Lecture 13

`After MidSem`

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MidSem Solution Discussion

Now, continuing with classifiers -

SVM for distribution-free learning

Empirical risk: risk of misclassifying training data == structural risk

Minimizing empirical risk implies maximizing margin, i.e. having support vectors close to the separating hyperplanes.

$$\max_{w,b}[\min_i||\mathbf{w}^T\mathbf{x}_i + b||]$$

is the constrained optimization problem subject to the constraints : $||\mathbf{w}|| = 1$ and
$\forall i, t_i(w^T x_i + b) \geq 0$.
$t_i \in \{-1, 1\}$

The above method was one type of formulation for this, another formulation can be:

$$\min_{v,c}||\mathbf{v}||^2$$

such that $\forall i, t_i(\mathbf{v}^T\mathbf{x}_i + c) \geq 1$ and $\mathbf{v}/c = \mathbf{w}/b$.