शिक्षा मंत्रालय
MINISTRY OF
EDUCATION
सत्यमेव जयते

INDIAN INSTITUTE OF TECHNOLOGY
JODHPUR

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NPTEL

Department of Computer Science & Engineering

PMRF
Prime Minister's Research Fellowship

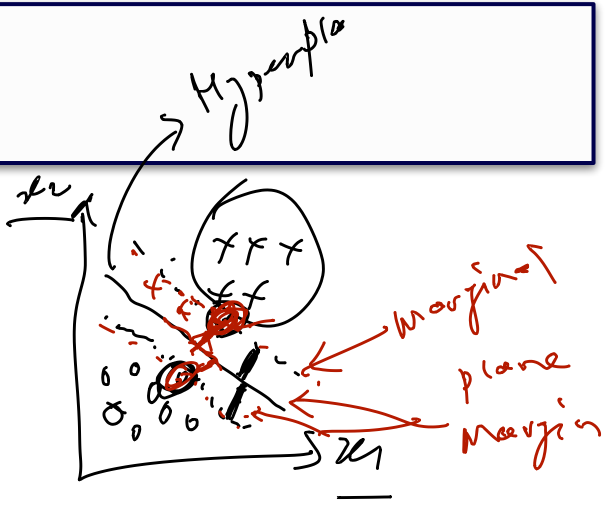
Week 5 - Live Session

Data Mining

Swapnil S. Mane
mane.1@iitj.ac.in
PMRF Research Scholar

Q1. Margin of a hyperplane is defined as:

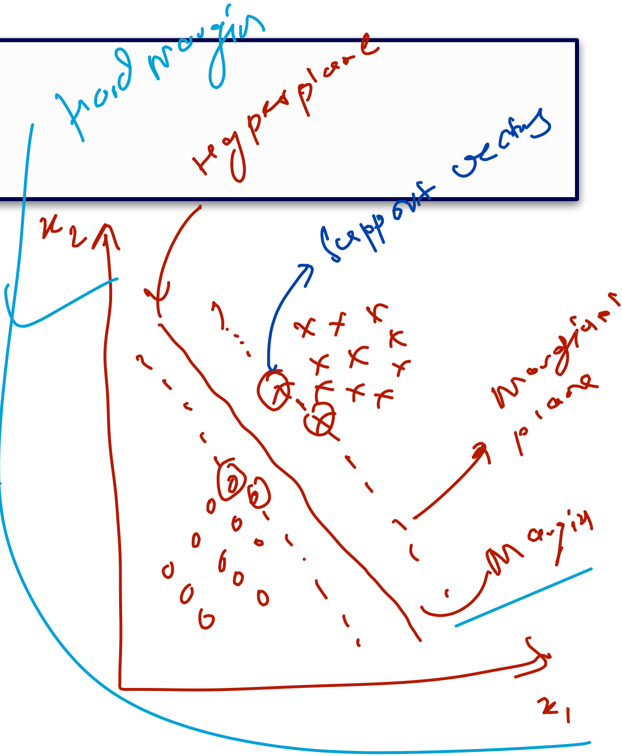
a) The angle it makes with the axes
b) The intercept it makes on the axes
c) Perpendicular distance from its closest point
d) Perpendicular distance from origin



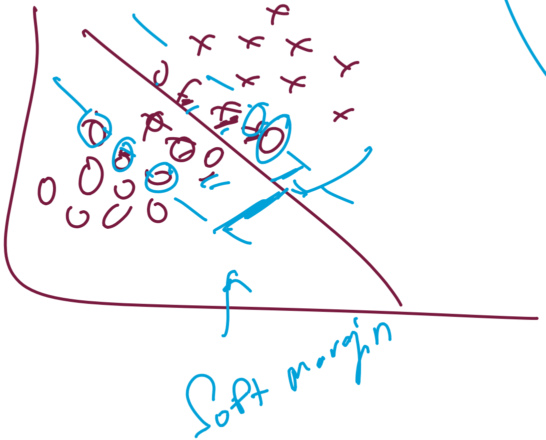
$2 \quad \frac{1}{2}||w||$

Q2. In a hard margin support vector machine:

a) No training instances lie inside the margin
b) All the training instances lie inside the margin
c) Only few training instances lie inside the margin
d) None of the above



C=3



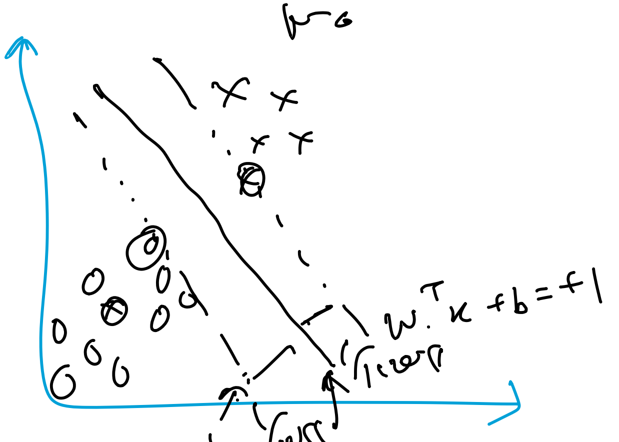
Q3. The primal optimization problem solved to obtain the hard margin optimal separating hyperplane is:

A. Minimize ½ W^TW, such that $y_i(W^TX_i+b) \geq 1$ for all i

B. Maximize ½ W^TW, such that $y_i(W^TX_i+b) \geq 1$ for all i

C. Minimize ½ W^TW, such that $y_i(W^TX_i+b) \leq 1$ for all i

D. Maximize ½ W^TW, such that $y_i(W^TX_i+b) \leq 1$ for all i



Max margin $= \frac{1}{\|w\|}$

$= \sqrt{w_1^2 + w_2^2}$

$= \min \frac{1}{2}\|w\|^2$

$= \min \frac{1}{2} w^T w$

$y_i(w^T x_i + b) \geq 1$

$w^T x + b = 0$

Q4. The dual optimization problem solved to obtain the hard margin optimal separating hyperplane is:

$y_i(w^T x_i + b) \geq 1$

$y_i(w^T x_i + b) - 1 \geq 0$

A. Maximize ½ W^TW, such that $y_i(W^TX_i+b) \geq 1 - \alpha_i$ for all i

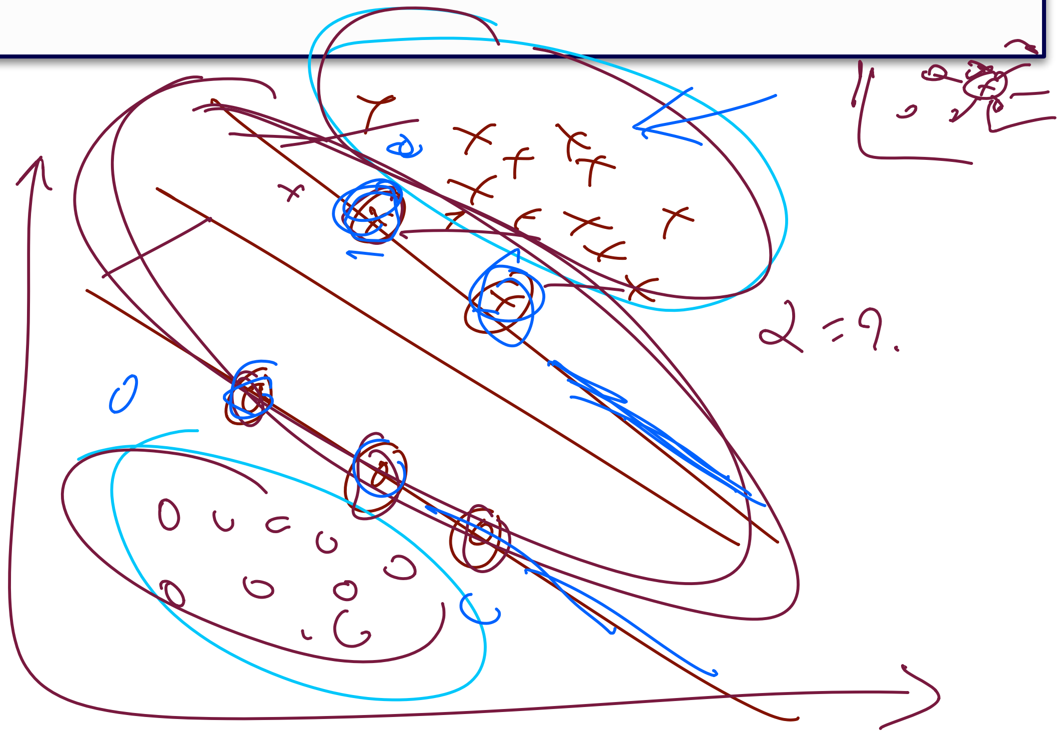
B. Minimize ½ $W^TW - \Sigma\, \alpha_i(y_i(W^TX_i+b) - 1)$, such that $\alpha_i \geq 0$, for all i

C. Minimize ½ $W^TW - \Sigma\, \alpha_i$, such that $y_i(W^TX_i+b) \leq 1$ for all i

D. Maximize ½ $W^TW + \Sigma\, \alpha_i$, such that $y_i(W^TX_i+b) \leq 1$ for all i

Q5. The Lagrange multipliers corresponding to the support vectors have a value:

a) Equal to zero
b) Less than zero
c) Greater than zero
d) Can take on any value



Q6. The SVM's are less effective when:

a) The data is linearly separable
b) The data is clean and ready to use
c) The data is noisy and contains overlapping points
d) None of the above

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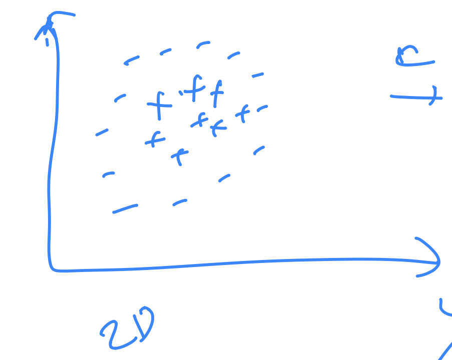
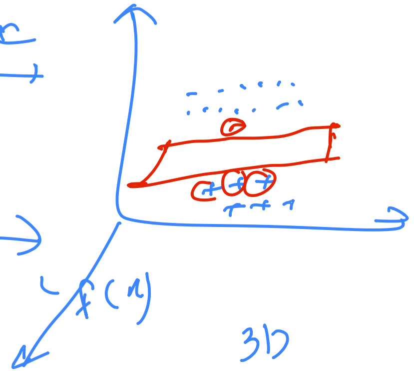
8 week 6

9 week 7

Q7. The dual optimization problem in SVM design is solved using:

a) Linear programming
b) Quadratic programming
c) Dynamic programming
d) Integer programming





(i) problem: binary Classification

C_1^+ / C_2^-

training

	x_1	x_2	C
o_1	–	–	C_1
o_2	–	–	C_2
o_3	–	–	C_1