**Practical-10 ( K-Nearest Neighbour )**

**1)** Calculate the Euclidean Distance between the two data points A(5,4),B(2,3)

🡪 Let A(5,4) = (x1,y1)

B(2,3) = (x2,y2)

Formula for Euclidean Distance is,

d =

=

=

=

=

=

d = 3.162

**2)** Use KNN to predict given class(Yes or No), X1={9,9,5,5}; X2={9,6,6,7}; Y={Yes,Yes,NO,NO}; K=3 (Use Euclidean for distance calculation).What will by Y values for new records X1=5; X2=9; Y = ?

🡪Given: K=3

X1={9,9,5,5}

X2={9,6,6,7}

Y={Yes,Yes,NO,NO}

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X1 | X2 | Y | Distance | Rank |
| 9 | 9 | Yes | 4 | 3 |
| 9 | 6 | Yes | 5 | 4 |
| 5 | 6 | No | 3 | 2 |
| 5 | 7 | No | 2 | 1 |

Calculating the Euclidean distance betwn each points from set and new record, and assigning them their ranks accordingly.

d1 = sqrt(9-5)^2 + (9-9)^2 = sqrt16 = 4

d2 = sqrt(9-5)^2 + (6-9)^2 = sqrt25 = 5

d3 = sqrt(5-5)^2 + (6-9)^2 = sqrt9 = 3

d4 = sqrt(5-5)^2 + (7-9)^2 = sqrt4 = 2

since K=3(given)

:Considering 3 ranks and their respective Y values, No(rank1), NO(rank2), Yes(rank3)

: The Y value for new records, X1 =5; X2 =9 is NO

**3)** Below are the 7 actual values of target variable from the training data [no,no,no,yes,yes,yes,yes].What will be entropy of target variable?

🡪Probability of positive(yes) and negative(no) are as follows:

P(Yes) = 4/7; P(No)=3/7

we calculate entropy by putting probability values in formula :

entropy = -PlogzP - Nlog2N

= (-4/7)log2(4/7) - 3/7log2(3/7)

= (-0.571)x(-0.808) - 0.428(-1.224)

= 0.461 -(-0.523)

Entropy = 0.984