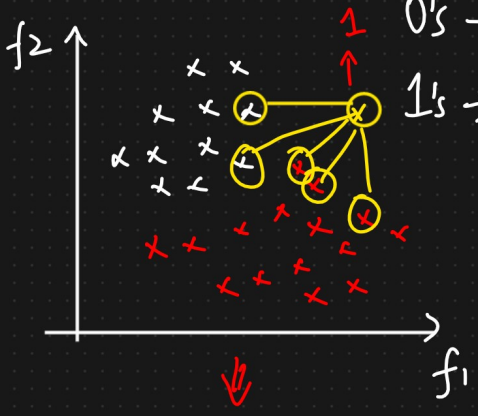
K Nearest Neighbour (KNN)

① Classification

② Regression

① Classification



{Binary Category}

f1	f2	y {Multi class}
–	–	0
		1
		1
		0

① We have to initialize the K value

K=5

K ≥ 0

K = 1, 2, 3, 4, 5, 6 ⇒ Hyperparameter

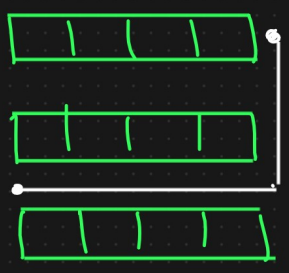
② Find the K Nearest Neighbour from the Test DATA

③ From those K=5 how many neighbours belongs to 0 category and 1 category.

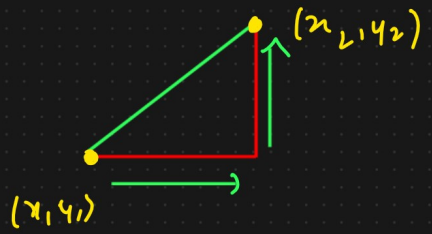
Distance Metrics

① Euclidian Distance

② Manhattan Distance



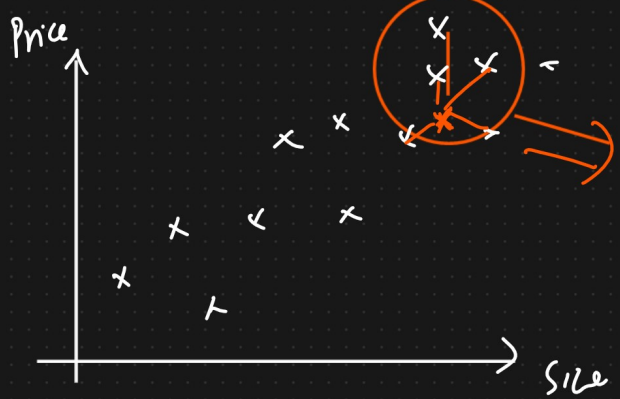
=) 2 Dimension



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

$$\text{Distance} = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}$$

(2) Regression

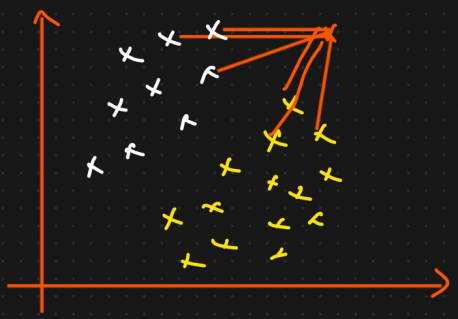


$k = 5$

Average or Median.

O/P Continuous O/P.

Variant of KNN



Time Complexity ↑↑↑

$O(n)$

① KD Tree
② Ball Tree
} Binary Tree

⇓

Time complexity ↓↓.

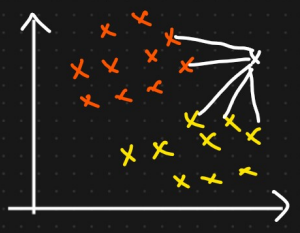
Variants of KNN

Two Variants

① KD Tree ✓
② Ball Tree ✓

⇓

Binary Tree



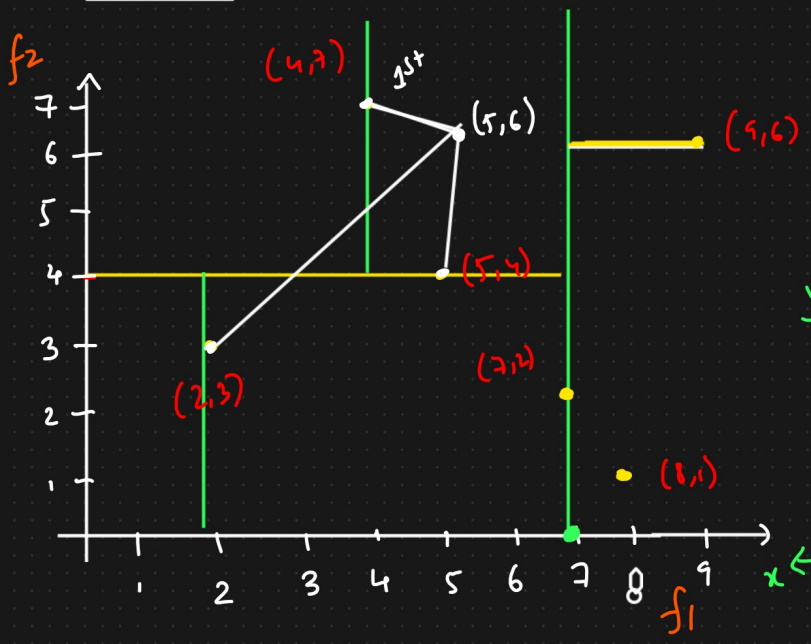
Time Complexity

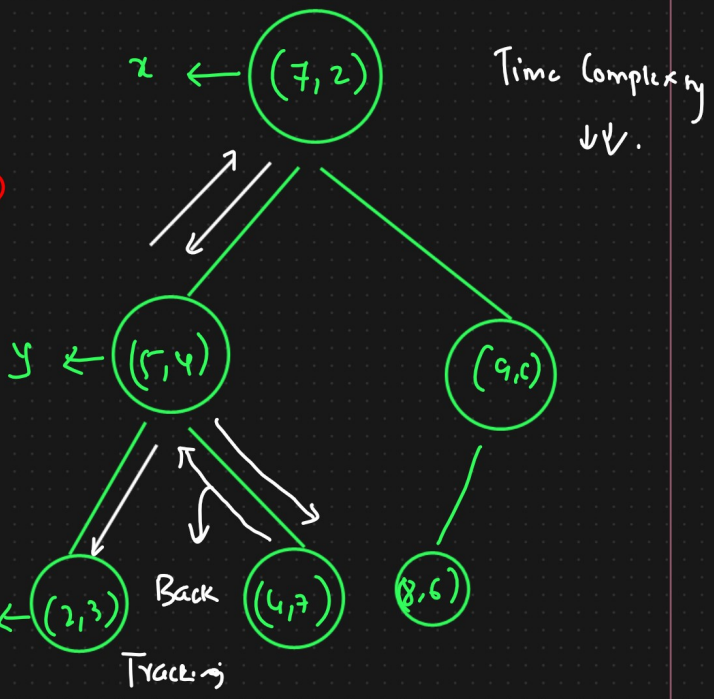
Brute Search

Auto

K=3

① KD Tree ⇒ K-Dimensions Tree





Time Complexity ↓↓.

① Median of the x Cordinate

2, 4, [5, 7] 8, 9

⇓

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

② Median of y axis

1, 2, [3.4,] 6.7

② Ball Tree