

Logistic Regression:

| x | y |
|---|---|
| 1 | 2 |
| 2 | 2 |
| 3 | 2 |
| 4 | 3 |
| 5 | 3 |
| 6 | 3 |

$$\hat{y} = \frac{1}{1 + e^{-z}}$$

$$z = b_0 + b_1 \cdot x$$

$$b_0 = 0 \quad b_1 = 0$$

| x | y | \hat{y} | $y - \hat{y}$ |
|---|---|-----------|---------------|
| 1 | 2 | 0.5 | +0.5 |
| 2 | 2 | 0.5 | 1.5 |
| 3 | 2 | 0.5 | 1.5 |
| 4 | 3 | 0.5 | 2.5 |
| 5 | 3 | 0.5 | 2.5 |
| 6 | 3 | 0.5 | 2.5 |

update parameters:

$$b_0 = b_0 + \alpha \sum (y_i - \hat{y})$$

$$b_1 = b_1 + \alpha \sum (y_i - \hat{y}) x_i$$

$$\alpha = 0.1$$

$$\begin{aligned} b_0 &= 0 + 0.1 (12) \\ &= 0 + 1.2 \\ &= 1.2 \end{aligned}$$

$$b_1 = 0 + 0.1(1.5^*1 + 1.5^*2 + 1.5^*3 + 2.5^*4 + 2.5^*5 + 2.5^*6)$$

$$= 0 + 0.1(1.5 + 3 + 4.5 + 10 + 12.5 + 15)$$

$$= 0 + 0.1(46.5)$$

$$= 4.65$$

$$b_0 = 1.2, \quad b_1 = 4.65$$

$[b_0^{\text{new}} - b_0^{\text{old}}] \leq 0.0001$ } to satisfy this condition stop iteration.
 $[b_i^{\text{new}} - b_i^{\text{new}}] \leq 0.0001$