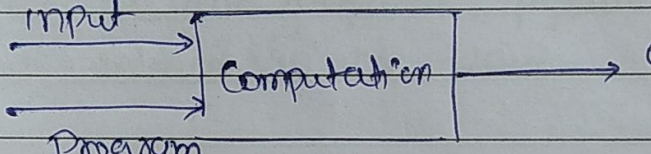
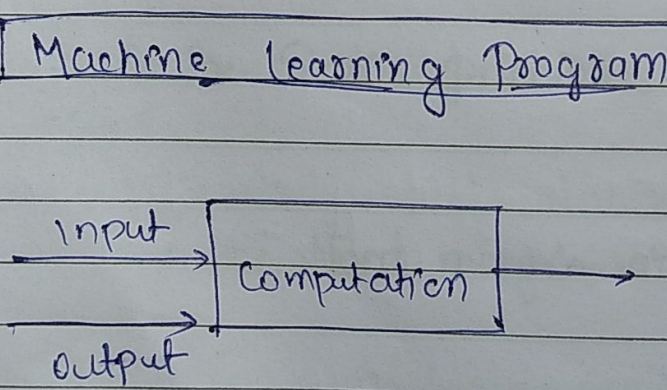
The small t-score indicates that the groups are similar.
The t-value compares our sample means to the Null hypothesis and incorporates both the sample size and the variability in the data.
A t-value of 0 indicates that the sample results exactly = the null hypothesis.

C.W.
18/10/22

Conventional programming :-



Machine learning Program :-

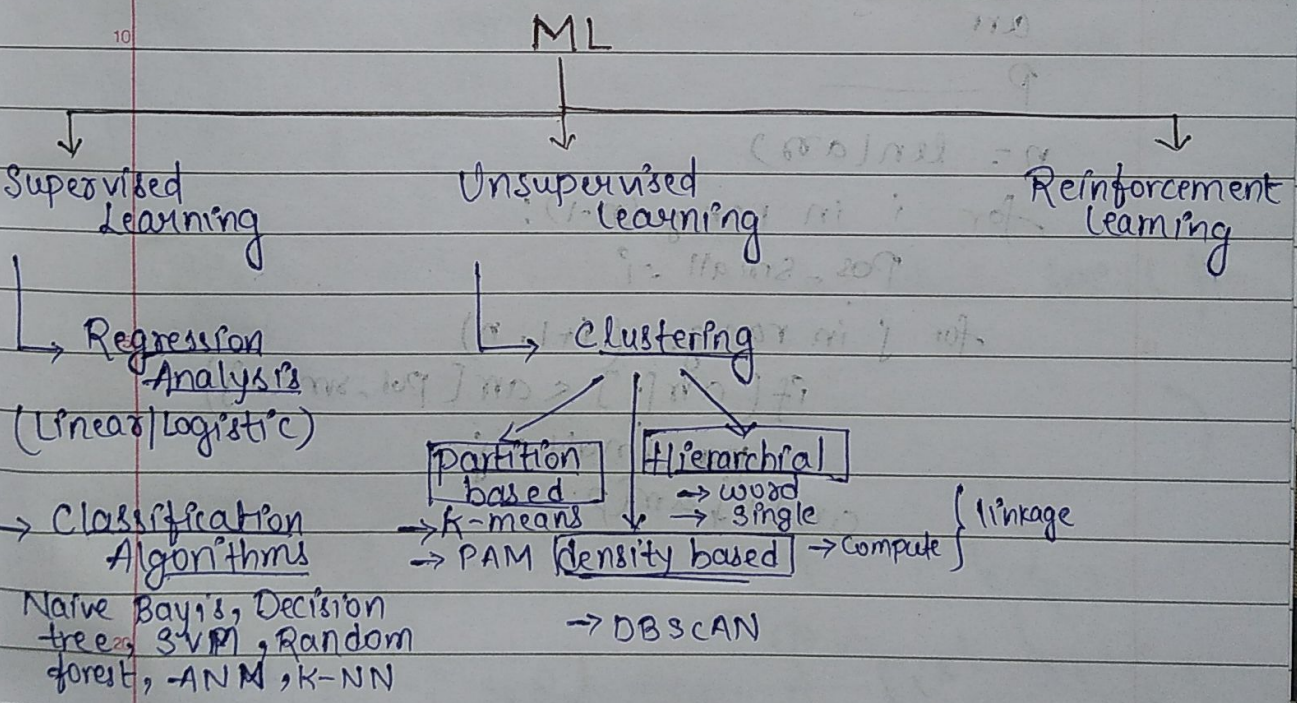


Camlin Page
Date / /

Algo + Data Structure → Program

Machine Learning is the study of Computer algorithms that allow computer programs to automatically improve through experience.

What are the different types of Learning Techniques in Machine Learning?



C.W.
15/11/22

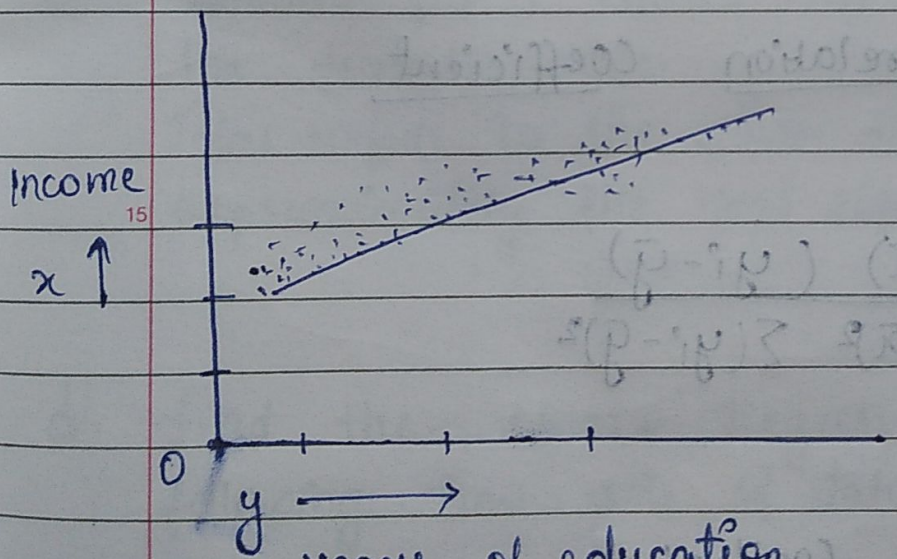
$$RSS = \sum^{n} (y_i - \bar{y})^2$$

$$TSS = \sum^{n} (y_i - \hat{y})^2$$

$$R^2 = \frac{TSS - RSS}{TSS}$$

RSS measures each point how far segregated or how far points are scattered (variability of data)

MSE (MEAN SQUARE ERROR) :-



$$MSE = \frac{1}{n} \sum_{i=1}^{n} (y_i - f(x_i))^2$$

$$f(x_i) = a + bx_i$$
$$= \beta_0 + \beta_1 x_i$$

Co-relation Matrix

	Tv	Radio	Newspaper
Tv	1	0.72	0.02
Radio		1	
News-Paper			1

Pearson Correlation coefficient

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

r = correlation coefficient
x_i = values of x_i in sample
y_i = " y_i " "
$\bar{x}$ = " x variable "
$\bar{y}$ = " y " "

$$E(Y - \hat{Y})^2 = E\left[(f(x) - \hat{f}(x) + \epsilon)^2\right]$$

$$= \underbrace{[f(x) - \hat{f}(x)]^2}_{\text{reducible part}} + \underbrace{\text{var}(\epsilon)}_{\text{Irreducible}}$$

The reducible component consists of two components Bias and variance.
Variance refers to the amount by which $\hat{f}$ would change if we estimated it using a different training data set but Ideally the estimate for f should not vary too much between the training sets.
Bias refers to the error that is introduced by approximately the real life problems.

Q. Find the Linear Regression Equation for the following two sets of data.

x	2	4	6	8
y	3	7	5	10

$y = a + bx$

$\Rightarrow \beta_0 + \beta_1 x$

$$\beta_0 / a = \frac{\Sigma y \, \Sigma x^2 - \Sigma x \, \Sigma xy}{n \Sigma x^2 - (\Sigma x)^2}$$

$$\beta_1 / b = \frac{n \Sigma xy - (\Sigma x)(\Sigma y)}{n \Sigma x^2 - (\Sigma x)^2}$$

x	y	x^2	xy
2	3	4	6
4	7	16	28
6	5	36	30
8	10	64	80
$\Sigma x = 20$	$\Sigma y = 25$	$\Sigma x^2 = 120$	$\Sigma xy = 144$

$$\beta_0 / a = \frac{25 \times 120 - 20 \times 144}{4 \times 120 - (20)^2}$$

$$= \frac{3000 - 2880}{480 - 400} = \frac{120}{80} = 1.5$$

$$b = \frac{4 \times 144 - 20 \times 25}{4 \times 120 - (20)^2} = \frac{576 - 500}{480 - 400}$$

$$= \frac{76}{80} \frac{38}{40} \frac{19}{20} = 0.95$$

$$y = 1.5 + 0.95x$$

C.W.
16/11/22

LAB

1. WAP in python using Numpy to find out the determinant value of matrix
   lin.alg.det()

2. WAP in python using numpy to find out the eigen value & eigen vector of a matrix.

3. WAP in python to read the contents of a text file & display it also count the no. of lines present in the text file.

   "C:/documents

1.5

4. WAP in python to read the content of a text file and write it in another file.

5. WAP in python to read & display the contents of a csv file.

C.W.O. 7/11/22

Q.(2) Calculate the regression coefficient and obtain the lines of regression for the following set of data:

x	1	2	3	4	5	6	7
y	9	8	10	12	11	13	14

$$y = a + bx$$
$$= B_0 + B_1 x$$

$$B_0/a = \frac{\Sigma y \Sigma x^2 - \Sigma x \Sigma xy}{n\Sigma x^2 - (\Sigma x)^2}$$

$$B_1/b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

x	y	x^2	xy
1	9	1	9
2	8	4	16
3	10	9	30
4	12	16	48
5	11	25	55
6	13	36	78
7	14	49	98

$\Sigma x = 28 \quad \Sigma y = 77 \quad \Sigma x^2 = 140 \quad \Sigma xy = 334$

$$\beta_0/a = \frac{77 \times 140 - 28 \times 334}{7 \times 140 - (28)^2} = \frac{10780 - 9352}{980 - 784}$$

$$= \frac{1428}{196} = \underline{7.28}$$

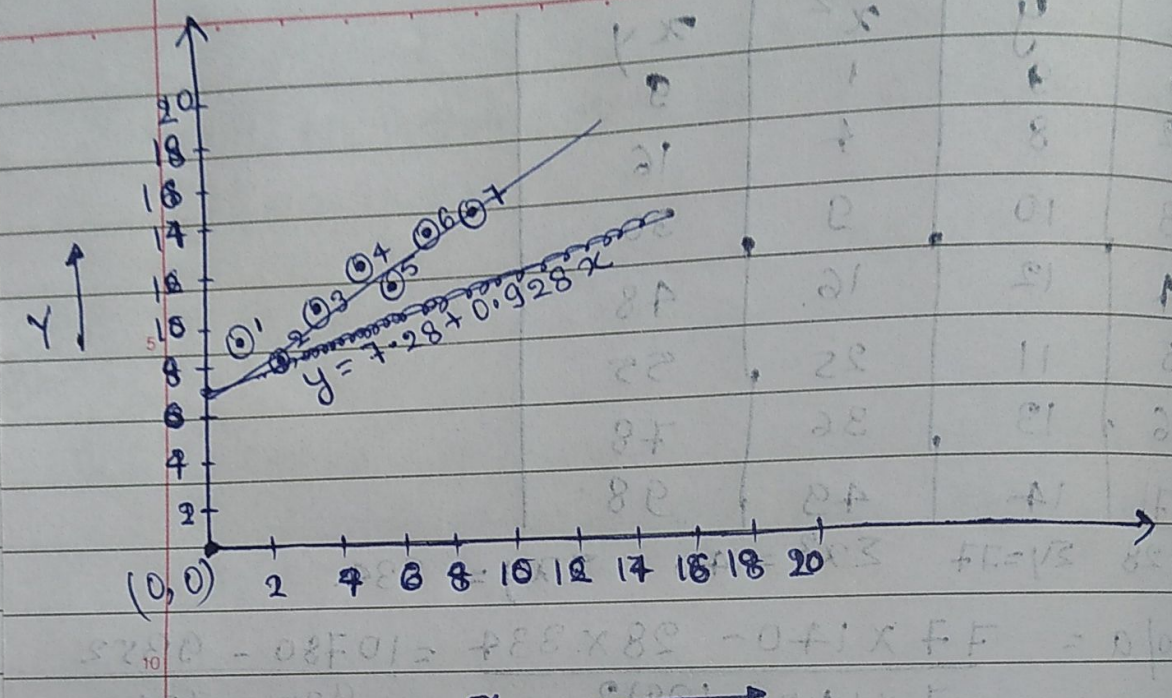
$$\beta_1/b = \frac{7 \times 334 - (28 \times 77)}{7 \times 140 - (28)^2}$$

$$= \frac{2338 - 2156}{980 - 784}$$

$$= \frac{182}{196} = \underline{0.928}$$

Linear Regression equation is :-

$$y = \underbrace{7.28}_{\beta_0} + \underbrace{0.928}_{\beta_1} x \rightarrow \text{Intercept}$$


Y
20
18
16
14
12
10
8
6
4
2
(0,0)
2
4
6
8
10
12
14
16
18
20
x
y = 7·28 + 0.928x