

## SVM

1. Initialize weights  $w$  and bias  $b$
2. Repeat until convergence  
for each training instance  $(x-i, y-i)$  in  $D$ :
  - a. Compute the margin  
$$\text{margin} = y-i * (w \cdot x-i + b)$$
  - b. if  $\text{margin} \geq 1$ :  
$$w = w - \text{learning-rate} * (2 * 1 * w)$$
  - c.  
$$w = w - \text{learning-rate} * (2 * 1 * w - y-i * x-i)$$
3. output  $w$  &  $b$

## Code

3)  $x = x[y \neq 2]$  } binary  
 $y = y[y \neq 2]$

$x\_train, x\_test, y\_train, y\_test =$   
 $\text{train-test-split}(x, y, \text{test-size} = 0.2)$

$clf = \text{svc}(\text{kernel} = 'linear')$

$clf.\text{fit}(x\_train, y\_train)$

$y\_pred = clf.\text{predict}(x\_test)$

*Signature*