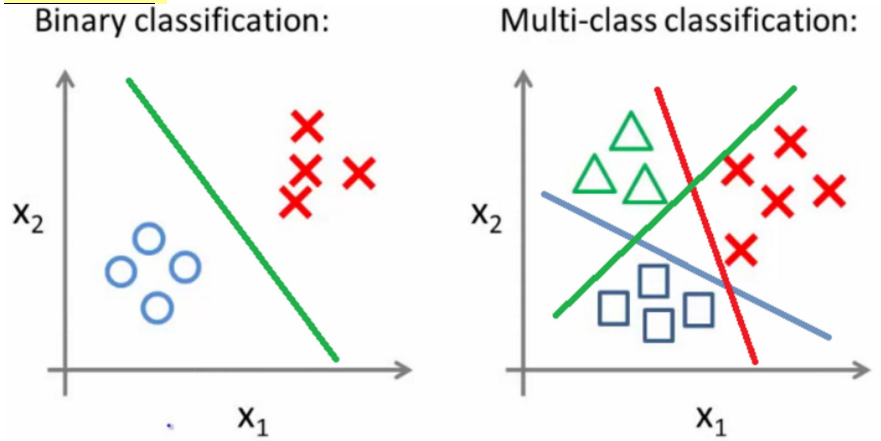
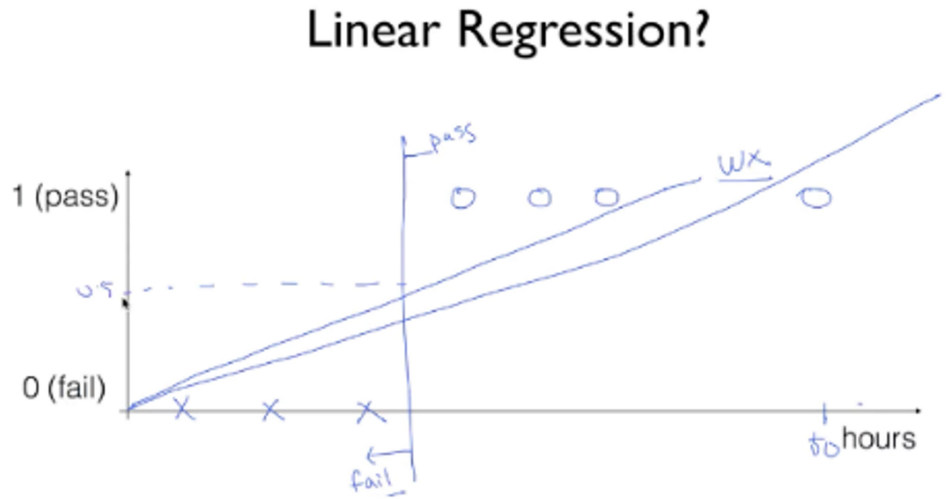
3. Logistic Classification

2019년 3월 29일 금요일 오후 12:47

1. *Definition*



- Binary한 분류 Classification (Binary) -> 0,1 encoding
- Logistic Regression 의 한계 : H(x) = Wx + b 는 값이 x값에 따라 1보다 무한정 커질 수 있다.



2. ***Hypothesis***

$$H_L(X) = WX$$

↓

$$Z = H_L(X)$$

↓

$$g(z) = \frac{1}{1+e^{-z}}$$

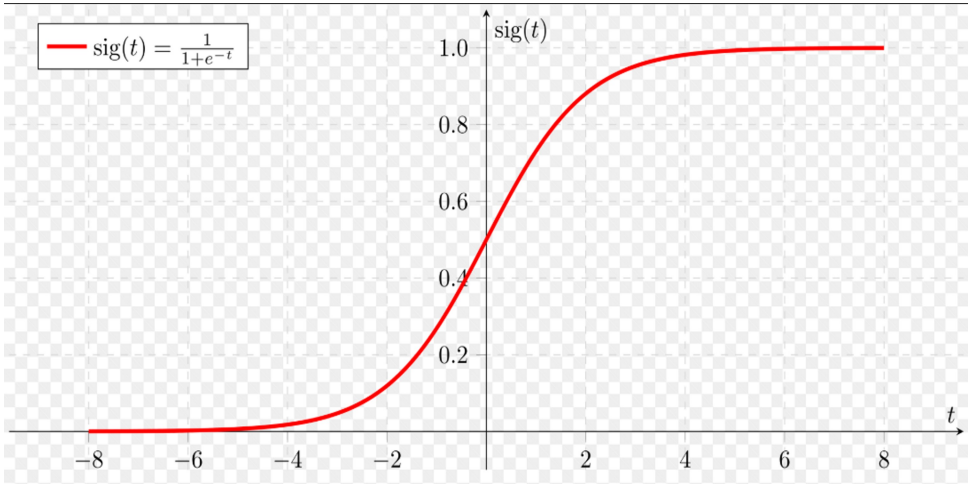
↓

$$H_R(X) = g(H_L(X))$$

↓

$$H(X) = \frac{1}{1+e^{-W^T X}}$$

- ***sigmoid function :***
  - logistic regression의 한계를 해결
  - g(z) : logistic, sigmoid function
  - z가 무한히 커지면 1에 수렴하고, 무한히 작아지면 0에 수렴
  - 어떤 값이라도 0과 1사이로 나오도록 조정



3. ***Cost function***

- 일반적인 이차 코스트 함수를 쓸 수 없다. -> log를 취한다.

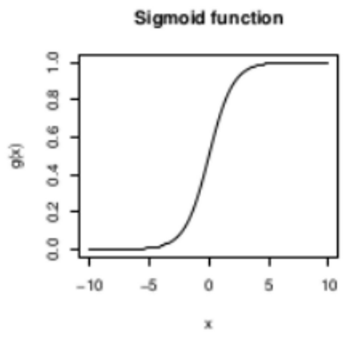
Cost function

$$cost(W) = \frac{1}{m}\sum \quad c\,(H(x), y)$$

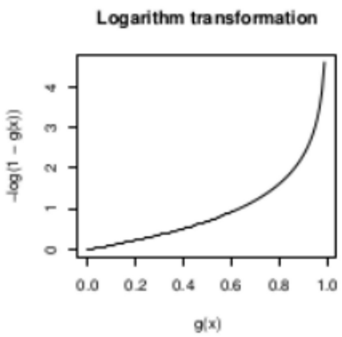
$$J(\theta) = \frac{1}{m}\sum_{i=1}^{m} \text{Cost}(h_\theta(x^{(i)}), y^{(i)})$$

$$\text{Cost}(h_\theta(x), y) = -\log(h_\theta(x)) \qquad \text{if y} = 1$$
$$\text{Cost}(h_\theta(x), y) = -\log(1 - h_\theta(x)) \qquad \text{if y} = 0$$

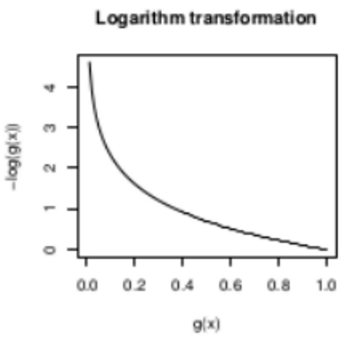
$$c\,(H(x), y) = ylog(H(x)) - (1-y)log(1-H(x))$$



(a) *Sigmoid function.*



(b) *Cost for* $y = 0$.



(c) *Cost for* $y = 1$.

4. ***Gradient descent algorithm***