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Sparse Support Matrix Machine

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Highlights

- We propose a novel classifier called SSMM for classification problem involved explanatory features that are two-dimensional matrices. Compared with existing classifiers, the proposed method can simultaneously leverage the inherent structural information within matrix-form data and select useful features, and hence improve the classification performance.
- We propose a novel objective function based on regularized risk minimization framework by regularizing the combination of nuclear norm and l_1 norm of the regression matrix, and develop an efficient solver based on GFB splitting framework to solve it. We also provide a theoretical guarantee for the global convergence and analyze the excess risk statistically.
- We extensively evaluate the proposed SSMM on four real datasets. The results show that SSMM achieves state-of-the-art generalization performance under the image classification and single-trial EEG classification tasks.

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