Recall perceptron

$\theta = 0$

run through $i = 1, \ldots, n$

if $y^{(i)}\, \theta \cdot \phi(x^{(i)}) \le 0$

$\theta \leftarrow \theta + \underbrace{y^{(i)} \phi(x^{(i)})}$

$$\theta \cdot \phi(x^{(i)}) = \sum_{j=1}^{n} \underbrace{\alpha_j}_{\#\text{ of mistakes}} y^{(j)} \overbrace{\phi(x^{(j)}) \cdot \phi(x^{(i)})}^{K(x^{(j)}, x^{(i)})}$$

Recall perceptron

$\theta = 0$ $\quad \underline{\alpha_1 = \cdots = \alpha_n = 0}$

run through $i = 1, \ldots, n$

if $\underline{y^{(i)}\, \theta \cdot \phi(x^{(i)}) \le 0}$ $\quad y^{(i)} \sum_{j=1}^{n} \alpha_j y^{(j)} K(x^{(j)}, x^{(i)}) \le 0$

$\underbrace{\theta \leftarrow \theta + y^{(i)} \phi(x^{(i)})}_{\alpha_i \leftarrow \alpha_i + 1}$

$$\theta \cdot \phi(x^{(i)}) = \sum_{j=1}^{n} \alpha_j y^{(j)} K(x^{(j)}, x^{(i)})$$

You can think of the kernel function here as a kind of similarity measure how similar the j-th example is to the i-th example.