

## ⑫ SVM - Different Type of kernels

### Kernel Classification

#### Custom Kernel

$$k(x_1, x_2) = (\langle x_1, x_2 \rangle)^2$$

$$x_1 = [1, 2, 3]$$

$$x_2 = [4, 5, 6]$$

#### Dot Product

$$(4 + 10 + 18)^2$$

↓

less computation

$$\text{But } x_1^2 \cdot x_2^2$$

$$\left\{ \begin{aligned} &= \begin{bmatrix} \quad \end{bmatrix} \cdot \begin{bmatrix} \quad \end{bmatrix} \\ &\quad \text{9 terms} \quad \quad \text{9 terms} \end{aligned} \right\} \text{inefficient}$$