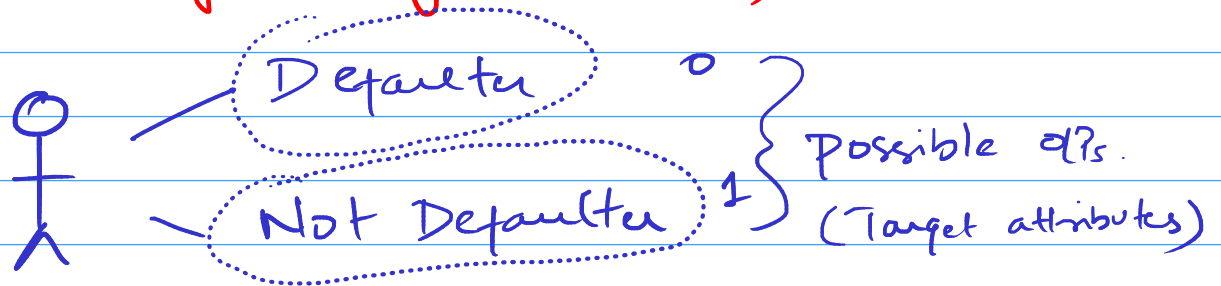


Logistic Regression

Why Logistic Regression (LR) model?



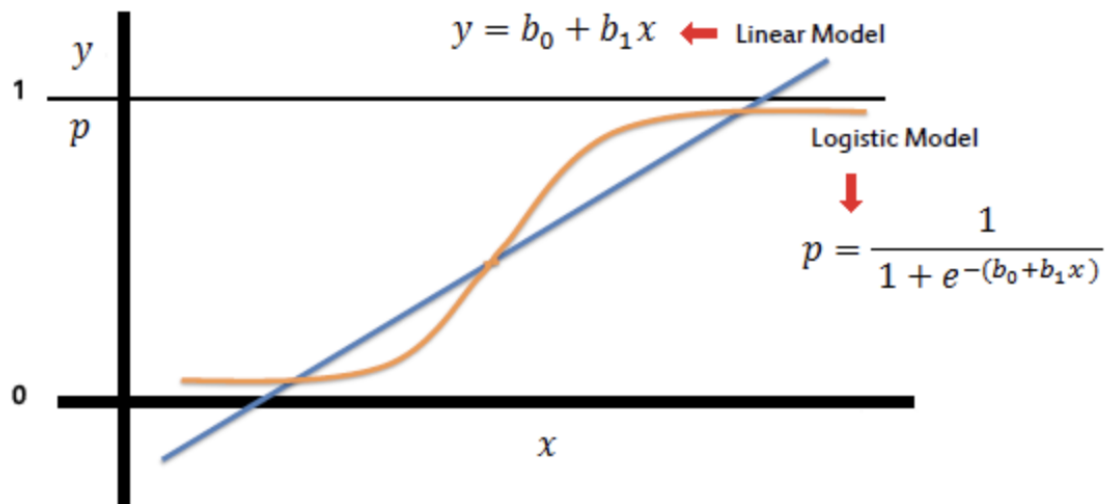
If Linear Regression were used:
→ The prob. of o/p $\in \mathbb{R}$ or $(-\infty, \infty)$

To restrict the probability estimator to the range $(0, 1)$, \Rightarrow Logistic (sigmoid) regression.

$$p = \frac{e^{(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n)}}{1 + e^{(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n)}}$$

$$p = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n)}}$$

where $x_1, x_2, \dots, x_n \leftarrow$ predictor variables
 $\beta_0, \beta_1, \beta_2, \dots, \beta_n \leftarrow$ Regression coefficients
 $p \leftarrow$ estimated prob. of success
 $\text{rang}(p) \in (0, 1)$



$$\text{Age} \leftarrow x$$

$$f(x) = \frac{1}{1 + e^{-\beta_0 + \beta_1(\text{Age})}}$$