

Artificial Intelligence

Assignment-4

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Q1

The equation is:-

$$y = w_1 * x_1 + w_2 * x_2 + w_3 * x_3 + w_4 * x_4 + w_5 * x_5 + b$$

The loss function is:-

$$L(w; \{(x^{(i)}, y^{(i)})\}) = \frac{1}{N} \sum_{i=1}^N (y^{(i)} - \hat{y}^{(i)})^2, \quad i = 1, 2, \dots, N$$
$$\hat{y}^{(i)} = w^T x^{(i)}, \quad i = 1, 2, \dots, N$$

Replacing, \hat{y} with $w_1 * x_1 + w_2 * x_2 + w_3 * x_3 + w_4 * x_4 + w_5 * x_5 + b$,

We get our loss function, now we update w and b in each iteration with its values,

Now, since it is of the form $(mx+c)^2$, when we further put limit to 0, and derive it, the x^2 turns, to $2x$.

Consequently, the loss function will turn from $1/n$ to $2/n$,

Consequently it turns to,

$$\frac{2}{N} \sum_{i=1}^N (y^{(i)} - \hat{y}^{(i)})^2, \quad i = 1, 2, \dots, N$$
$$\hat{y}^{(i)} = w^T x^{(i)}, \quad i = 1, 2, \dots, N$$

Now we can replace x with each of the requisite w 's for the answer, which is of the form as input above

For vector form, we can take y as a vector Y and x as X , and consequently it turns to $2/ (X^T X)(\text{prediction-actual})$

