

## concept of classification

```
In [3]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings('ignore')
```

```
In [5]: x = np.array([0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0])
```

```
In [6]: y = np.round(x)
```

```
In [7]: y
```

```
Out[7]: array([0., 0., 0., 0., 0., 1., 1., 1., 1., 1.])
```

```
In [8]: # and that is defined the concepts of classification
```

## Sigmoid curve

Sigmoid Function acts as an activation function in machine learning which is used to add non-linearity in a machine learning model, in simple words it decides which value to pass as output and what not to pass, there are mainly 7 types of Activation Functions which are used in machine learning and deep learning.

```
In [13]: data= pd.DataFrame({'Actual':x, 'pred':y})
```

```
In [15]: data
```

```
Out[15]:
```

	Actual	pred
0	0.1	0.0
1	0.2	0.0
2	0.3	0.0
3	0.4	0.0
4	0.5	0.0
5	0.6	1.0
6	0.7	1.0
7	0.8	1.0
8	0.9	1.0
9	1.0	1.0

```
In [28]: outcome = 1/(1+np.exp(-data))
```

```
In [29]: outcome
```

```
Out[29]:
```

	Actual	pred
0	0.524979	0.500000
1	0.549834	0.500000
2	0.574443	0.500000
3	0.598688	0.500000
4	0.622459	0.500000
5	0.645656	0.731059
6	0.668188	0.731059
7	0.689974	0.731059
8	0.710950	0.731059
9	0.731059	0.731059

```
In [30]: data1 = np.linspace(-8,8,1000)
```

```
In [31]: data1
```

```
Out[31]: array([-8.          , -7.98398398, -7.96796797, -7.95195195, -7.93593594,
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```

In [36]: outcome

Out[36]: array([ 3.35350130e-04, 3.40762500e-04, 3.46262192e-04, 3.51850614e-04,  
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## true positives

(TP): These are cases in which we predicted yes (they have the disease), and they do have the disease.  
 true negatives (TN): We predicted no, and they don't have the disease.  
 false positives (FP): We predicted yes, but they don't actually have the disease. (Also known as a "Type I error.")  
 false negatives (FN): We predicted no, but they actually do have the disease. (Also known as a "Type II error.")

In [ ]:

In [ ]:

```
In [39]: actual= [1,0,1,1,0,0,0,0,1,1]
         pred= [0,1,1,0,0,1,0,1,0,1]
```

```
In [42]: dataf = pd.DataFrame({'Actual':actual,'predicted':pred})
```

In [43]: dataf

```
Out[43]:
```

	Actual	predicted
0	1	0
1	0	1
2	1	1
3	1	0
4	0	0
5	0	1
6	0	0
7	0	1
8	1	0
9	1	1

```
In [48]: from sklearn import metrics
```

```
In [51]: from sklearn import metrics
```

```
In [53]: metrics.confusion_matrix(actual,pred)
```

```
Out[53]: array([[2, 3],
                [3, 2]], dtype=int64)
```

```
In [54]: metrics.confusion_matrix(actual,pred)
```

```
Out[54]: array([[2, 3],
                [3, 2]], dtype=int64)
```

```
In [58]: metrics.accuracy_score(actual,pred)*100
```

```
Out[58]: 40.0
```

```
In [60]: from sklearn import metrics
```

```
In [62]: metrics.confusion_matrix(actual,pred)
```

```
Out[62]: array([[2, 3],
                [3, 2]], dtype=int64)
```

```
In [63]: from sklearn import metrics
```

```
In [65]: metrics.confusion_matrix(actual,pred)
```

```
Out[65]: array([[2, 3],
                [3, 2]], dtype=int64)
```

```
In [66]: from sklearn import metrics
```

```
In [67]: metrics.confusion_matrix(actual,pred)
```

```
Out[67]: array([[2, 3],
                [3, 2]], dtype=int64)
```

```
In [70]: metrics.accuracy_score(actual,pred)*100
```

```
Out[70]: 40.0
```