Logistic Regression

Used when prediction target is categorical
→ Spam vs ham
→ Boy or Girl
Logistic regression values are bounded from 0 to 1

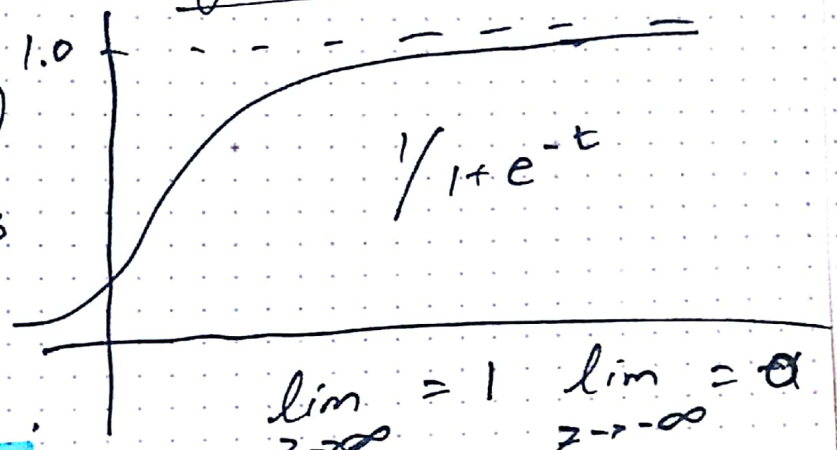
E.g. SPAM vs HAM

Output: 0 to 1 (probability)

Hypothesis: $z = WX + B$

$h\theta(x) = \text{sigmoid}(z)$

Sigmoid Funct



Types of Logistic Regression.

1. Binary Logistic Regression
→ categorical response only has 2 outcomes. SPAM/HAM

2. Multinomial Logistic Regression
Three or more output categories eg. Black, white, brown

3. Ordinal Logistic Regression
→ 3 or more categories with ordering eg. movie rating 1→5

Decision boundry

→ Used to predict which class a datum belongs to
i.e. if predicted value ≥ 0.5 the SPAM else HAM

Cost function

$$\text{Cost}(h\theta(x), Y_{actual}) = -\lg(h\theta(x)), \text{if } Y=1$$
$$-\lg(1 - h\theta(x)), \text{if } Y=0$$