HyperParameter

Parameter	hyper Parameter

Parameter are internal to model

$$Y = mx + c$$

$m, c \Rightarrow$ Parameter

Parametric
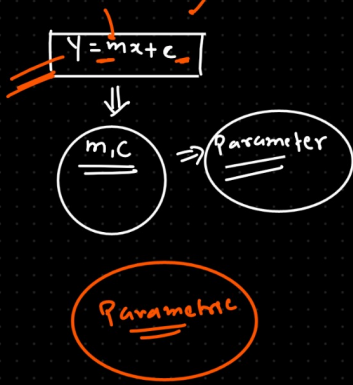
Parameter that are explicitly specified and control the training process.

SVM | SVC $\Rightarrow$

$C \Rightarrow$ hyperParameter

γ gamma $\Rightarrow$ " "

kernel $\Rightarrow$ " "

meaning
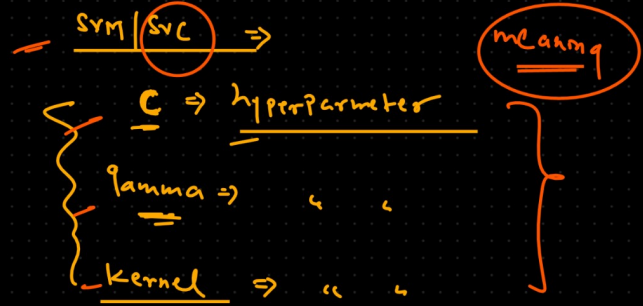
- these are learned & set by the model
rtsuf

- these are set manually by a mc engineer.

slope   inter
$$Y = mx + c$$
$\downarrow$
Lin reg

m, c

$$m_{new} = m_{old} - \eta \frac{\partial L}{\partial m}$$

m, c

Regression   type =
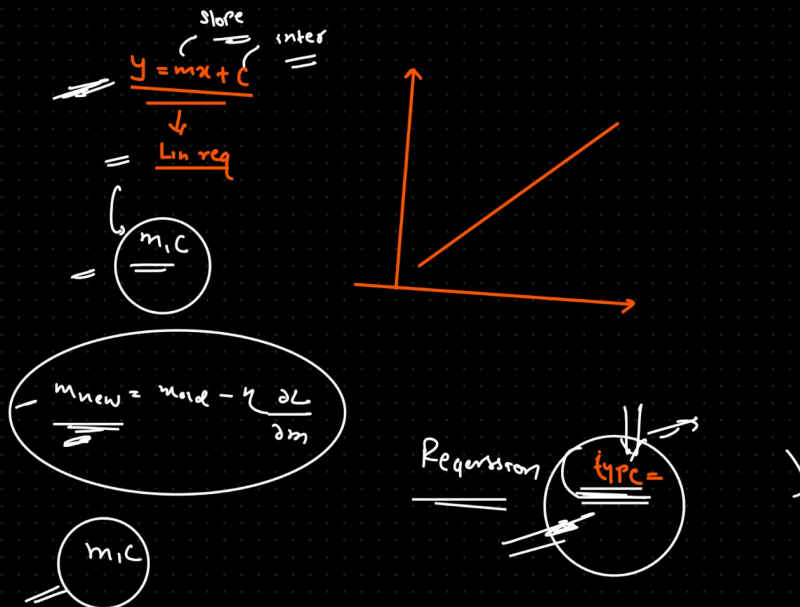
Grid Search CV $\Rightarrow$ | Grid Search | + CV
↗ $\hookrightarrow$ Cross validation
- best hyperParameter

Every Possible Permutation and Combination of hyperper Parameter
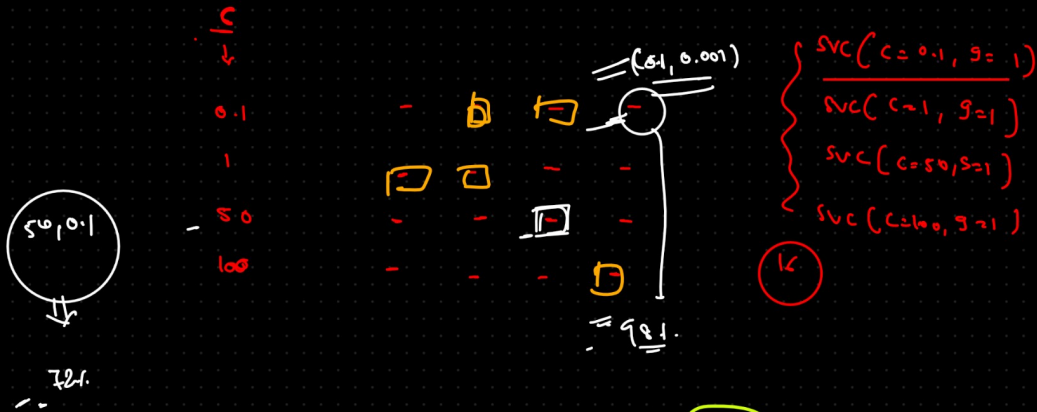
SVC $\Rightarrow$ C, gamma

$\Rightarrow$ C = [0.1, 1, 50, 100] $\Rightarrow$ ④

gamma = [1, 0.5, 0.1, 0.001] $\Rightarrow$ ④

SVC $\Rightarrow$ Grid Search CV

gamma $\rightarrow$ .1, 0.5, 0.1, 0.001

C
↓
0.1   —   🔲 🔲   = (0.1, 0.001)   SVC (C= 0.1, g= 1)
1   🔲 🔲   —   —   SVC (C=1, g=1)
(50, 0.1) — 50   —   —   🔲   —   SVC (C=50, g=1)
100   —   —   —   🔲   SVC (C=100, g=1)
⇩   = 98%   ⑯

721.

Random search cv $\Rightarrow$ Random search , Grid Search
                                    1cy memory , fast   (Slow)

⑩ $\Rightarrow$ ⑥

6 × 6 × 6 × 6

2 $\Rightarrow$ 4

4×4 = ⑯

3 $\Rightarrow$ 5

5 × 5 × 5 = 125

36 × 36

4 $\Rightarrow$ 6   1cy   grid , random

6 × 6 × 6 × 6 = 1296

Grid search, Random Search

CV → Cross validation

Cross + validation

test

Rawdata

train
test → validation

Cross + validation

train val split ⇒ 75/25

Validation ⇒ Random split

Random 42

1 → 70 → 3
2 → 72.4
3 → 69
→ 75.1
2 → 1.71

10

Fold = 5

$\dfrac{10}{Fold = 5} = 2$

1 → 70 → ? However
2 → 69 ← Problem
3 → 71
4 → 75

↳ 2 data point for validation

Rest (8) for training

In how many iter/fold = 5

Prediction on test data
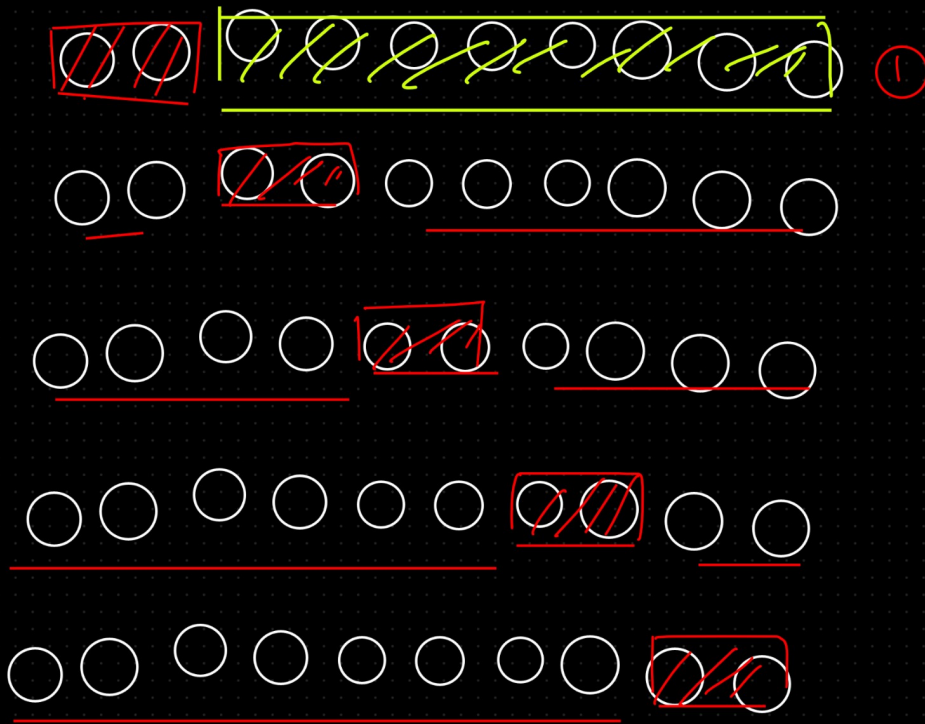
Cross + validation

↳ across all the data points

Grid search CV
↳ every combination
Cross validation

2 → 4   5 ⇒ ?   4 × 4 × 5 = 16 × 5 = 80

total D.P. = 10

No. of fold = 5

Every iteration how many

D.P. will be for

$\begin{cases} \text{training} = 8 \\ \text{testing (validation)} = 2 \end{cases}$

$\dfrac{\text{total No. of D.P.}}{\text{fold/iter}} = \dfrac{\overset{2}{\cancel{10}}}{\cancel{5}}$

= ②

Validation

① ... 10 → ⑤ ⑤ⁱⁱ

②

One hold out.

k-fold C 10000 =