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Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Maame Gyamfua Asante-Mensah

PhD Program: Computational and Data Science and Engineering

Title of Thesis: Automatic noise and artifacts removal from biomedical signals and images using tensor completion

Supervisor: Professor Andrzej Cichocki

Name of the Reviewer: Xi-Le Zhao

I confirm the absence of any conflict of interest	
	Date: 22-04-2023

The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report
Reviewers report should contain the following items: • Brief evaluation of the thesis quality and overall structure of the dissertation. • The relevance of the topic of dissertation work to its actual content • The relevance of the methods used in the dissertation • The scientific significance of the results obtained and their compliance with the international level and current state of the art • The relevance of the obtained results to applications (if applicable) • The quality of publications • The summary of issues to be addressed before/during the thesis defense

Overall, the thesis quality and the overall structure of the dissertation are good. The topic of the dissertation is relevant to its actual content. The methods used in the dissertation are appropriate for the research question and the research design. The results obtained in the candidate's research are scientifically significant and contribute to the current state of the art in the field. The candidate's research findings are in compliance with international standards and align with current research trends. The obtained results are potential for practical applications. The candidate has published several papers related to the dissertation topic in academic journals e.g., Machine Learning: Science and Technology. The following aspects should be considered before the thesis defense:

1. The content of Chapter 6 is incomplete, which only includes experiments.

2. t-SVD is the abbreviation of tensor-Singular Value Decomposition instead of Tubal Decomposition. Be consistence with the majority of references.

3. Please explain why to consider the sparsity of core tensors of tensor ring decomposition under the pre-defined dictionary.

5. Why the compared methods are different for random missing and structure missing in Fig. 4.1 and Fig. 4.2. And the order of compared methods are different in Fig. 4.1 and Fig. 4.2.

6. What is the advantage and disadvantage of cross tensor approximation as compared with the other random tensor approximation (e.g., random tensor t-SVD)?

7. Please discuss the relationship between the tensor tubal rank, the tensor multi-rank, and the tensor nuclear norm under t-SVD framework. Is tubal nuclear norm be the convex envelope of the tensor tubal rank?

Provisional Recommendation

⊠ *I recommend that the candidate should defend the thesis by means of a formal thesis defense*

☐ *I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report*

☐ *The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense*