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Assignment on KNN for Regression
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Task-01:

Manual calculation of K-Nearest Neighbors (KNN) with K=3.

Given Dataset:

Age	Income(k)
21	60
20	55
22	60
22	61
23	65
21	62
25	65
30	70
31	68
22	?

Input:

Predict the income for x = 22.

Step-1:

Calculate the Euclidean Distance for Each Age.
We calculate the absolute difference between each age in the dataset and x = 22:

$$\text{Distance} = |\text{Age} - 22|$$

(P.T.O)

For Age 21 : $|22 - 22| = 1$

For Age 20 : $|20 - 22| = 2$

For Age 22 : $|22 - 22| = 0$

For Age 23 : $|23 - 22| = 1$

For Age 25 : $|25 - 22| = 3$

For Age 30 : $|30 - 22| = 8$

For Age 31 : $|31 - 22| = 29$

~~Now~~, Step-2

~~Step~~ Select the 3 Nearest Neighbors:

After calculating the distances, we sort the dataset based on these distances and select the three smallest values:

Age	Income(k)	Distance
22	60	0
22	61	0
21	60	1

The three closest neighbors (ages 22, 22, and 21) have incomes of 60, 61, and 60.

Step-3

Calculate the predicted Income

To get the predicted income, we take the average of the incomes of three nearest neighbors:

$$\text{Predicted Income} = \frac{60+61+60}{3}$$

$$= \frac{181}{3}$$

$$= 60.33$$

Manual KNN Prediction:

The predicted income for $X = 22$ using $K=3$ is 60.33 K.