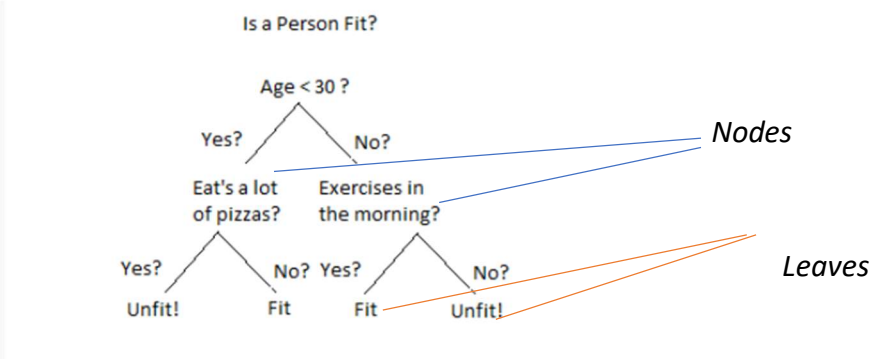
27-03-notes

Decision trees

Decision trees are diagrammatic way to present logistic data. Decision trees contain nodes and leaves. Nodes are the points where the data is split based on yes or no questions and leaves are the decisions or final outcomes.

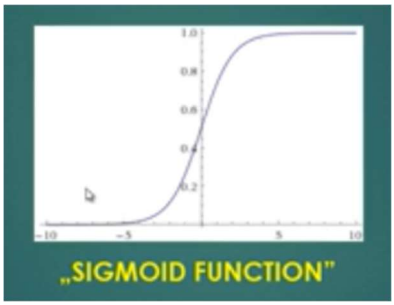


Logistic regression

A logistic function also called as sigmoid function takes discrete values in Boolean terms it takes yes or no. we use this function to model our regression.

The dependent variable is that which takes discrete values and the independent variable takes continuous values. Unlike linear regression here we do not predict what will be the dependent variable for the given independent variable.

Here we find the probability of occurrences of the discrete points for the given value of dependent variable.



$g(z) = 1/(1 + e^{(-z)})$ $z = b_0 + b_1x + \ldots$

Here g is the sigmoid function, g(0)=0.5 g(∞)=1 and g(-∞)=0

we define cost function as

$$J(\theta) = \sum_{i=1}^{M}[-y^{(i)} log H_\theta(x^{(i)}) - (1 - y^{(i)} log(1 - H_\theta(x^i))]$$

so that the gradient looks like the gradient of linear regression and the gradient is

$$\frac{\partial J(\theta)}{\partial \theta_k} = \sum_{i=1}^{M}(H_\theta(x^{(i)}) - y^{(i)})x_k^{(i)}$$

we can apply gradient descent to find the unknown parameters.

The probability of occurrence is given by the value of g.