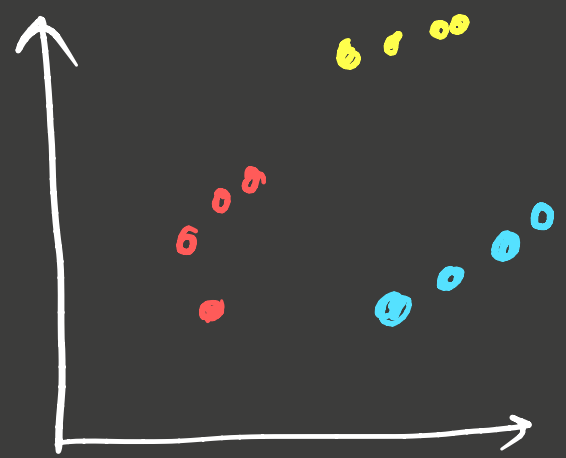
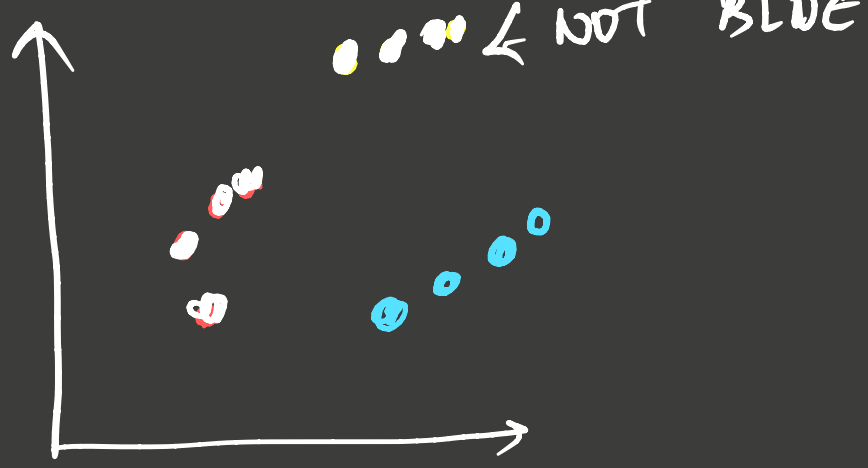
SVM FOR MULTI-CLASS CLASSIFICATION

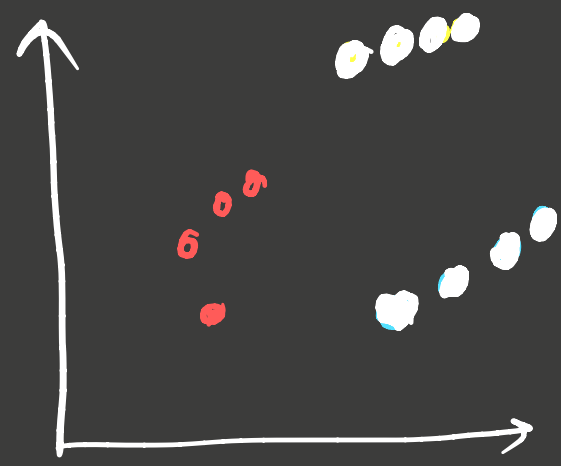
(1) ONE VS ALL



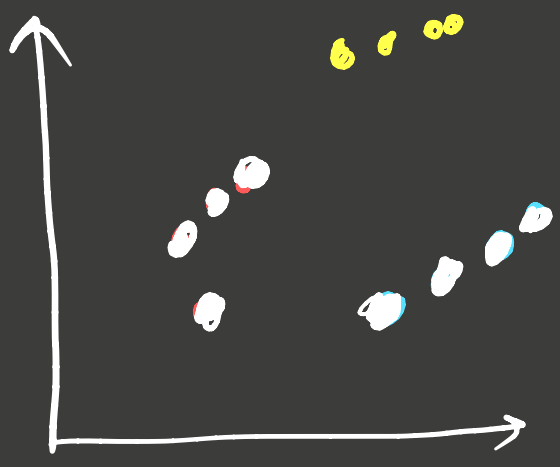
BLUE VS ALL



RED VS ALL

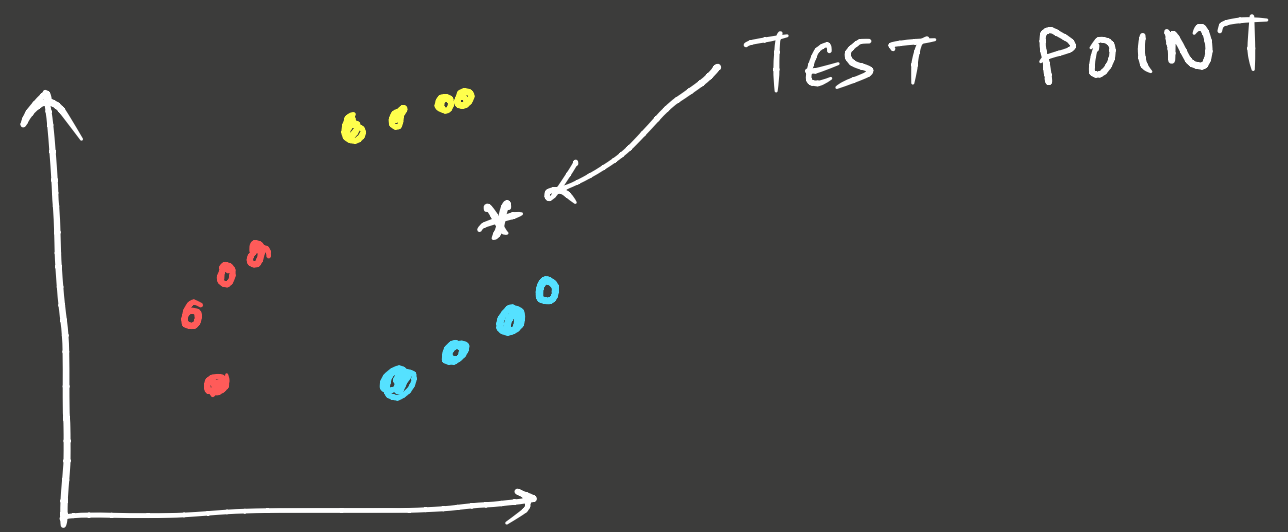


YELLOW VS ALL



SVM FOR MULTI-CLASS CLASSIFICATION

(1) ONE VS ALL



BLUE VS ALL : $\bar{w} \cdot \bar{x}_{TEST} + b = .8$
(+1) (-1)

YELLOW VS ALL : $\bar{w} \cdot \bar{x}_{TEST} + b = .6$
(+1) (-1)

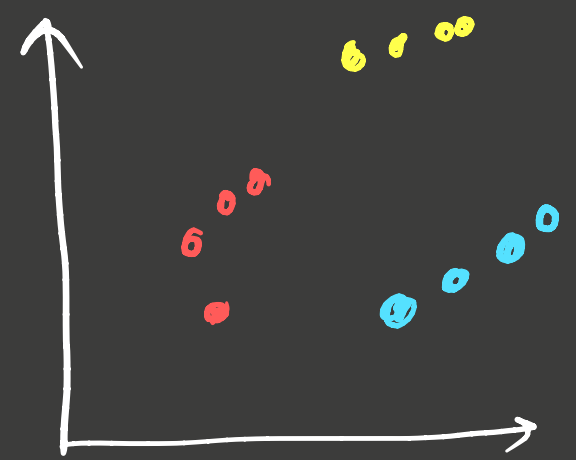
RED VS ALL : $\bar{w} \cdot \bar{x}_{TEST} + b = -0.2$
(+1) (-1)

} argmax = BLUE

∴ TEST POINT IS BLUE CLASS

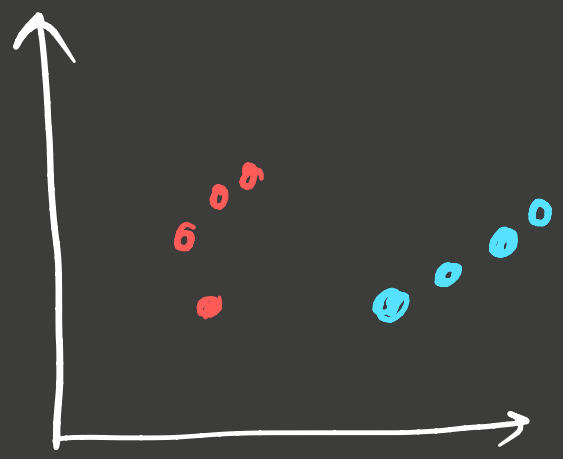
SVM FOR MULTI-CLASS CLASSIFICATION

(1) ONE VS ONE

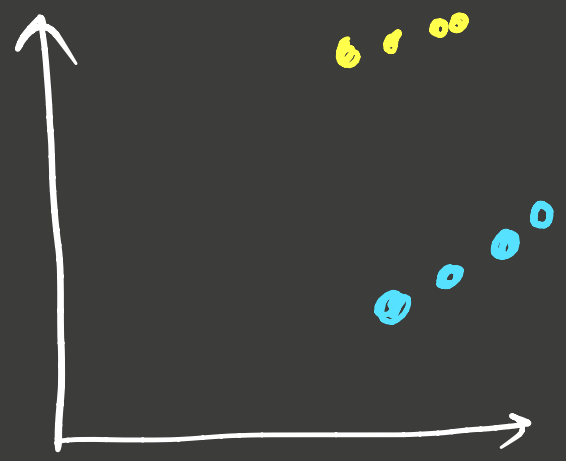


LEARN $3C_2$ CLASSIFIERS

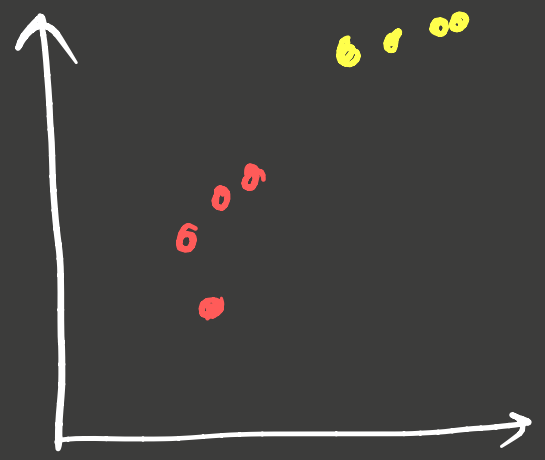
BLUE VS RED



BLUE VS YELLOW



YELLOW VS RED



SVM FOR MULTI-CLASS CLASSIFICATION

(1) ONE VIS ONE

1) BLUE VIS YELLOW → BLUE

2) YELLOW VIS RED → RED

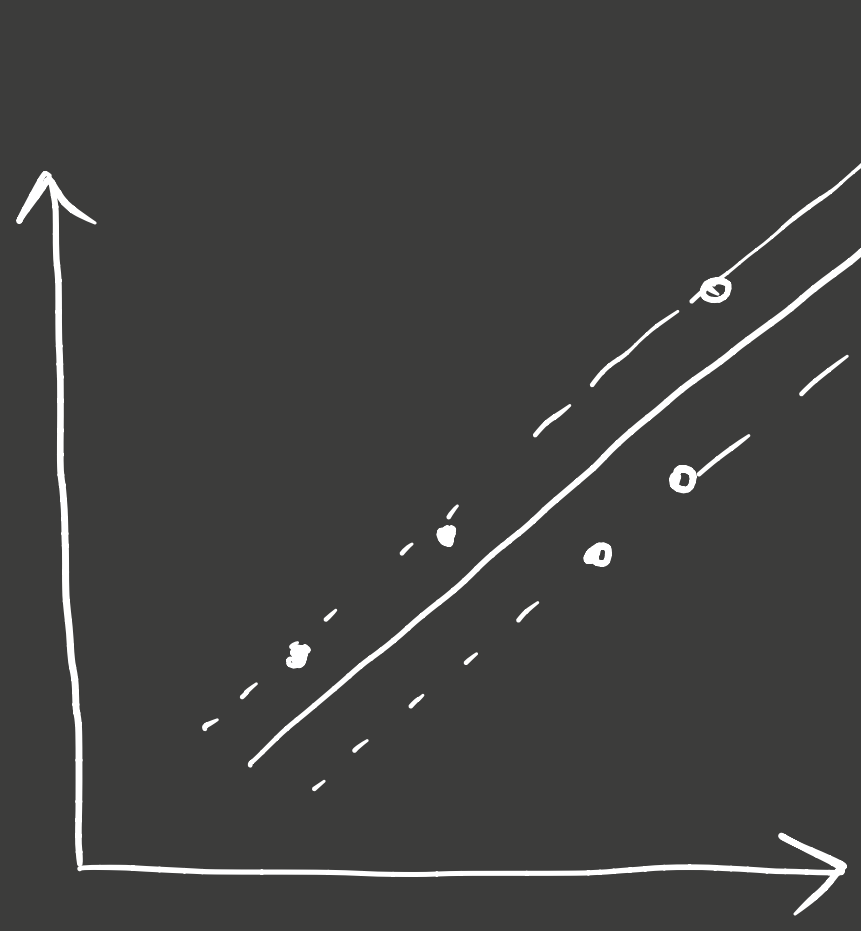
3) RED VIS BLUE → BLUE

MAJORITY = BLUE

SUPPORT VECTOR REGRESSION

HARD MARGIN OR ϵ-SVR

$$\hat{y}(x) = \bar{w} \cdot \bar{x} + b$$



(1) $\hat{y}_i$ has at most 'ϵ' deviation from y_i (for train)

$$-\epsilon \leq y_i - (\bar{w} \cdot \bar{x}_i + b) \leq \epsilon$$

(2) Fit is as "flat" as possible

$\Rightarrow$ Regularize 'w'

i.e. Minimize $\frac{1}{2} \|\vec{w}\|^2$

NOTEBOOK