

01-03-2022

Tuesday, March 1, 2022 5:00 PM

$$1.) \min L(\omega, b, \alpha) = \frac{1}{2} \omega^T \omega - \sum_{i=1}^N \alpha_i (y_i (\omega^T x_i + b) - 1)$$

$\text{s.t. } \alpha_i \geq 0$

$$\frac{\partial L}{\partial \omega} = \frac{\partial L}{\partial b} = 0$$

$$\left\{ \omega_0 = \sum_{i=1}^N \alpha_i y_i x_i \right\} \quad \left\{ \sum_{i=1}^N \alpha_i y_i = 0 \right\}$$

KKT Conditions: [Karush Kuhn Tucker]

$$\alpha_i [y_i (\omega_0 x_i + b) - 1] = 0$$

$$\Rightarrow \alpha_i = 0$$

$$\underline{\underline{\text{or } y_i (\omega_0 x_i + b) = 1}}$$

for +ve eg: where $y_i = +1$

for -ve eg: where $y_i = -1$

$$\text{if } y_i = 1, \text{ then } \underline{\omega_0 x_i + b = 1}$$

$$\text{if } y_i = -1, \text{ then } \underline{\omega_0 x_i + b = -1}$$

$$\underline{\underline{\alpha_i \neq 0}}$$



only for
support vectors