Efficient Algorithms for Lasso Regression

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1 Task Overview

Briefly describe the dataset or model you worked on, the goal of the project, and why the task is challenging. For example, challenges may include complex preprocessing, large dataset size, class imbalance, poor performance of baseline approaches, or the need for more complex models to achieve good results.

2 Methods

Explain the methods you implemented or analyzed. Include relevant equations:

$$\min_{\mathbf{w}} \quad \frac{1}{2}\|\mathbf{w}\|^2 + C\sum_{i=1}^{n}\xi_i$$

$$\mathbf{w}^{(t+1)} = \text{prox}\eta\lambda\left(\mathbf{w}^{(t)} - \eta\nabla g(\mathbf{w}^{(t)})\right) \quad \text{with} \quad \text{prox}\eta\lambda(z_j) = \text{sign}(z_j)\cdot\max(|z_j| - \eta\lambda, 0)$$

$$w_j^{(t+1)} \leftarrow \text{prox}\lambda\left(\frac{1}{n}\sum i = 1^n x_{ij}\left(y_i - \sum_{k\neq j} x_{ik}w_k^{(t)}\right)\right),$$

Mention any design decisions or implementation notes.

3 Experiments and Results

Present your results. Use figures, tables, and metrics:

4 Discussion

Summarize key findings, insights, or issues. Optionally, suggest future work or limitations.