Chapter 2: Tensorflow

Ex3: Multiple Linear Regression

- Hãy áp dụng Tensor Flow - Multiple Linear Regression để xây dựng model dự đoán petalwidth từ sepallength, sepalwidth, petallength
- Nếu sepallength, sepalwidth, petallength là 4.5, 3.1, 1.6 => petalwidth là bao nhiêu?

In [1]:
```
# from google.colab import drive
# drive.mount("/content/gdrive", force_remount=True)
```

In [2]:
```
# %cd '/content/gdrive/My Drive/LDS8_DeepLearning/Practice/Chapter2/'
```

In [3]:
```
import tensorflow as tf
print(tf.__version__)
```

```
2.5.0
```

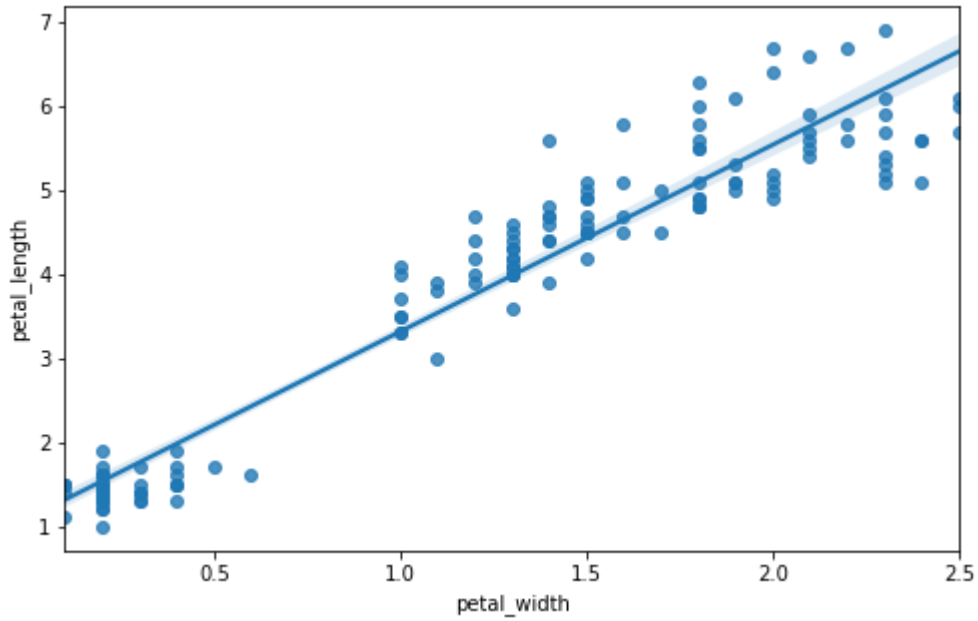
In [4]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [5]:
```
# Load dataset
data = pd.read_csv('iris.csv')
data.head()
```

Out[5]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa

In [6]:
```
plt.figure(figsize=(8,5))
sns.regplot(data = data, x="petal_width", y="petal_length")
plt.show()
```



In [7]:
```
# Define the targets and features
sepal_length = np.array(data.sepal_length, np.float32)
sepal_width = np.array(data.sepal_width, np.float32)
petal_length = np.array(data.petal_length, np.float32)
features = np.array([sepal_length, sepal_width, petal_length]) # features

petal_width = np.array(data.petal_width, np.float32) # targets

# Define the intercept and slope
intercept = tf.Variable(0.1, np.float32)
slope = tf.Variable([0.1, 0.1, 0.1], np.float32)
```

In [8]:
```
# Define a linear regression model
def linear_regression(intercept, slope, features):
    return intercept + slope[0] * features[0] + slope[1] * features[1] + slope[2
```

In [9]:
```
# Compute the predicted values and loss
def loss_function(intercept, slope, targets, features):
    predictions = linear_regression(intercept, slope, features)
    return tf.keras.losses.mse(targets, predictions)
```

In [10]:
```
# Define an optimization operation
opt = tf.keras.optimizers.Adam()
```

In [11]:
```
# Minimize the loss function and print the loss
for j in range(10000):
    opt.minimize(lambda: loss_function(intercept, slope, petal_width, features),
                 var_list=[intercept, slope])
  # print(loss_function(intercept, slope))
```

In [12]:
```
# MSE
tf.print(loss_function(intercept, slope, petal_width, features))
```

```
0.0358411074
```

In [13]:
```
# Print the trained parameters
print(intercept.numpy(), slope.numpy())
```

```
-0.24872363 [-0.21027136  0.22877719  0.52608824]
```

In [14]:
```
# sepallength, sepalwidth, petallength là 4.5, 3.1, 1.6
x_new = [4.5, 3.1, 1.6]
y_new = linear_regression(intercept, slope, features = x_new)
tf.print(y_new)
```

```
0.356005728
```