16 July, 2024 01825712246

Andrew Ng ⇒ Pioneer of Machine Learning

27 August, 2024

What is ML?

Coursera Machine Learning Course

28 August, 2024

Unsupervised ⇒ cluster

Lecture 2

#. Types

3 September, 2024

Double Slot ⇒ No class

Attendance done

4 September, 2024

Linear Regression

↳ Mid

Types of Loses

10 september, 2024

Linear Regression

$$y = mx + b$$

$$y = \theta_0 + \theta_1 x_1 + \theta_2 x_2$$

Ex-1

Lec-

price = $\theta_0 + \theta_1 \times$ size + $\theta_2 \times$ Bedroom

$\theta_0 = -80000$

$\theta_1 = 200$

$\theta_2 = 10,000$

} Given in Question

We know, Size = 1850 sq.

Bedroom = 4

$\therefore$ price = $-80000 + (200 \times 1850) + (10000 \times 4)$

$= -80,000 + 37,0000 + 40,000$

$= 3,30,000$

Loss = The difference between predicted value & Actual value.

Exercise-2

$$MSE = \frac{1}{n}\sum_{i=1}^{n} (\text{Actual MPG} - \text{Predicted MPG})^2$$

↓ Error deviation

$$= \frac{1}{5}\left(2^2 + (-1)^2 + (-2)^2 + 1^2 + 1^2\right)$$

$= 2.2$ MSE Less = Better Model

Gradient Descent ⇒ Optimization Algorithm.

11 September, 2024

Lecture 4 : Gradient Descent

Exercise :- Page: 11

If only 1 variable, $h\theta(x) = \theta_0 + \theta_1 x_1$

Batch + stochastic

Equations : [for Gradient Descent]

Batch Gradient Descent :

Update rule:

θ_0 → Given initial value, α → learning rate → will be given

$$\theta_0 = \theta_0 - \alpha \left(h_\theta(x^{(i)}) - y^{(i)}\right)$$

$$\theta_1 = \theta_1 - \alpha \left(\left(h_\theta(x^{(i)}) - y^{(i)}\right) x_1^{(i)}\right)$$

.....→ Here, $h_\theta(x^{(i)})$ = predicted value

First Iteration : $\alpha = 0.01$

$h_\theta(x) = 0.25\, x_1 - 100$

Data points :

For, $x_1^{(1)} = 2104$

$y^{(1)} = 400$ ⟵ Price = Predicted value

" $x_1^{(2)} = 1600$

$y^{(2)} = 330$

" $x_1^{(3)} = 2400$

$y^{(3)} = 369$

Batch GD (one iteration):

$\Rightarrow h_\theta(x^{(1)}) = 0.25 \times 2104 - 100 = 426$ ←

$\Rightarrow h_\theta(x^{(2)}) = 0.25 \times 1600 - 100 = 300$ ←

$\Rightarrow h_\theta(x^{(3)}) = 0.25 \times 2400 - 100 = 500$ ←

Loss for $x_1^{(1)} = 426 - 400 = 26$

Loss " $x_1^{(2)} = 300 - 330 = -30$

Loss " $x_1^{(3)} = 500 - 369 = 131$

Update θ_0, Here, $n = 3$ (given), $\theta_0 = -100$ (given)

For GD

$$\theta_0 = \theta_0 - \alpha \frac{1}{3} (26 + (-30) + 131)$$

$$= -100 - 0.01 \times \frac{1}{3} \times 127$$

$$= -100.42$$

Update θ_1,

$$\theta_1 = \theta_1 - \alpha \frac{1}{3} ((26 \times 2104) + (-30 \times 1600) + (131 \times 2400)) \times x_1$$

[Here, $\theta_1 = 0.25$ Given]

$$= 0.25 - (0.01 \times \frac{1}{3} \times 321104)$$

$$= 0.25 - 1070.35$$

$$= -1070.10$$

Batch ⇒ θ_0, θ_1 আপডেট হচ্ছে সকল sample কে Consider করে।

17 September, 2024

Next class: Stochastic এর Math

24 September, 2024

C.T 01

Q.Ans with example + precise Answer.

Topic: এখন পর্যন্ত যা করানো হয়েছে + Google classroom

☆ Batch + stochastic Gradient ⇒ Mid এ আসবে।

Define Linear Regression with a proper example.

Ans: The mathematical term for linear regression can be represented by the help of this equation, $y = mx + b$. where 'y' is Dependent on the independent value of 'x' and 'm' is slope and 'b' is a constant value. Linear Regression is

a model for prediction, where it has Single/multiple features. A model can be divided by the type of its supervision. The classification is supervised, unsupervised and semi-supervised. Unsupervised one is also called cluster. Gradient Descent is known as the optimization algorithm. In a model the difference between predicted value and Actual value is considered as Loss. The MSE value is for Error Calculation. The less MSE, the better model.

Example:

Sqrft	Bedrooms	Price	Predicted values
2500	2	1 cr	0.9 cr
2354	4	2.5 cr	2.1 cr
1794	3	90 lakhs	95 lakhs
1325	4	1.3 cr	90 lakhs

Here, Gradient descent is a mathematical technique that iteratively find the weights and bias, which produce the model with the lowest loss. Where α is the learning rate & θ is the weight parameter at the n-th iteration.

↳ Here Equation + Features Needed to be mentioned. + Graph of loss and accuracy

+ Tf Example with Math + Explanation.

Overfitting + Underfitting ⇒ Big Issue than

↳ Lecture 5. # ML course ⇒ Coursera