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ABSTRACT

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1 INTRODUCTION

My current plan is to write a survey about the screening methods used in identifying non-support vector in solving Support Vector Machine (SVM) problem. Such methods differ from the screening strategy for lasso in that, in SVM the data points are discarded while in lasso the features are discarded.

2 SVM: NON-SEPARABLE CASE

We are interested in solving SVM problem where there is no hyperplane that can correctly classify all the data points.

2.1 Without Kernel

The primal formulation of such problem is

$$\begin{aligned} \min_{\mathbf{w},b,\boldsymbol{\xi}} \quad & \frac{1}{2}\|\mathbf{w}\|_2^2 + C\sum_{i=1}^{m} \xi_i \\ \text{s.t.} \quad & y_i(\mathbf{w}\cdot\mathbf{x}_i + b) \geqslant 1 - \xi_i \cap \xi_i \geqslant 0, i \in [m]. \end{aligned} \tag{P}$$

Using the standard derivation, we have the following dual formulation of (P)

$$\begin{aligned} \min_{\boldsymbol{\alpha}} \quad & \|\boldsymbol{\alpha}\|_1 - \frac{1}{2}\boldsymbol{\alpha}^\top \mathbf{Q}\boldsymbol{\alpha} \\ \text{s.t.} \quad & 0 \leqslant \alpha_i \leqslant C \cap \boldsymbol{\alpha}\cdot\mathbf{y} = 0, i \in [m], \end{aligned} \tag{D}$$

where $\mathbf{Q}_{i,j} = y_i y_j(\mathbf{x}_i \cdot \mathbf{x}_j)$.

2.2 With Kernel

3 METHODS

4 RESULTS AND DISCUSSION

REFERENCES