Demo

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1 Bounded Quadratic Programming

Consider SVM model:

$$\min_{\mathbf{w}} \frac{1}{2}\|\mathbf{w}\|_2^2 + c\sum_{i=1}^{n}(1 - y_i\mathbf{w}^T\mathbf{x}_i)_+^p \tag{1}$$

where $(\cdot)_+ = \max(0, \cdot)$. Given $p = 1, 2$, the above problem can be converted into

$$\tilde{\boldsymbol{\alpha}} = \arg\min_{\boldsymbol{\alpha}} f(\boldsymbol{\alpha}) = \frac{1}{2}\boldsymbol{\alpha}^T\mathbf{Q}\boldsymbol{\alpha} + \mathbf{h}^T\boldsymbol{\alpha}, \quad \text{s.t. } 0 \leq \alpha_i \leq c. \tag{2}$$

where $f(\boldsymbol{\alpha})$ denotes the objective function. The solution of problem (1) is given by

$$\mathbf{w} = \sum_{i=1}^{n} y_i\tilde{\alpha}_i\mathbf{x}_i. \tag{3}$$

2 Bounded Quadratic Programming

More descriptions...