

## Linear Regression

X	Y
0.5	1.4
2.3	1.9
2.9	3.2

i) equation define કરો

$$y = mx + c$$

અમદા દેખા શકે છે, ના થાય છે.  
મદિ ૨ દિ input થાય તદ્દર  $x_1, x_2$ .

$$y = m \cdot x_1 \cdot x_2 + c \rightarrow \text{આમર prediction.}$$

ii) Find loss function.

$$\sum_{i=1}^n (y - y_{\text{pred}})^2$$

actual  
value in  
db (1.4, 1.9 etc)

(દેખા શકે છે, ના થાય છે) ઉદાહરણ  
eqn ટમાર, .

$$SSR = \sum_{i=1}^n (y - y_{\text{pred}})^2 = (1.4 - (m \cdot 0.5 + c))^2 + (1.9 - (m \cdot 2.3 + c))^2 + (3.2 - (m \cdot 2.9 + c))^2$$

iii) Find derivative of loss function with respect to  $m$  and  $c$  individually.

$$\frac{d}{dm} (SSR) = \sum 2(1.4 - 0.5m - c)x(-.5) + \sum 2(1.9 - 2.3m - c)x(-2.3) + \sum 2(3.2 - 2.9m - c)x(-2.9) \dots (i)$$

$$\frac{d}{dc} (SSR) = \sum (1.4 - 0.5m - c)x(-1) + \sum 2(1.9 - 2.3 - c)x(-1) + \sum 2(3.2 - 2.9m - c)x(-1) \dots (ii)$$

iv) Assume values for unknown parameters, if not given and update them.

ধরি (যদিও) আছে,

$$m = 1, c = 0, (\alpha = 0.01)$$

$$\sum x(x) \frac{b}{ab} \dots$$



eqn (i) putting the values,

$$\frac{d}{dm} (SSR) = -0.8$$

$$\text{Step size} = \alpha$$

$$\text{new}(m) = m_{\text{old}} - \left\{ \frac{d}{dm} (SSR) \times \alpha \right\}$$

$$= m_{\text{old}} - \left\{ -0.8 \times 0.01 \right\}$$

$$= 1.008$$

new(m) = 1.008

eqn (ii) putting the values,

$$\frac{d}{dc} (SSR) = -1.6$$

$$\text{new}(c) = c_{\text{old}} - \left\{ \frac{d}{dc} (SSR) \times \alpha \right\}$$

$$= 0 - \{ -1.6 \times .01 \}.$$

$$= (0 + .016)$$

$$New(e) = .016$$

We will continue this unless tangent becomes 0 or step size  $0.001 / .0001$ .

For, iteration 2  $\rightarrow m = 1.008$ ,  $e = .016$

$$\alpha = .01.$$