Support Vector Regression

$w^T x + b + \epsilon$

Price

40

30

20

10

h_i:

Best fit line

marginal plane.

$w^T x + b$

$w^T x + b - \epsilon$

size
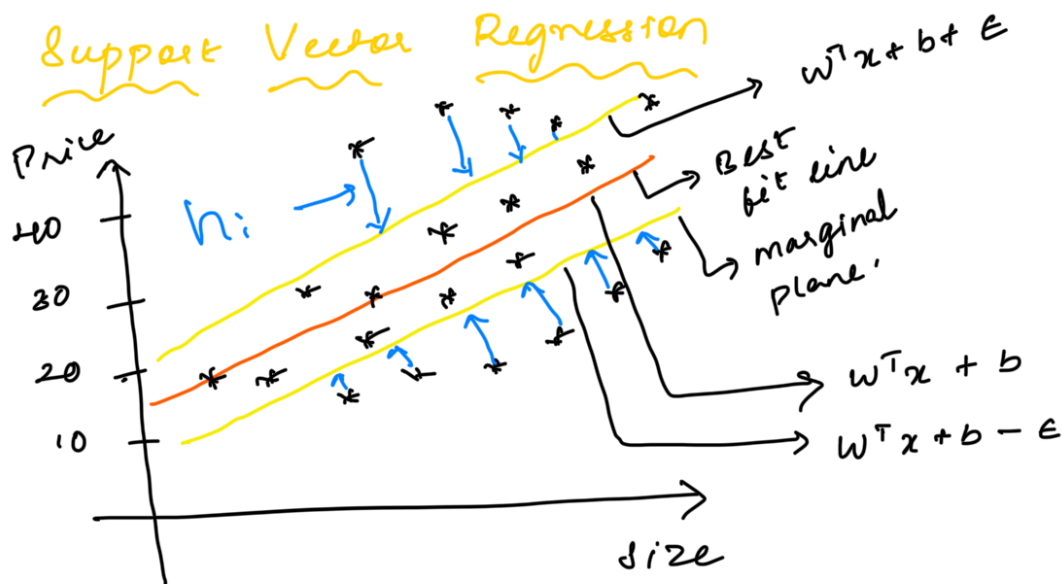
cost function

$\text{minimize} \atop w, b$ $\dfrac{\|w\|}{2}$

constraint

$\left| y_i - w_i x_i \right| \leq \epsilon$

→ If the data points are falling with in the marginal plane.

cost function, to handle the data points that are away from the marginal plane (Real world case)

$\text{minimize} \atop w, b$ $\dfrac{\|w\|}{2} + \left(C \sum_{i=1}^{n} h_i \right)$ → hinge loss.

hyper parameter.

$h_i \rightarrow$ is the deviation of the data points from the top marginal plane and the bottom marginal plane.

the constraint will be

hence   ...
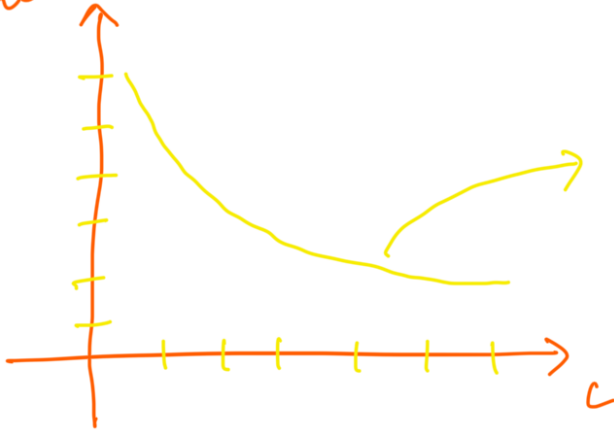
$$\left| y_i - w_i x_i \right| \leq \epsilon + h_i$$

⇓

Loss function

Relationship

$C \uparrow\uparrow \to$ loss function $\downarrow\downarrow$

As C increases,
the loss function
decreases.

$\epsilon \longrightarrow$ Marginal error

$h \longrightarrow$ Error above the marginal plane.

these two parameters will be
used to create the best fit line.