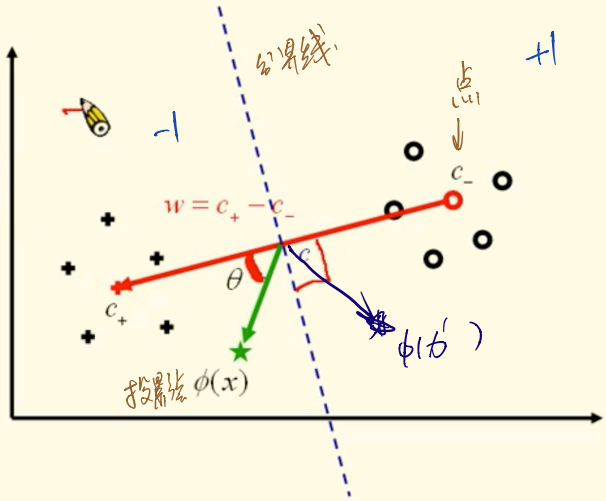
A Simple Recognition Algorithm

Testing Sample: $(x, y) \xrightarrow{\phi} (\phi(x), y) \to y = ?$



$$y = 1 \Leftrightarrow 0 \le \theta < \frac{\pi}{2} \Leftrightarrow 0 < \cos\theta \le 1 \Leftrightarrow 0 < \frac{<\phi(x) - c, w>}{\sqrt{\phi(x) - c}\sqrt{w}} \le 1 \Leftrightarrow <\phi(x) - c, w> \ge 0$$

+1

$y = -1$ $\frac{\pi}{2} \le \theta \le \pi$ $-1 < \cos\theta < 0$

$<\phi(x') - c, w> \le 0.$

求 $y = sgn(\langle \phi(h) - c, w \rangle)$

$$\langle \phi(h) - c, w \rangle = w^T(\phi(h) - c) = w^T\phi(h) - w^Tc$$

$$= (c_+ - c_-)^T\phi(h) - \frac{1}{2}(c_+ - c_-)^T(c_+ + c_-)$$

$$= \left[\frac{1}{m_+}\sum_{\{i|y_i=1\}}\phi^T(h_i)\phi(h) - \frac{1}{m_-}\sum_{\{i|y_i=-1\}}\phi(h_i)^T\phi(h)\right] - b$$

$$= \left[\frac{1}{m_+}\sum_{\{i|y_i=1\}}k(x_i, x) - \frac{1}{m_-}\sum_{\{i|y_i=-1\}}k(x_i, x)\right] - b$$

只要知道 $k(h, x_i)$ 即，不知 $\phi(h)$.