

# Logistic Regression

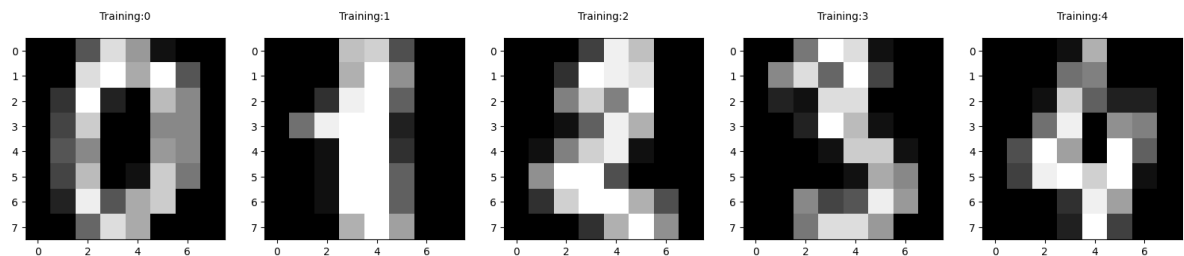
```
In [5]: import re
from sklearn.datasets import load_digits
from sklearn.model_selection import train_test_split
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn import metrics

%matplotlib inline
digits=load_digits()
```

```
In [6]: print("Image Data Shape",digits.data.shape)
print("Label Data Shape",digits.target.shape)
```

Image Data Shape (1797, 64)  
Label Data Shape (1797,)

```
In [7]: plt.figure(figsize=(20,4))
for index,(image,label)in enumerate(zip(digits.data[0:5],digits.target[0:5])):
    plt.subplot(1,5,index+1)
    plt.imshow(np.reshape(image,(8,8)),cmap=plt.cm.gray)
    plt.title('Training:%i\n'%label,fontsize=10)
```



```
In [8]: from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(digits.data,digits.target,test_
```

```
In [9]: print(x_train.shape)
```

(1257, 64)

```
In [10]: print(y_train.shape)
```

(1257,)

```
In [11]: print(x_test.shape)
```

(540, 64)

```
In [12]: print(y_test.shape)
```

```
(540,)
```

```
In [13]: from sklearn.linear_model import LogisticRegression
```

```
In [14]: logisticRegr=LogisticRegression(max_iter=10000)
logisticRegr.fit(x_train,y_train)
```

```
Out[14]: LogisticRegression(max_iter=10000)
```

**In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.**

**On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.**

```
In [15]: print(logisticRegr.predict(x_test))
```

```
[4 0 9 1 8 7 1 5 1 6 6 7 6 1 5 5 8 6 2 7 4 6 4 1 5 2 9 5 4 6 5 6 3 4 0 9 9
 8 4 6 8 8 5 7 9 8 9 6 1 7 0 1 9 7 3 3 1 8 8 8 9 8 5 8 4 9 3 5 8 4 3 1 3 8
 7 3 3 0 8 7 2 8 5 3 8 7 6 4 6 2 2 0 1 1 5 3 5 7 1 8 2 2 6 4 6 7 3 7 3 9 4
 7 0 3 5 4 5 0 3 9 2 7 3 2 0 8 1 9 2 1 5 1 0 3 4 3 0 8 3 2 2 7 3 1 6 7 2 8
 3 1 1 6 4 8 2 1 8 4 1 3 1 1 9 5 4 8 7 4 8 9 5 7 6 9 4 0 4 0 0 9 0 6 5 8 8
 3 7 9 2 0 8 2 7 3 0 2 1 9 2 7 0 6 9 3 1 1 3 5 2 5 5 2 1 2 9 4 6 5 5 5 9 7
 1 5 9 6 3 7 1 7 5 1 7 2 7 5 5 4 8 6 6 2 8 7 3 7 8 0 9 5 7 4 3 4 1 0 3 3 5
 4 1 3 1 2 5 1 4 0 3 1 5 5 7 4 0 1 0 9 5 5 5 4 0 1 8 6 2 1 1 1 7 9 6 7 9 7
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 6 9 7 2 8 5 1 2 4 1 8 8 7 6 0 8 0 6 1 5 7 8 0 4 1 4 5 9 2 2 3 9 1 3 9 3 2
 8 0 6 5 6 2 5 2 3 2 6 1 0 7 6 0 6 2 7 0 3 2 4 2 3 6 9 7 7 0 3 5 4 1 2 2 1
 2 7 7 0 4 9 8 5 6 1 6 5 2 0 8 2 4 3 3 2 9 3 8 9 9 5 9 0 3 4 7 9 8 5 7 5 0
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 3 3 4 8 6 9 6 3 3 0 5 7 8 9 1 5 3 2 5 1 7 6 0 6 9 5 2 4 4 7 2 0 5 6 2 0 8
 4 4 4 7 1 0 4 1 9 2 1 3 0 5 3 9 8 2 6 0 0 4]
```

```
In [16]: print(logisticRegr.predict(x_test))
```

```
[4 0 9 1 8 7 1 5 1 6 6 7 6 1 5 5 8 6 2 7 4 6 4 1 5 2 9 5 4 6 5 6 3 4 0 9 9
 8 4 6 8 8 5 7 9 8 9 6 1 7 0 1 9 7 3 3 1 8 8 8 9 8 5 8 4 9 3 5 8 4 3 1 3 8
 7 3 3 0 8 7 2 8 5 3 8 7 6 4 6 2 2 0 1 1 5 3 5 7 1 8 2 2 6 4 6 7 3 7 3 9 4
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 3 1 1 6 4 8 2 1 8 4 1 3 1 1 9 5 4 8 7 4 8 9 5 7 6 9 4 0 4 0 0 9 0 6 5 8 8
 3 7 9 2 0 8 2 7 3 0 2 1 9 2 7 0 6 9 3 1 1 3 5 2 5 5 2 1 2 9 4 6 5 5 5 9 7
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 4 1 3 1 2 5 1 4 0 3 1 5 5 7 4 0 1 0 9 5 5 5 4 0 1 8 6 2 1 1 1 7 9 6 7 9 7
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 6 9 7 2 8 5 1 2 4 1 8 8 7 6 0 8 0 6 1 5 7 8 0 4 1 4 5 9 2 2 3 9 1 3 9 3 2
 8 0 6 5 6 2 5 2 3 2 6 1 0 7 6 0 6 2 7 0 3 2 4 2 3 6 9 7 7 0 3 5 4 1 2 2 1
 2 7 7 0 4 9 8 5 6 1 6 5 2 0 8 2 4 3 3 2 9 3 8 9 9 5 9 0 3 4 7 9 8 5 7 5 0
 5 3 5 0 2 7 3 0 4 3 6 6 1 9 6 3 4 6 4 6 7 2 7 6 3 0 3 0 1 3 6 1 0 4 3 8 4
 3 3 4 8 6 9 6 3 3 0 5 7 8 9 1 5 3 2 5 1 7 6 0 6 9 5 2 4 4 7 2 0 5 6 2 0 8
 4 4 4 7 1 0 4 1 9 2 1 3 0 5 3 9 8 2 6 0 0 4]
```

```
In [18]: score=logisticRegr.score(x_test,y_test)  
         print(score)
```

0.9537037037037037

```
In [ ]:
```