March 6, 2023

Journal of Machine Learning Research

Dear Editors:

We are writing to submit our manuscript "**Iteratively Reweighted Nuclear Norm Methods for Low-Rank Minimization with Rank Identification**" to the *Journal of Machine Learning Research*.We confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere.

In this paper, we propose iteratively reweighted nuclear norm methods for solving Schatten-p regularization problems. The importance of this work lies in the low-rank matrix minimization in machine learning research. We believe this manuscript is appropriate for publication by JMLR because it is a critical task that deeply relates to machine learning research.

The main contribution of our work is that we show the rank identification property possessed by the proposed methods, meaning the correct rank can be detected in finite iterations. This is the first work of pointing out the model identification property (a famous property in vector optimization) in matrix optimization. Based on this property, we also designed a novel updating strategy for ϵ_i to smooth the Schatten-p norm, so that ϵ_i associated with the positive singular values can be driven to 0 rapidly and those associated with the 0 singular values can be automatically fixed as constants after finite iterations, so that the techniques for smooth algorithms can directly applied including acceleration techniques and convergence analysis. Our algorithm were illustrated empirically on test sets of synthetic and real data sets.

Our submission has the following keywords: **low-rank minimization**, **weighted Nuclear norm**, **Schatten-p norm**, **Kurdyka-Łojasiewicz property**, **rank identification**.

We suggest the following action editors and referees for our submission. Action Editors:

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As the corresponding author, I confirm that none of the co-authors listed below have a conflict of interest with the action editors and referees I suggest above. Further, I confirm that all co-authors below consent to my submission of this manuscript to the *Journal of Machine Learning Research*.

Sincerely,

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