Deployment using Flask

Name: Jeffery Su
Batch Code: LISUM11:30
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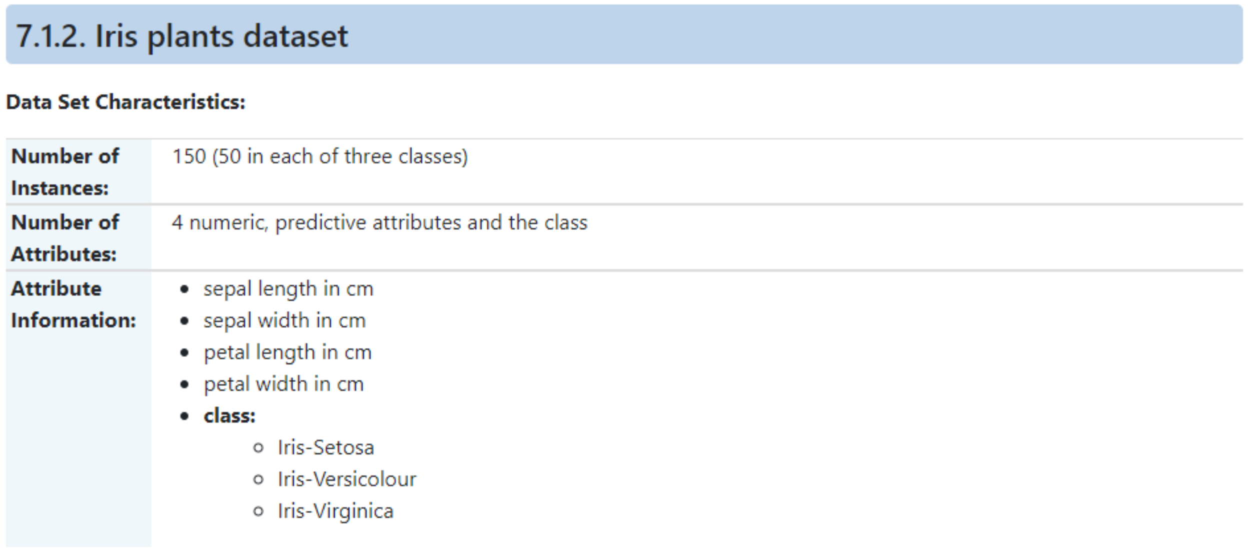
Selecting Toy Data

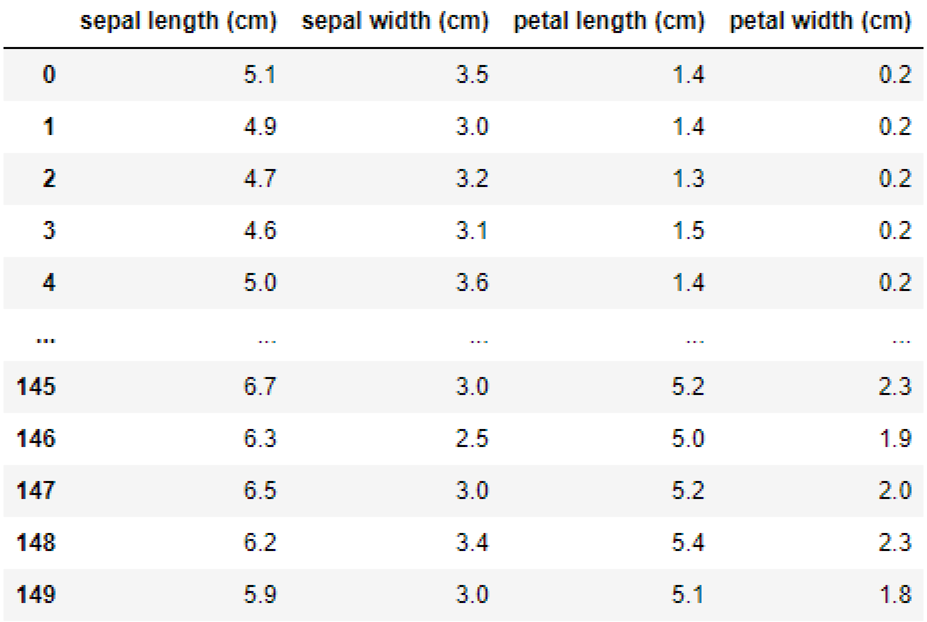


7.1.2. Iris plants dataset

Data Set Characteristics:

Number of Instances:	150 (50 in each of three classes)
Number of Attributes:	4 numeric, predictive attributes and the class
Attribute Information:	- sepal length in cm - sepal width in cm - petal length in cm - petal width in cm - **class:** ○ Iris-Setosa ○ Iris-Versicolour ○ Iris-Virginica

The toy data I'm going to use is dataset of Iris plants from scikit-learn. The dataset have 150 instances and 4 attributes (sepal length, sepal width, petal length, and petal width).



	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)
0	5.1	3.5	1.4	0.2
1	4.9	3.0	1.4	0.2
2	4.7	3.2	1.3	0.2
3	4.6	3.1	1.5	0.2
4	5.0	3.6	1.4	0.2
...	...	...	...	...
145	6.7	3.0	5.2	2.3
146	6.3	2.5	5.0	1.9
147	6.5	3.0	5.2	2.0
148	6.2	3.4	5.4	2.3
149	5.9	3.0	5.1	1.8

Model Development

Im going to create a model that uses sepal length, sepal width and petal width to predict the petal length.

First I’m using Jupyter notebook to create the model

In [4]:

```
# sepal length, sepal width and petal width
X = df.iloc[:, [0,1,3]]
# petal length
Y = df.iloc[:, [2]]
# spliting the data
xtrain, xtest, ytrain, ytest = train_test_split(X, Y, test_size = 0.2, random_state = 0)
```

In [5]:

```
# building model
regressor = LinearRegression()
regressor.fit(xtrain, ytrain)
```

Out[5]:

```
LinearRegression()
```

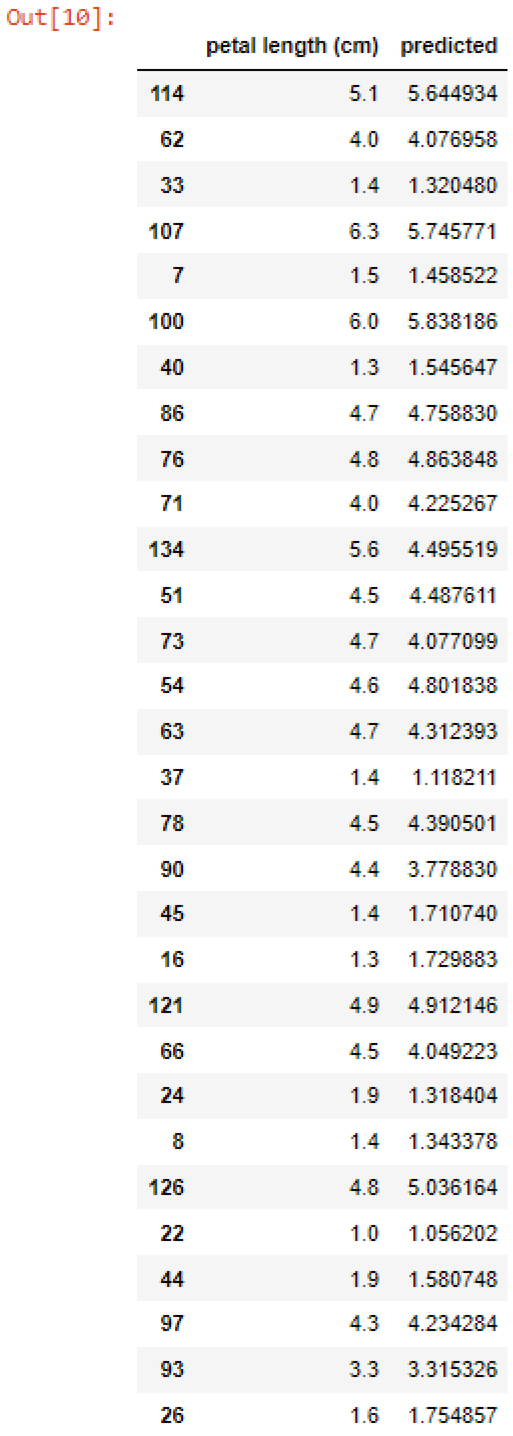
In [6]:

```
print('The intercept is {} and the coef are {}'.format(regressor.intercept_, regressor.coef_))
```

```
The intercept is [-0.26533136] and the coef are [[ 0.7005897  -0.61042077  1.48167646]]
```

In [7]:

```
ypred = regressor.predict(xtest).tolist()
ypred_ = [val for sublist in ypred for val in sublist]


ytest['predicted'] = ypred_
ytest
```

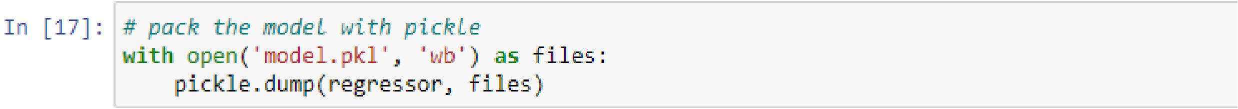


Out[10]:

	petal length (cm)	predicted
114	5.1	5.644934
62	4.0	4.076958
33	1.4	1.320480
107	6.3	5.745771
7	1.5	1.458522
100	6.0	5.838186
40	1.3	1.545647
86	4.7	4.758830
76	4.8	4.863848
71	4.0	4.225267
134	5.6	4.495519
51	4.5	4.487611
73	4.7	4.077099
54	4.6	4.801838
63	4.7	4.312393
37	1.4	1.118211
78	4.5	4.390501
90	4.4	3.778830
45	1.4	1.710740
16	1.3	1.729883
121	4.9	4.912146
66	4.5	4.049223
24	1.9	1.318404
8	1.4	1.343378
126	4.8	5.036164
22	1.0	1.056202
44	1.9	1.580748
97	4.3	4.234284
93	3.3	3.315326
26	1.6	1.754857

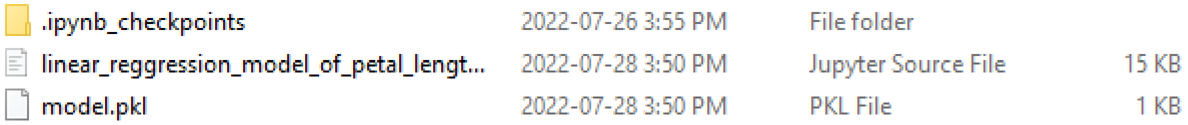
I see the predicted petal length is pretty similar to the actual petal length, so I know the model is correct.

Then I’m going to pack the model with pickle



```
In [17]: # pack the model with pickle
         with open('model.pkl', 'wb') as files:
             pickle.dump(regressor, files)
```

Now there is a file with the model call model.pkl

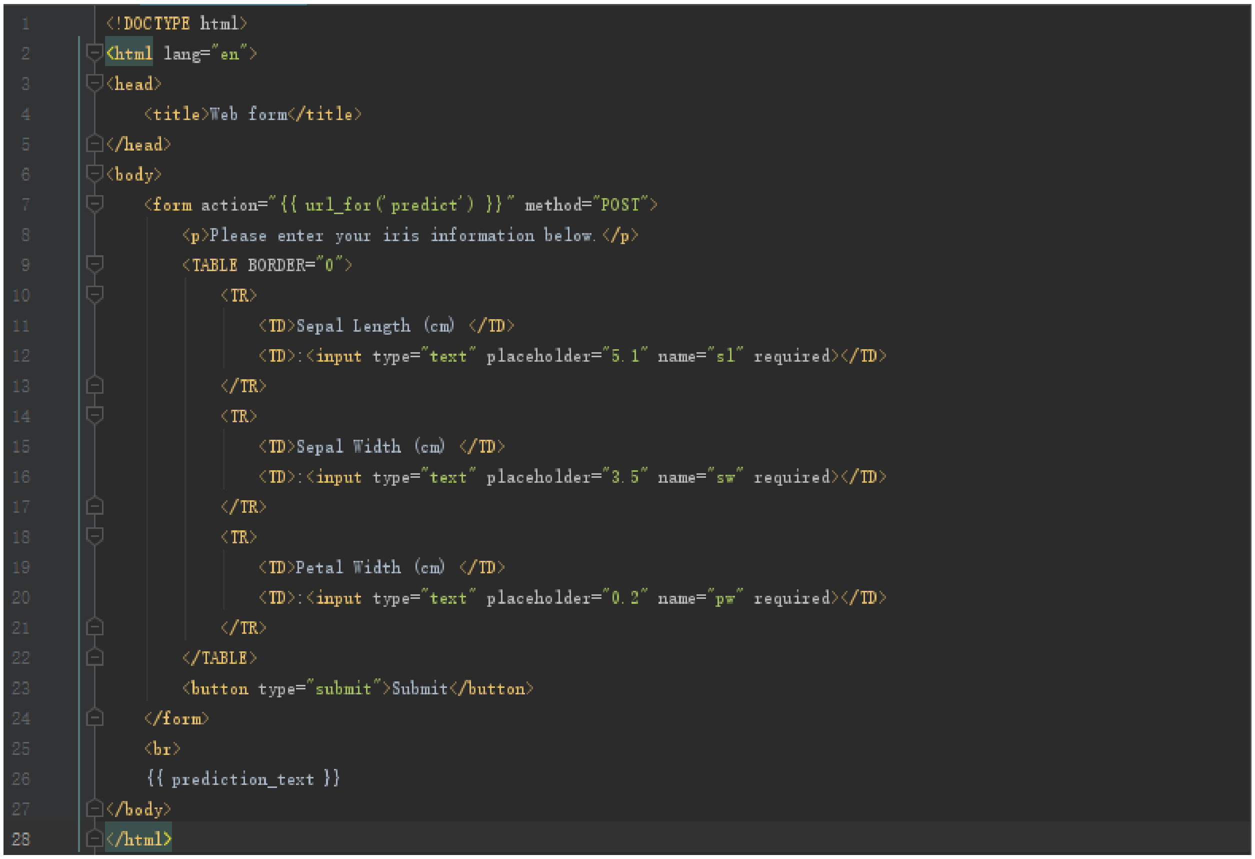


.ipynb_checkpoints	2022-07-26 3:55 PM	File folder	
linear_reggression_model_of_petal_lengt...	2022-07-28 3:50 PM	Jupyter Source File	15 KB
model.pkl	2022-07-28 3:50 PM	PKL File	1 KB

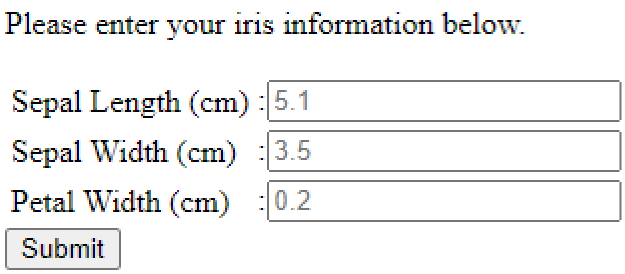
Deployment on Flask

I'm using pycharm to code flask.

First I need to build a website with html. It's just a very simple website with 3 text box and a submit button.



```
<!DOCTYPE html>
<html lang="en">
<head>
    <title>Web form</title>
</head>
<body>
    <form action="{{ url_for('predict') }}" method="POST">
        <p>Please enter your iris information below.</p>
        <TABLE BORDER="0">
            <TR>
                <TD>Sepal Length (cm) </TD>
                <TD>:<input type="text" placeholder="5.1" name="sl" required></TD>
            </TR>
            <TR>
                <TD>Sepal Width (cm) </TD>
                <TD>:<input type="text" placeholder="3.5" name="sw" required></TD>
            </TR>
            <TR>
                <TD>Petal Width (cm) </TD>
                <TD>:<input type="text" placeholder="0.2" name="pw" required></TD>
            </TR>
        </TABLE>
        <button type="submit">Submit</button>
    </form>
    <br>
    {{ prediction_text }}
</body>
</html>
```



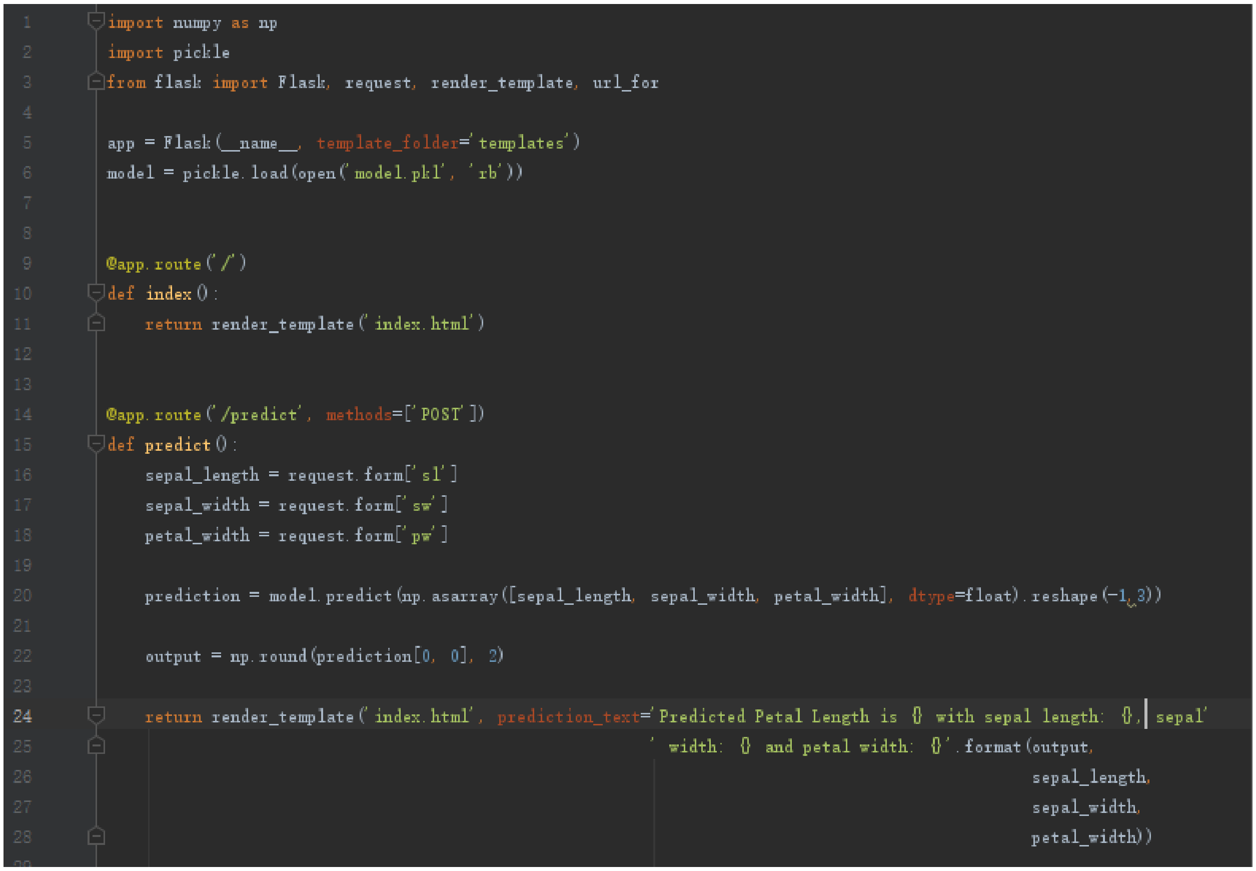
Please enter your iris information below.

Sepal Length (cm) : 5.1

Sepal Width (cm) : 3.5

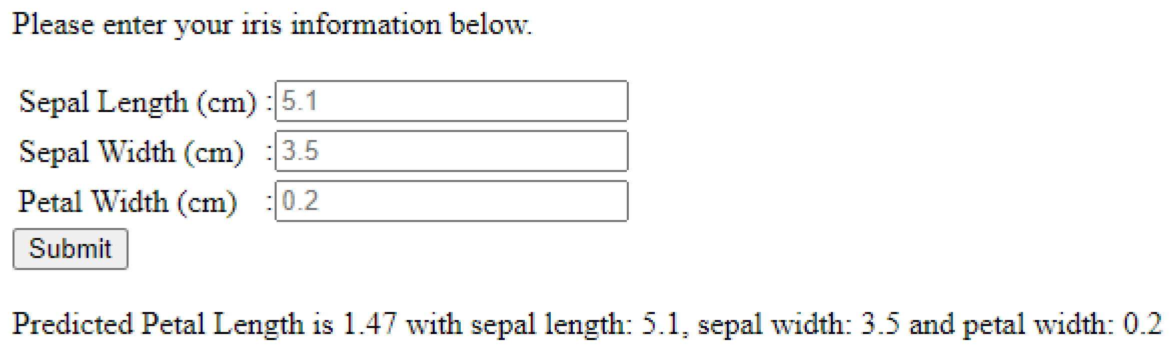
Petal Width (cm) : 0.2

Now its time for flask.



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

app = Flask(__name__, template_folder='templates')
model = pickle.load(open('model.pkl', 'rb'))


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


@app.route('/predict', methods=['POST'])
def predict():
    sepal_length = request.form['sl']
    sepal_width = request.form['sw']
    petal_width = request.form['pw']

    prediction = model.predict(np.asarray([sepal_length, sepal_width, petal_width], dtype=float).reshape(-1,3))

    output = np.round(prediction[0, 0], 2)

    return render_template('index.html', prediction_text='Predicted Petal Length is {} with sepal length: {}, sepal'
                                                        ' width: {} and petal width: {}'.format(output,
                                                                                                sepal_length,
                                                                                                sepal_width,
                                                                                                petal_width))
```

Here is a test run:



Please enter your iris information below.

Sepal Length (cm) : 5.1

Sepal Width (cm) : 3.5

Petal Width (cm) : 0.2

Predicted Petal Length is 1.47 with sepal length: 5.1, sepal width: 3.5 and petal width: 0.2

The flask server is up and can be access at http://127.0.0.1:5000/.