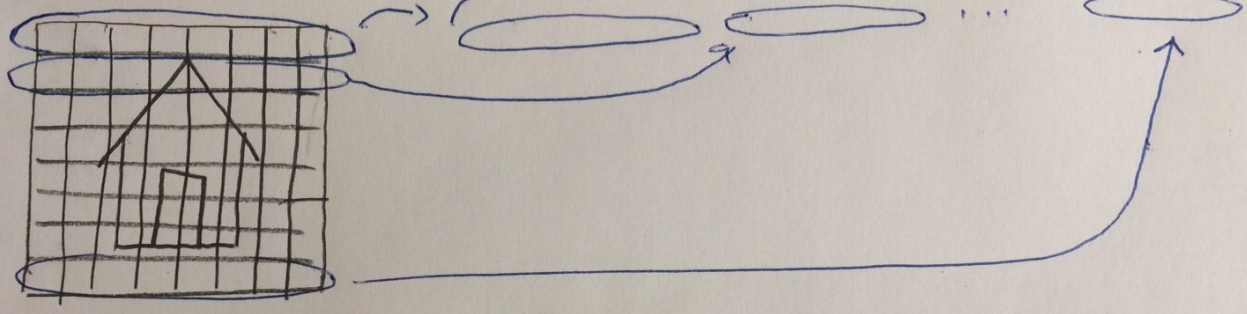
# Blackboard 1.1 : notation

$\vec{x} \in \mathbb{R}^N$



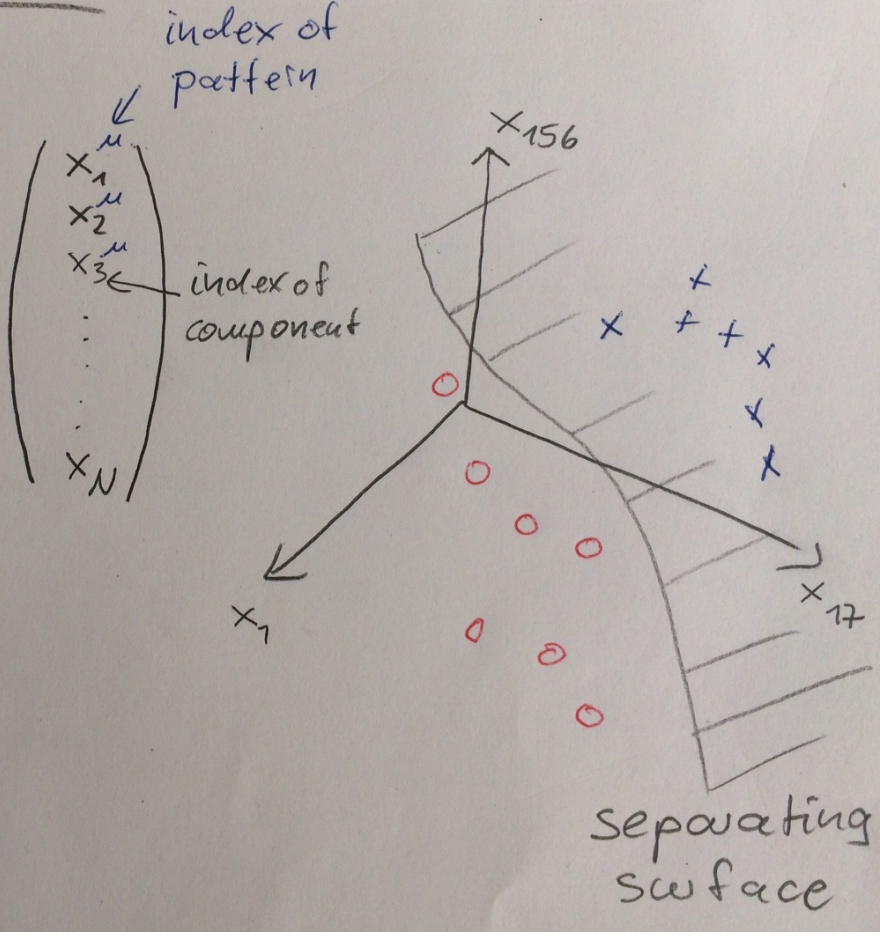
$128 \times 128 \Rightarrow N = 16\,384$!

2-dim order of pixels is neglected

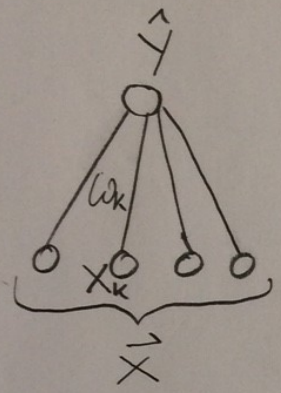
# Blackboard 1.2 : separating surface

input pattern

$\vec{x}^{\mu} =$



# Blackboard 1.3: simple perceptron




$$\hat{y} = g\left(\sum_k \omega_k x_k\right)$$

$$= \begin{cases} 1 & \text{if } \sum_k \omega_k x_k > \vartheta \\ 0 & \text{if } \sum_k \omega_k x_k < \vartheta \end{cases}$$

consider critical case

$$\sum_k \omega_k x_k = \vartheta$$

vector notation: scalar product

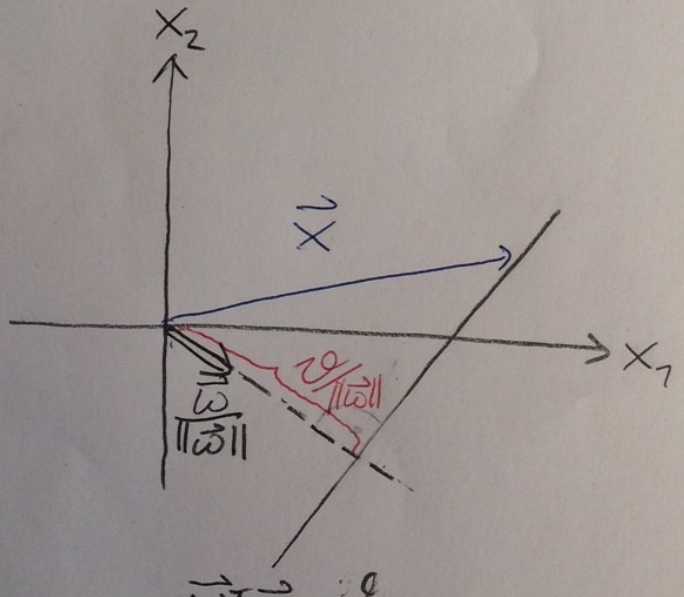
$$\vec{\omega}^T \cdot \vec{x} = \vartheta$$

equation of hyperplane

$$\frac{\vec{\omega}^T}{\|\vec{\omega}\|} \vec{x} = \frac{\vartheta}{\|\vec{\omega}\|}$$

$\frac{\vec{\omega}^T}{\|\vec{\omega}\|}$: unit vector

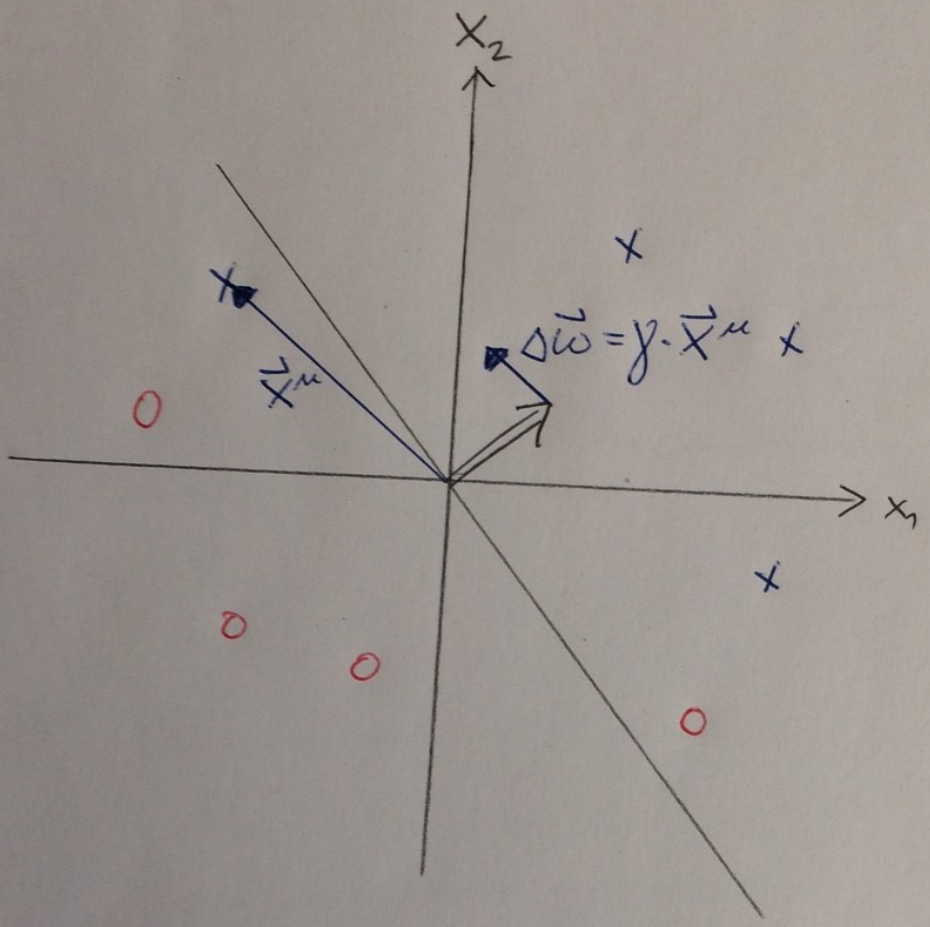
$\frac{\vartheta}{\|\vec{\omega}\|}$: distance from origin




$\vec{\omega}^T \cdot \vec{x} = \vartheta$

linear discriminant function!

# Blackboard 1.4 : geometry of perceptron algo




separating hyperplan tuius!