Course No. : BMC-AIML\_June\_2023\_PCAMBZC211

Course Title : PG Program in AI & Machine Learning

1. 1. 1. Regression algorithm.

Company revenue will grow or decrease with the product sale. Revenue is depend on product sale.

* + - 1. Product sale => independent variable
      2. Revenue => dependent variable.
    1. Regression algorithm.

Wind speed will increase when there air presses goes up. Wind speed changes with change in air pressure.

* + - 1. Air Pressure => independent variable
      2. wind speed => dependent variable.
    1. Classification algorithm.

Given credit card is fraud or not is depend on few properties so Outcome is classified as fraud credit card or not a fraud credit card.

* + - 1. Incorrect attempts of Card expiration date, Is billing address and IP address are too far => independent variables
      2. Is transaction fraud => dependent variable.
    1. Classification algorithm.

Amazon product review can be categorized into 1 to 5 rating which is finite set of number where review is classified.

* + - 1. Quality of the product, user experience, price, shipping time, item packaging => independent variables
      2. Amazon review => dependent variable
  1. The error function is nothing but the error or difference between predicated value  Y` and actual value Y. This is also called as cost function. It is a Mean Squared error between actual and predicted value and its represented as,

E = (1/n) \* Σ(Y’ – Y)2

Here, n= Number of items

Σ = Sum of all data points

Y’ = Predicted value by the regression function for Y

Y = Actual value of a dependent variable in data set.

Let’s consider a data set where X = {43, 44, 45, 46, 47}, Y = {41, 45, 49, 47, 44} and Y = 9.2 + 0.8X is the regression function. Let’s find the Mean Squared error.

1. Step1 : lest predict a dependent variable Y based on the regression function.

Y`1 = 9.2 + 0.8X1 = 9.2 + (0.8 \* 43)= 43.6

Y`2 = 9.2 + 0.8X2 = 9.2 + (0.8 \* 44)= 44.4

Y`3 = 9.2 + 0.8X3 = 9.2 + (0.8 \* 45)= 45.2

Y`4 = 9.2 + 0.8X4 = 9.2 + (0.8 \* 46)= 46

Y`5 = 9.2 + 0.8X5 = 9.2 + (0.8 \* 47)= 46.8

1. Step2 : let’s find (predict – actual) value i.e. (Y` - Y)

(Y`1 – Y1) = (43.6 – 41) = 2.6

(Y`2 – Y1) = (44.4 – 45) = -0.6

(Y`3 – Y1) = (45.2 – 49) = -3.8

(Y`4 – Y1) = (46 – 47) = -1

(Y`5 – Y1) =(46.8 - 44) = 2.8

1. Step3 : Find Mean squared error

MSE = (1/5) \* ( (2.6)^2 + (-0.6)^2 + (-3.8)^2 + (-1)^2 + (2.8)^2)

= (1/5) \* (30.4)

MSE = 6.08

Mean squared errors tells that the smaller the mean squared error, the closer

best fit line for the linear regression model.