

The Kernel-Adatron Algorithm

1. Initialise $\alpha_i = 1$ and $\theta = 0$.

2. Calculate

$$z_i = \sum_{j=1}^p \alpha_j y_j K(x_i, x_j)$$

3. Calculate $\gamma_i = y_i(z_i - \theta)$

4. Let $\delta\alpha_i = \eta(1 - \gamma_i)$ be the proposed change to α_i .

- (a) if $(\alpha_i + \delta\alpha_i) \leq 0$ then $\alpha_i \rightarrow 0$
- (b) if $(\alpha_i + \delta\alpha_i) > 0$ then $\alpha_i \rightarrow \alpha_i + \delta\alpha_i$

5. Calculate the new threshold θ

$$\theta = \frac{1}{2} \left(\min(z_i^+) + \max(z_i^-) \right)$$

where z_i^+ are those patterns i with class label $+1$ and z_i^- those with class label -1 .

6. If a maximum number of presentations of the pattern set has been exceeded or the margin $m = \frac{1}{2} \left(\min(z_i^+) - \max(z_i^-) \right)$ has approached 1 then stop, otherwise return to step 2.