Logistic Regression

(1) starting point = 3.0754 [X train]

weight

Age : 57 × (0.007) = − 0.4

sex : 1 × (−1.409) = −1.41

⋮ ⋮ ⋮

total Score (z) = 3.0754 + (−0.4) + (−1.41) + ...

Cost Function = $-y \cdot \ln(\hat{y}) - (1-y) \cdot \ln(1-\hat{y})$

if $y=1$, cost Function = $-\ln(\hat{y})$

$y=0$, cost Function = $-\ln(1-\hat{y})$

Initial weight For Age (w_1) = 0.01

Initial weight for Sex (w_2) = 0.5

Bias (b) = 0

$z = (w_1 \cdot Age) + (w_2 \cdot Sex) + b$

Row(1), $z = (0.01 \times 63) + (0.5 \times 1) + 0 = 1.13$

Sigmoid Formula $\hat{y} = \frac{1}{1+e^{-1.13}} \approx 0.75$

Row(2), $\hat{y} \approx 0.70$

Row(3), $\hat{y} \approx 0.60$

Cost Prediction $= -\ln$ (prediction)

Row 1 Cost ≈ 0.28

Row 2 Cost ≈ 0.35

Row 3 Cost ≈ 0.51

Total Cost Average

$= \frac{0.28+0.35+0.51}{3}$

$= 0.38$

Reducing weight (Gradient Descent)

Gradient = (Prediction − Target) . x

For row(1), Prediction $(\hat{y}) = 0.75$

Target $(y) = 1$

Error $(0.75 - 1) = -0.25$

Gradient for age, Error Age $= (-0.25)(63)$

$= -15.75$

Created by Notein

Update weight Age) New weight = Old weight − (Learning rate × Gradient)

update w_1 = 0.01 (initial weight) − (0.001 (L.R) × −15.75) Error Age

= 0.02575

X test come use update weight latest.

$z = (w_1 \cdot Age) + (w_2 \cdot Sex) + b = -1.94225$

Sigmoid Function = $\hat{y} = \dfrac{1}{1+e^{-1.94225}}$

= 87 %

⇓

Compare with Y test

$$\text{Accuracy} = \frac{\text{No. Correct Prediction}}{\text{total no. Test row}} \times 100\%$$

* When Learning stop?

(1) The "hard limit" (Epochs)

max_iteration = " "

(2) The Good enough rule (Convergence)

(3) The safety break (Early stopping)