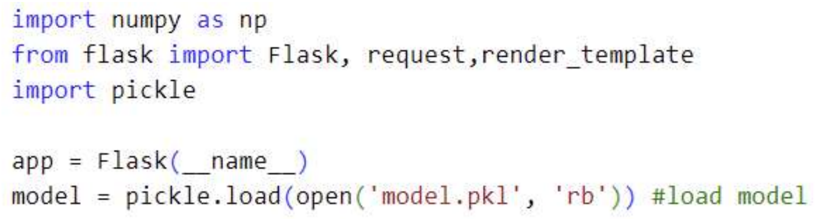
I developed used car price prediction model with car_details_v3 data. I approached with the linear regression model from sckit-learning library. The model splits the data into train and test set and trains itself from the features: year, selling_price, km_driven, owner, seats with the selling_price. I then converted the model to pickle form.
Following is the snapshot of the model-building code



```
data = pd.read_csv('car_details_f.csv').dropna(axis=0) # from:https://www.kaggle.com/datasets/nehalbirla/vehicle
num = {'First Owner': 1, 'Second Owner': 2, 'Third Owner': 3, 'Fourth & Above Owner': 4, 'Test Drive Car': 0}
data.owner = [num[item] for item in data.owner]

x = data[['year', 'km_driven', 'owner', 'seats']]
y = data['selling_price']
# train_test split
x_train, x_test, y_train, y_test = train_test_split(x,y,test_size=0.4,random_state=0)

# regression model
model = LinearRegression()
model.fit(x_train, y_train)

y_pred = model.predict(x_test) # prediction

pickle.dump(model, open('model.pkl','wb'))
```

Deployment

Defining app and loading the regression model developed:



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

app = Flask(__name__)
model = pickle.load(open('model.pkl', 'rb')) #load model
```

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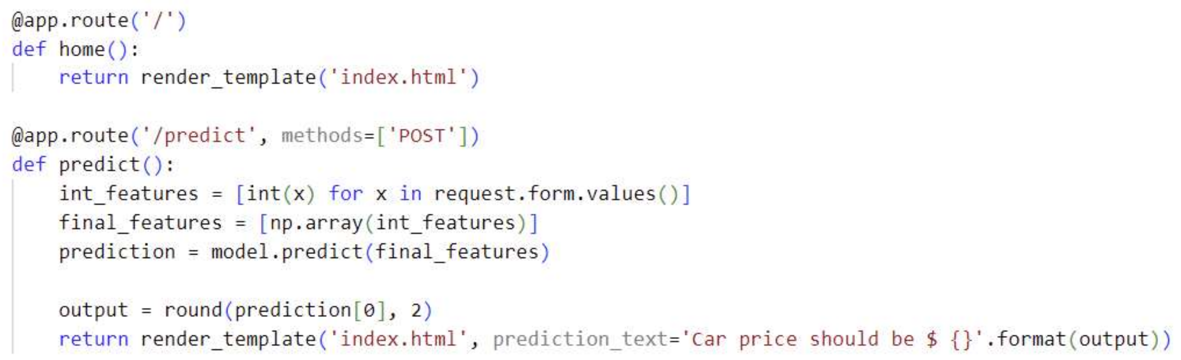
Setting up routes:



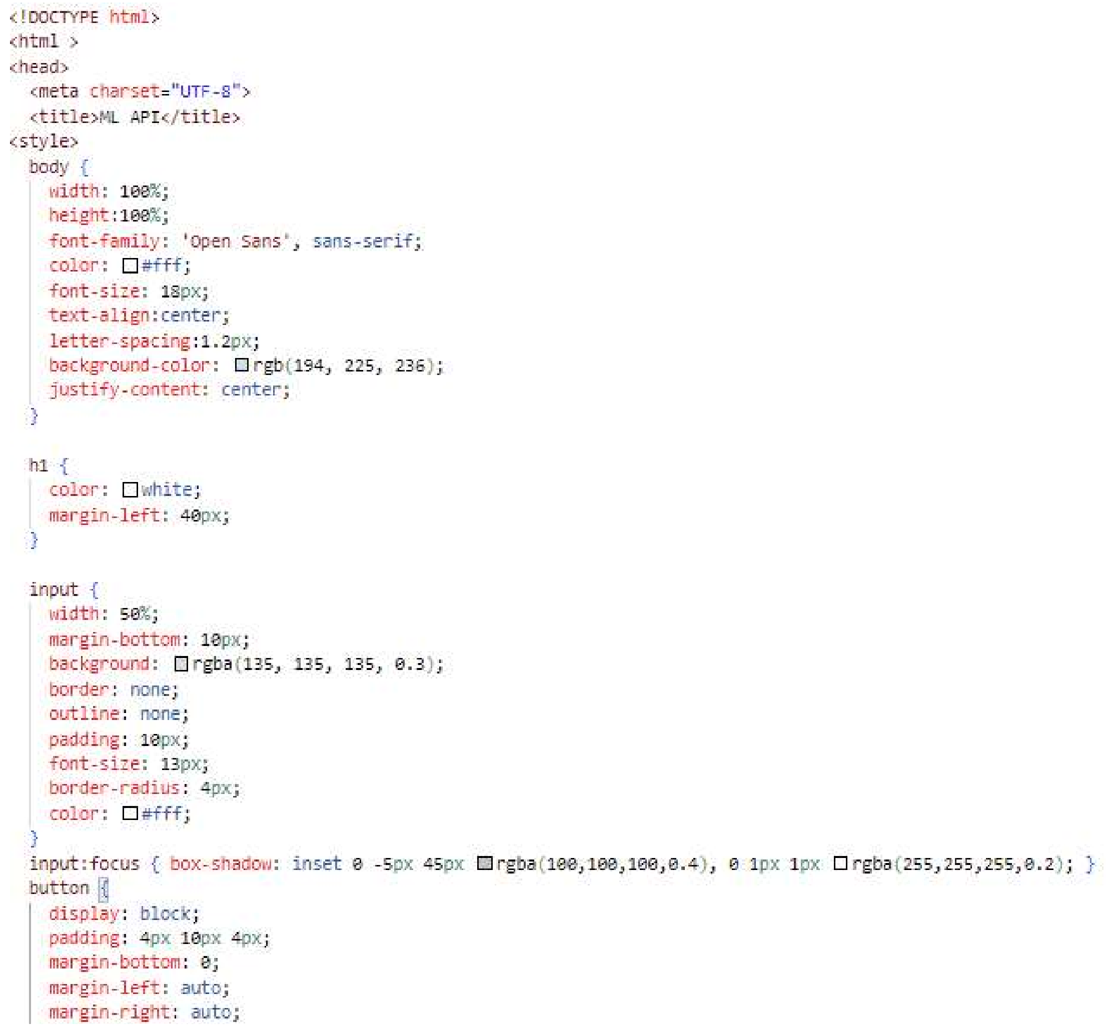
```
@app.route('/')
def home():
    return render_template('index.html')

@app.route('/predict', methods=['POST'])
def predict():
    int_features = [int(x) for x in request.form.values()]
    final_features = [np.array(int_features)]
    prediction = model.predict(final_features)

    output = round(prediction[0], 2)
    return render_template('index.html', prediction_text='Car price should be $ {}'.format(output))
```

Home route uses the index.html template I created. Predict route extracts the features taken via input forms from webapp. The input forms asks for the year purchased, distance travelled, number of owners, and number of seats. Then car price predicted using the model developed and the extracted features.

Index.html:



```
<!DOCTYPE html>
<html >
<head>
  <meta charset="UTF-8">
  <title>ML API</title>
<style>
  body {
    width: 100%;
    height:100%;
    font-family: 'Open Sans', sans-serif;
    color: #fff;
    font-size: 18px;
    text-align:center;
    letter-spacing:1.2px;
    background-color: rgb(194, 225, 236);
    justify-content: center;
  }

  h1 {
    color: white;
    margin-left: 40px;
  }

  input {
    width: 50%;
    margin-bottom: 10px;
    background: rgba(135, 135, 135, 0.3);
    border: none;
    outline: none;
    padding: 10px;
    font-size: 13px;
    border-radius: 4px;
    color: #fff;
  }
  input:focus { box-shadow: inset 0 -5px 45px rgba(100,100,100,0.4), 0 1px 1px rgba(255,255,255,0.2); }
  button {
    display: block;
    padding: 4px 10px 4px;
    margin-bottom: 0;
    margin-left: auto;
    margin-right: auto;
```

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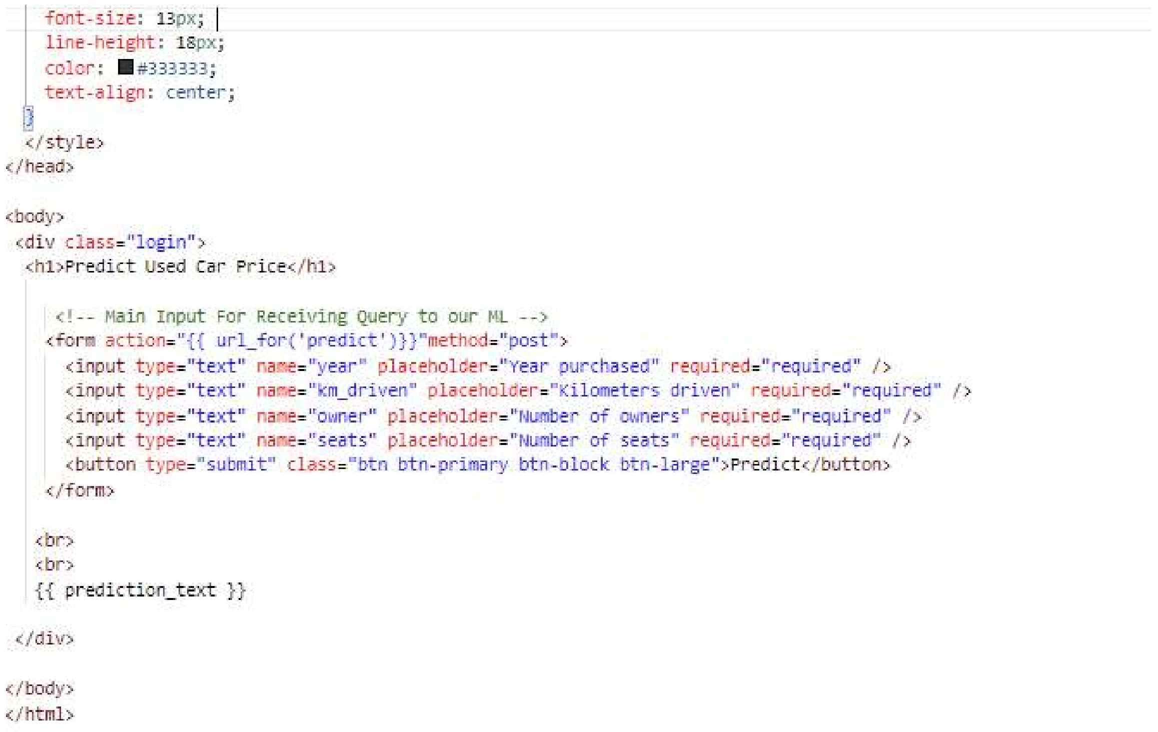

```
    font-size: 13px;
    line-height: 18px;
    color: #333333;
    text-align: center;
  }
  </style>
</head>

<body>
 <div class="login">
  <h1>Predict Used Car Price</h1>

    <!-- Main Input For Receiving Query to our ML -->
    <form action="{{ url_for('predict')}}"method="post">
      <input type="text" name="year" placeholder="Year purchased" required="required" />
      <input type="text" name="km_driven" placeholder="Kilometers driven" required="required" />
      <input type="text" name="owner" placeholder="Number of owners" required="required" />
      <input type="text" name="seats" placeholder="Number of seats" required="required" />
      <button type="submit" class="btn btn-primary btn-block btn-large">Predict</button>
    </form>

   <br>
   <br>
   {{ prediction_text }}

 </div>

</body>
</html>
```