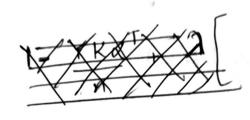
Asignment

Kund SVM with TKT

(Lets consider binary SVM)

$$R(y, f(n)) = \frac{1}{n} \sum_{i=1}^{n} (1 - y_i f(n_i)) + \frac{1}{n} \sum_{i=1}^{n} (1 - y_i f(n_i)) + \frac{1}{n} \sum_{i=1}^{n} (1 - y_i f(n_i)) + \frac{1}{n} \sum_{i=1}^{n} (1 - y_i \sum_{j=1}^{n} y_j x_j f(n_i, x_j)) + \frac{1}{n} \sum_{i=1}^{n} y_i x_j f(n_i, x_j) + \frac{1}{n} \sum_{i=1}^{n} y_i x_j f(n_i, x_j)$$



$$J(a) = 1 - \frac{y^T k \lambda}{n} + \lambda x^T k \lambda$$

$$-\frac{K^{T}Y}{n} + \lambda \left[2Kx \right] = 0.$$

Resubstituting & back in the equation gives solution simular to solving duals of sum

$$\tilde{k} = \int_{n}^{\infty} \tilde{\xi} \, \tilde{\xi} \, \tilde{\xi} \, \tilde{\xi}$$

$$\therefore \tilde{\chi} = \int_{1}^{n} \frac{1}{2} \phi_{i} \phi_{i}^{T} - \frac{2}{n^{2}} \frac{1}{2} \phi_{i}^{T} + \int_{1}^{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} \phi_{i}^{T} \phi_{k}$$

in maticus from this can be written ar

$$\begin{bmatrix} \frac{1}{k} & \frac{1}{k} & \frac{1}{k} & \frac{1}{k} & \frac{1}{k} \\ \frac{1}{k} & \frac{1}{k} & \frac{1}{k} & \frac{1}{k} & \frac{1}{k} \end{bmatrix}$$

(2013):

Let K be a kund of X and let If be the REHS associated with it. Fix An-In t X and

Considu the optimization

f* agnin R (Ha) - A(2n)) + g (1411) f & 34

where $g(\cdot)$ is non increasing and R depends on n_i only through $f(n_i)$.

If I' has a solution then its of the

H.) = & x; k(.,n;)

If g(.) is an increasing function then every bolution of It is of the same form

Profit

let f = f + f1

ty = projections of f outo the span of knowles orthogonal to bunch functions

11(f,) 11 + 1f2112 - 11f112

9 1811 7 11 th 11 : 9(11/1) 7 9(11/11) ~

for most optimal case during optimization g (1+112) = g (11+112)

as a result we can express

f(.) = = = xj K(., xj) K are kund functions

with TRT me get

$$f^* = \underset{n}{\operatorname{arg min}} \int_{n}^{n} \frac{3}{2} \left(y_i - \underset{j=1}{\overset{n}{\leq}} \chi_j \chi(\cdot, x_j) \right)^2$$

$$f \in \mathcal{A}$$

In matrix form we have

Assuming K is invertible, J(x) is larver in a

Setting $\nabla J(x) \neq 3$ to me have $J((y-Kx)^{T}(y-Kx) + \lambda x^{T}xx) = 0$ $-\frac{1}{n} [y-Kx] + \lambda x = 0$ $= \frac{1}{n} [x+n\lambda I] + \frac{1}{n}$