

KNN

$$d_M = \left(\sum_{i=1}^d |x_i^{(p)} - x_i^{(a)}|^n \right)^{\frac{1}{n}} \quad [r_0 = 1]$$

age	Income	Manhattan distance	d	age	d
21	60	22-21	1	22	0
20	55	22-20	2	22	0
22	60	22-22	0	21	1
22	61	22-22	0	22	1
23	65	22-23	1	21	1
21	62	22-21	1	20	2
25	65	22-25	3	25	3
30	70	22-30	8	30	8
21 31	68	22-31	9	31	9
22	?				

Prediction

age = 22

using KNN, income = ?

as, $K=3$

we will take first three values

Income for age 22 is (Predicted)

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

$$= \frac{181}{3} = 60.333$$

$$= \frac{110}{120} = 0.916667$$

$$= \frac{100}{120} = 0.833333$$

$$= \frac{115}{120} = 0.958333$$

$$= \frac{120}{120} = 1.0$$