op = f(Base learner + ...)

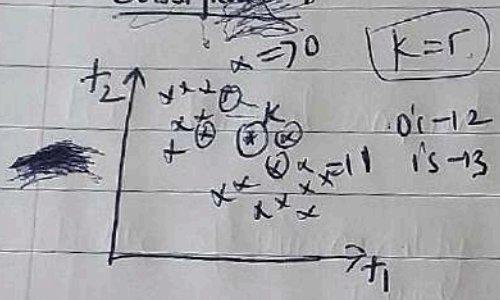
KNN Classification and Regression

K Nearest Neighbour (KNN)

① Classification

② Regression

1. Classification



f_1	f_2	y
–	–	0
–	–	1

① We have to initilize the k value

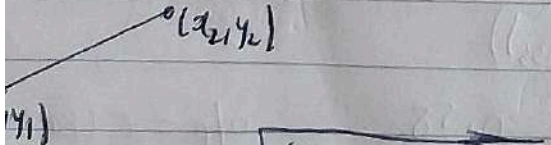
k > 0 ... 0

k = 1, 2, 3, 4, 5 ... ⇒ Hyperparameter.

② Find the k Nearest neighbour for test Data.

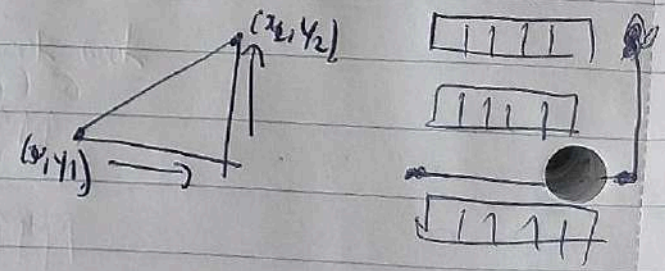
③ From thoie K=5 how many neighbour belongs to 0 category and 1 category

Euclidian Distance

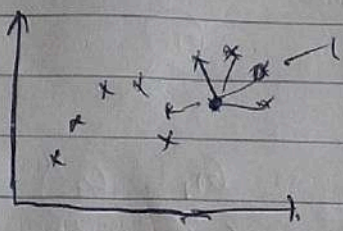


$$\text{Distance} = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$

② Manhatten Distance



② Regression



average of all nearest points to find out the output

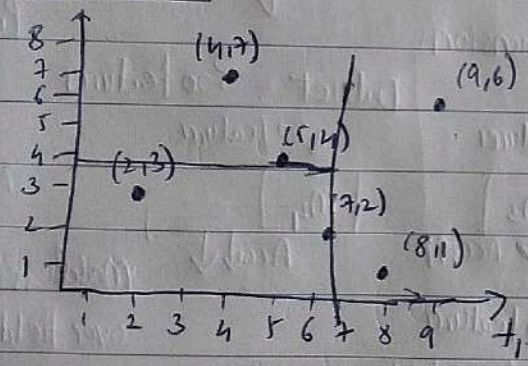
① KD Tree
② Ball Tree
} Optimize

⇓

Binary Tree

Variants of KNN

KD Tree



t_1	t_2
7	2
5	4
9	6
2	3
4	7
8	1

[KD. Tree]

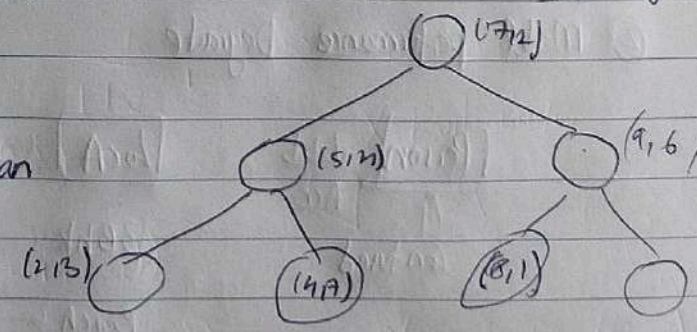
t_1 = 2, 4, **5**, 7, 8, 9 ← median

$\frac{5+7}{2} = 6.5$

t_2 = 1, 2, **3**, 4, 6, 7 ← median

$\frac{3+4}{2} = 3.5$

Binary Tree

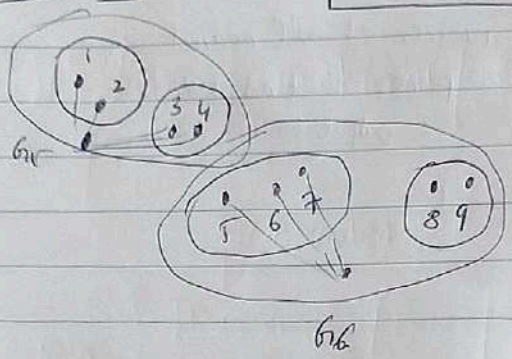


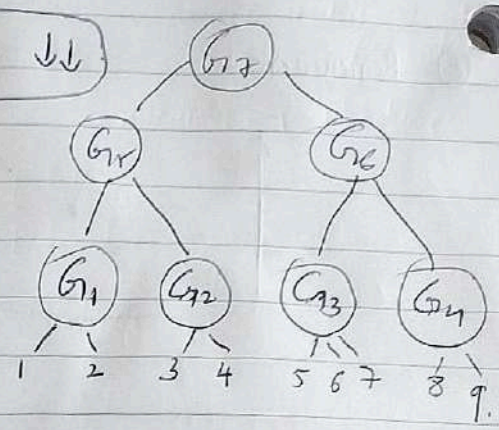
Time complixety ↓↓

Back Tracking also used.

② Ball Tree

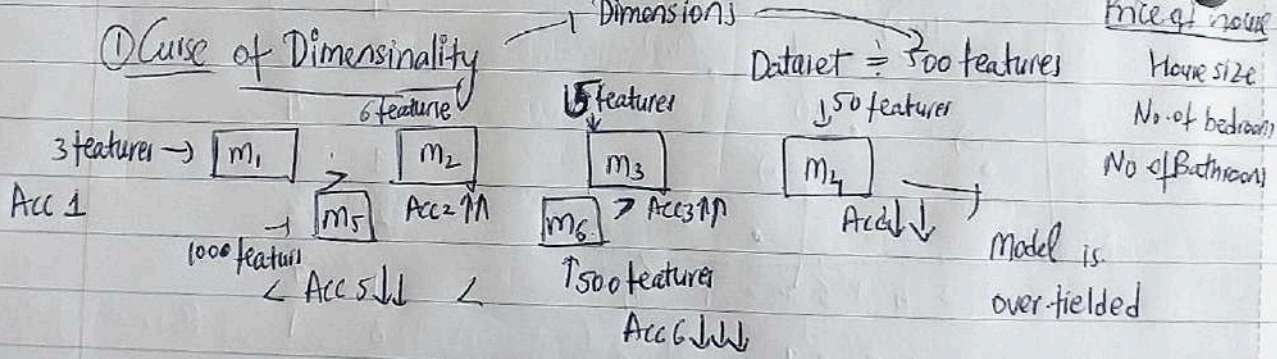
Time complexity ↓↓





PCA (Principal Component Analysis) [Dimensinality Reduction]

① Curse of Dimensinality



② Model performance Degrade