

# Day4

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**Logistic regression sounds like a regression method, but actually it is used for classification**

## 0.1 How does it work?

Simply understanding, the logistic regression applies an extra nonlinear transformation on top of the linear regression. Through this transformation, the output is mapped to a range between 0 and 1, which is usually interpreted as probabilities.

## 0.2 How to predict?

As we know, we have the probability for each input, when given the threshold, we can label our inputs by comparing the probability with the threshold.

## 0.3 What's the transform?

The nonlinear transformation we used here is called Sigmoid-Function. Its expression is:  $\phi(z) = \frac{1}{1+e^{-z}}$ ,  $z$  is the linear predicted output.

- Graph of Sigmoid Function

```
In [14]: import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline

z = np.arange(-8, 8, 0.1)
y = 1. / (1+ np.exp(-z))
plt.plot(z, y, color='red')
plt.grid(True)
```

