Week 4: Deployment on Flask

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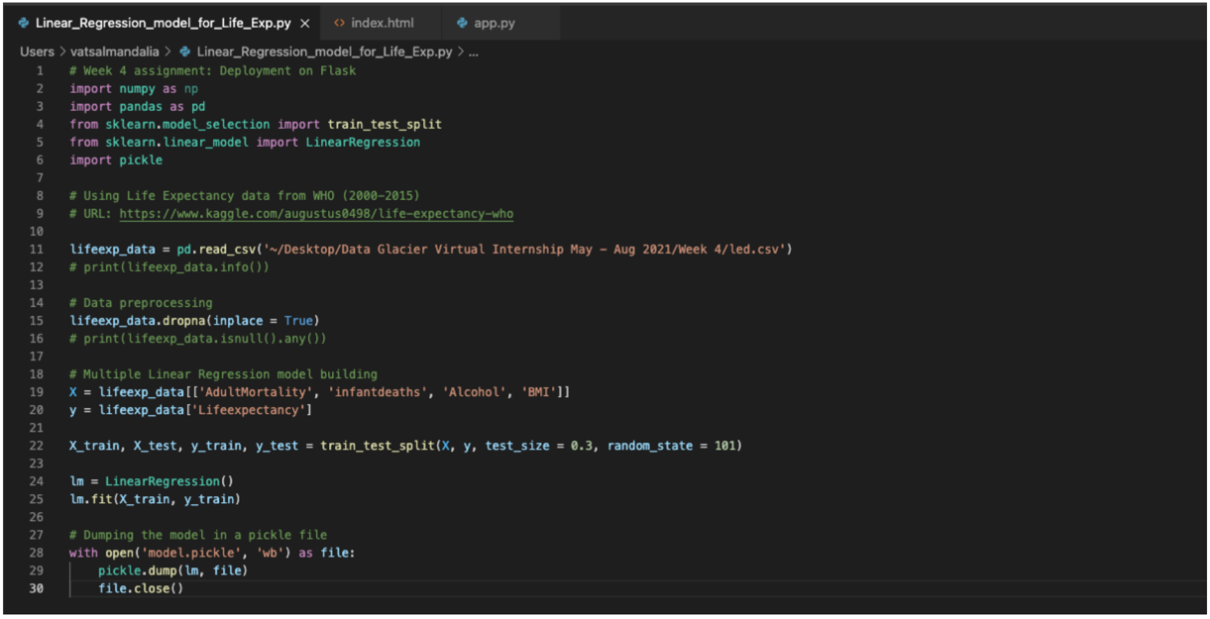
Submission Date: 21/07/2021
Submitted to: Data Glacier Teachers

Steps of Deployment:

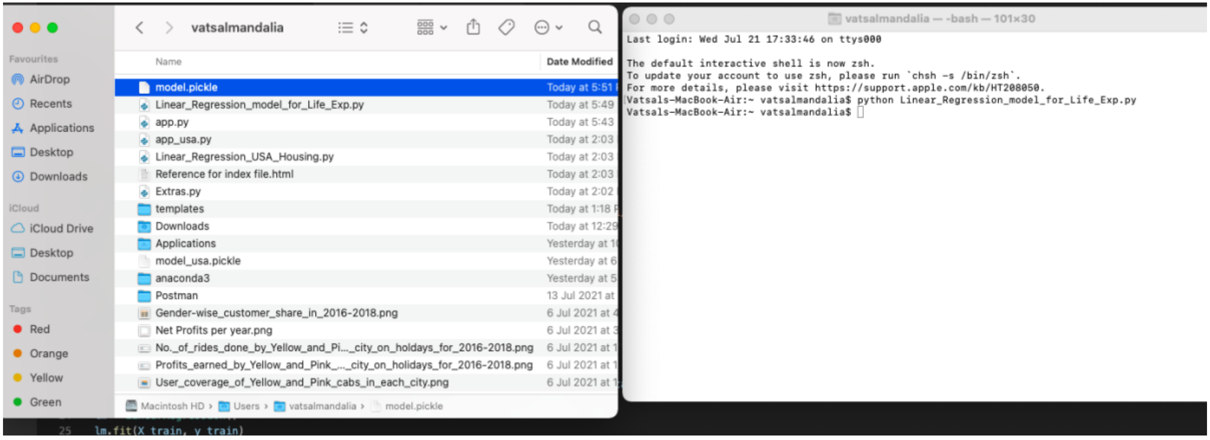
1. Linear Regression Model Building for the Life Expectancy data from WHO


Linear_Regression_model_for_Life_Exp.py
index.html
app.py
Users > vatsalmandalia > Linear_Regression_model_for_Life_Exp.py > ...

```python
# Week 4 assignment: Deployment on Flask
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
import pickle

# Using Life Expectancy data from WHO (2000-2015)
# URL: https://www.kaggle.com/augustus0498/life-expectancy-who

lifeexp_data = pd.read_csv('~/Desktop/Data Glacier Virtual Internship May - Aug 2021/Week 4/led.csv')
# print(lifeexp_data.info())

# Data preprocessing
lifeexp_data.dropna(inplace = True)
# print(lifeexp_data.isnull().any())

# Multiple Linear Regression model building
X = lifeexp_data[['AdultMortality', 'infantdeaths', 'Alcohol', 'BMI']]
y = lifeexp_data['Lifeexpectancy']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.3, random_state = 101)

lm = LinearRegression()
lm.fit(X_train, y_train)

# Dumping the model in a pickle file
with open('model.pickle', 'wb') as file:
    pickle.dump(lm, file)
    file.close()
```

Carried out Linear Regression on Life Expectancy data from WHO. Life Expectancy was the target variable with the 'AdultMortality', 'infantdeaths', 'Alcohol' and 'BMI' being independent variables.

2. Model.pickle file creation

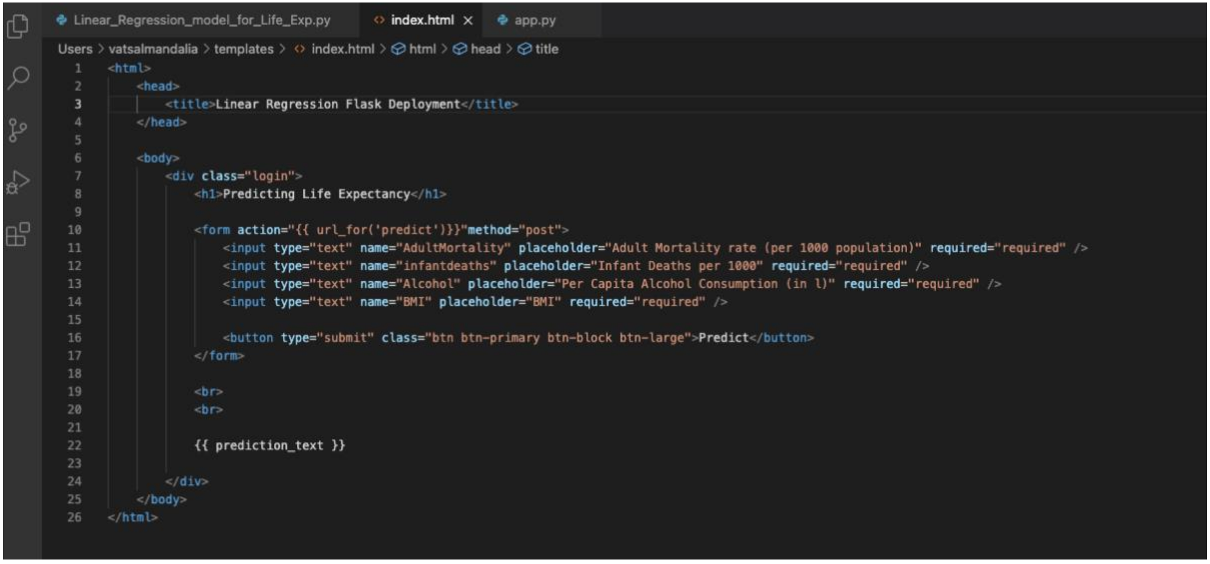


Name	Date Modified
model.pickle	Today at 5:51
Linear_Regression_model_for_Life_Exp.py	Today at 5:49
app.py	Today at 5:43
app_usa.py	Today at 2:03
Linear_Regression_USA_Housing.py	Today at 2:03
Reference for index file.html	Today at 2:03
Extras.py	Today at 2:02
templates	Today at 1:18 F
Downloads	Today at 12:29
Applications	Yesterday at 1
model_usa.pickle	Yesterday at 6
anaconda3	Yesterday at 5
Postman	13 Jul 2021 at
Gender-wise_customer_share_in_2016-2018.png	6 Jul 2021 at 4
Net Profits per year.png	6 Jul 2021 at 3
No._of_rides_done_by_Yellow_and_Pi..._city_on_holdays_for_2016-2018.png	6 Jul 2021 at 1
Profits_earned_by_Yellow_and_Pink_..._city_on_holidays_for_2016-2018.png	6 Jul 2021 at 1
User_coverage_of_Yellow_and_Pink_cabs_in_each_city.png	6 Jul 2021 at 1

```
Last login: Wed Jul 21 17:33:46 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
Vatsals-MacBook-Air:~ vatsalmandalia$ python Linear_Regression_model_for_Life_Exp.py
Vatsals-MacBook-Air:~ vatsalmandalia$ 
```

Creation of the model.pickle file.

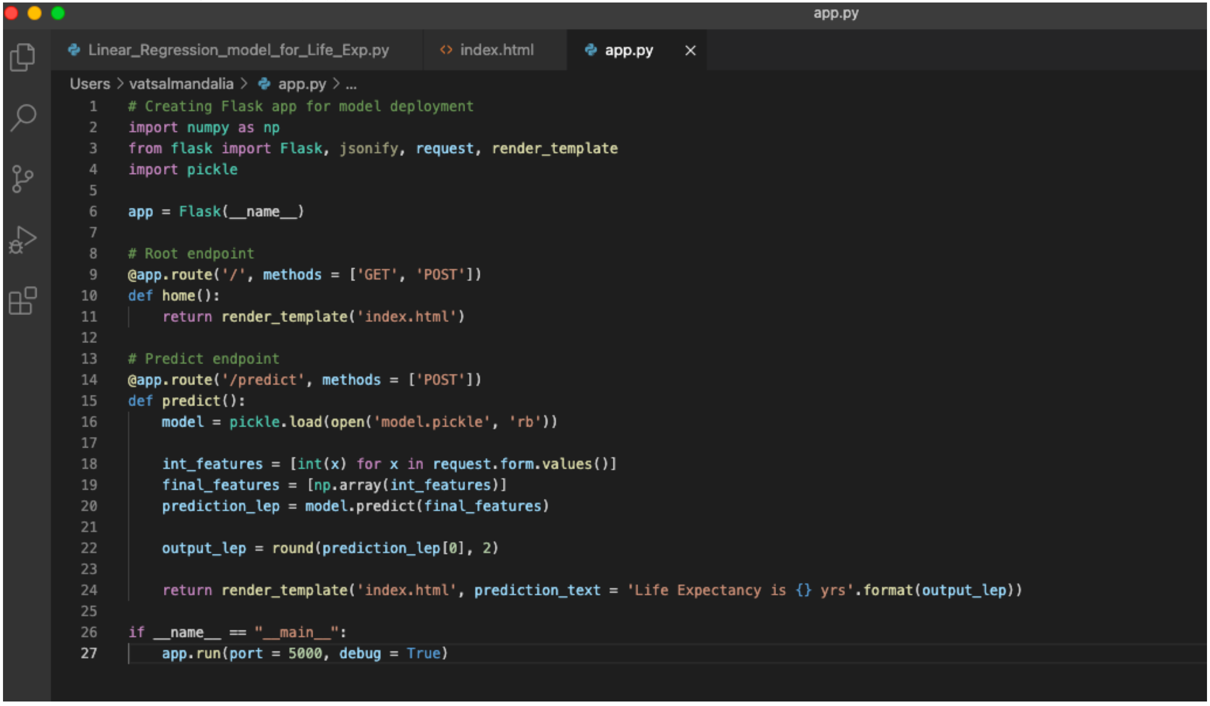
3. Creating index.html for allowing user to enter the values for the features


Linear_Regression_model_for_Life_Exp.py
index.html
app.py
Users > vatsalmandalia > templates > index.html > html > head > title

```html
<html>
    <head>
        <title>Linear Regression Flask Deployment</title>
    </head>

    <body>
        <div class="login">
            <h1>Predicting Life Expectancy</h1>

            <form action="{{ url_for('predict')}}"method="post">
                <input type="text" name="AdultMortality" placeholder="Adult Mortality rate (per 1000 population)" required="required" />
                <input type="text" name="infantdeaths" placeholder="Infant Deaths per 1000" required="required" />
                <input type="text" name="Alcohol" placeholder="Per Capita Alcohol Consumption (in l)" required="required" />
                <input type="text" name="BMI" placeholder="BMI" required="required" />

                <button type="submit" class="btn btn-primary btn-block btn-large">Predict</button>
            </form>

            <br>
            <br>

            {{ prediction_text }}

        </div>
    </body>
</html>
```

The index.html allows the user to input values for the feature variables.

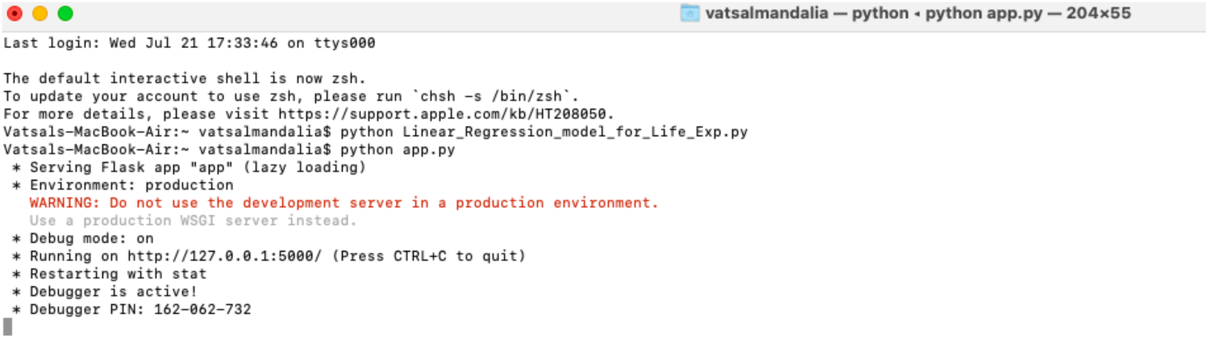
4. Creating the app.py file


app.py
Linear_Regression_model_for_Life_Exp.py
index.html
app.py
Users > vatsalmandalia > app.py > ...

```python
# Creating Flask app for model deployment
import numpy as np
from flask import Flask, jsonify, request, render_template
import pickle

app = Flask(__name__)

# Root endpoint
@app.route('/', methods = ['GET', 'POST'])
def home():
    return render_template('index.html')

# Predict endpoint
@app.route('/predict', methods = ['POST'])
def predict():
    model = pickle.load(open('model.pickle', 'rb'))

    int_features = [int(x) for x in request.form.values()]
    final_features = [np.array(int_features)]
    prediction_lep = model.predict(final_features)

    output_lep = round(prediction_lep[0], 2)

    return render_template('index.html', prediction_text = 'Life Expectancy is {} yrs'.format(output_lep))

if __name__ == "__main__":
    app.run(port = 5000, debug = True)
```

App.py contains the code for model deployment through a flask application.

5. Running the app.py file on terminal



```
Last login: Wed Jul 21 17:33:46 on ttys000

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For more details, please visit https://support.apple.com/kb/HT208050.
Vatsals-MacBook-Air:~ vatsalmandalia$ python Linear_Regression_model_for_Life_Exp.py
Vatsals-MacBook-Air:~ vatsalmandalia$ python app.py
 * Serving Flask app "app" (lazy loading)
 * Environment: production
   WARNING: Do not use the development server in a production environment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 162-062-732
```
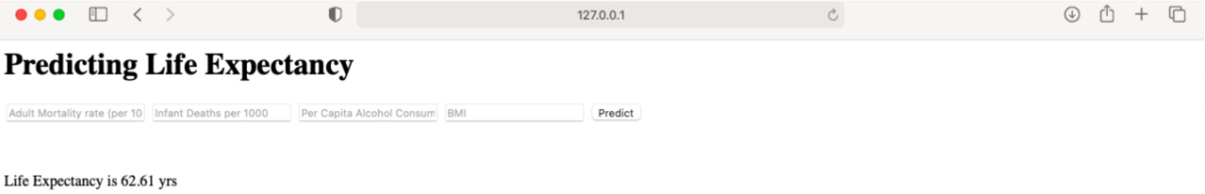

The app.py file is executed on the terminal.

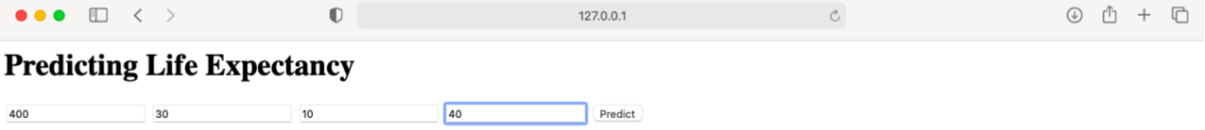
6. Posting the url of the local server on Safari



Predicting Life Expectancy

Adult Mortality rate (per 10 | Infant Deaths per 1000 | Per Capita Alcohol Consum | BMI | Predict

Life Expectancy is 62.61 yrs

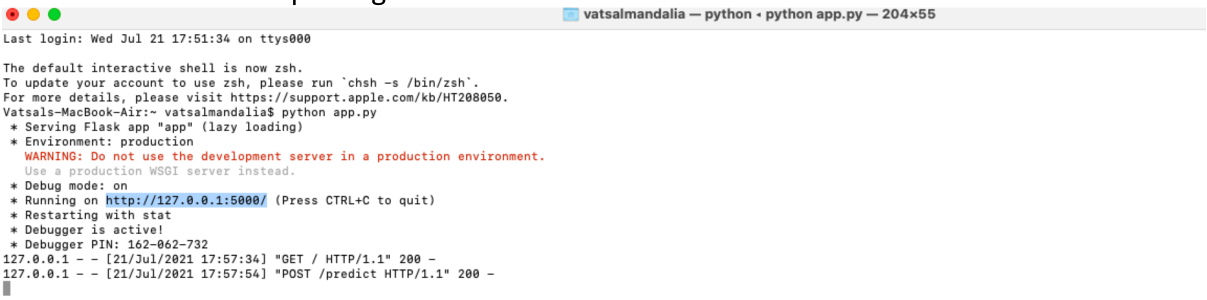


Predicting Life Expectancy

400 | 30 | 10 | 40 | Predict

User allowed put in inputs for the five features and the predicted Life Expectancy is returned as output.

7. Terminal after posting the url on Safari



```
Last login: Wed Jul 21 17:51:34 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
Vatsals-MacBook-Air:~ vatsalmandalia$ python app.py
 * Serving Flask app "app" (lazy loading)
 * Environment: production
   WARNING: Do not use the development server in a production environment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 162-062-732
127.0.0.1 - - [21/Jul/2021 17:57:34] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [21/Jul/2021 17:57:54] "POST /predict HTTP/1.1" 200 -
```