Project SCATE - Evaluation 156313

QUALITY AND SCIENTIFIC AIM

a - Clarity of research objectives and hypotheses
b - Scientific ambition of the project and position in relation to the state-of-the-art
[Added value of the project in terms of scientific contribution - scope, problem and methodological approach - and in terms of knowledge production]
c - Adequacy and relevance of the methods implemented
[« Relevance » is also understood in terms of ethics, scientific integrity and social responsibility of the sciences - and as such, taking into account the sex and/or gender aspect -, of disciplinary coverage (mono-trans-inter-disciplinarity) and of scientific risk management. “Methods” also includes Open Science practices, namely: data management, reuse of existing data sets, development or contribution to open source software, standards, and adopting permanent identifiers for all research products]

COMMENT

The project is concerned with two key tasks in tensor computations: Matrix-tensor products and (multiple) Khatri-Rao products. The project aims to establish communication lower bounds and designs new algorithms that ideally achieve these bounds. Clearly, several innovations with respect to the state-of-the-art are proposed. One issue is that the proposal does not clearly spell out the innovations relative to [12], which is termed a "preliminary study" but involves a set of authors different from the collaborators on the project. The methodology based on [12] is highly adequate; it will very likely lead to the expected results. At the same time, the project is not very specific on major methodological innovations needed to overcome the specific challenges of the project. Concerning open science practice and data management, the described strategy is adequate but sufficiently specific to be entirely convincing.

ORGANISATION AND IMPLEMENTATION OF THE PROJECT

a - Skills, expertise and involvement of the scientific coordinator
b - Contribution to the coordinator’s level of responsibility and team development
c - Adequacy of implemented and requested means to the project’s objectives

Warning:The French National Research Agency (ANR) has signed the San Francisco Declaration on Research Assessment (DORA). Consequently, all the results of research work must be considered (scientific publications, data sets, software, etc.). The use of bibliometric indicators such as the impact factor and the h-index must be banned in favor of qualitative indicators on the works, such as their influence on policies and practices.

COMMENT

The scientific background of the coordinator perfectly matches the scope of the project, putting the coordinator in an ideal position to pursue the proposed work. The described measures for team management are standard. Considering the rather limited scope of the project, the requested budget in terms of personnel appears rather high. The involvement of both, a PhD student and a PostDoctoral researcher, together with the 75% involvement of the coordinator is not fully justified.

IMPACT AND BENEFITS OF THE PROJECT

a - Scientific impact and potential economic, social or cultural impact
b - Strategy for the dissemination and exploitation of the results; promotion of scientific, technical and industrial culture

COMMENT

Matrix-tensor products and Khatri-Rao products, the operations addressed by the project, arise frequently in tensor-based algorithms and hence in most applications that rely on tensors, for example in multivariate data analysis, scientific computing, etc. The focus on these two key operations has the major advantage that the results of the project can, in principle, be easily disseminated to a large number of applications, although a specific integration strategy into existing software is missing. Also, the claim that these two operations are the bottleneck operations (for example, in the HOSVD) is not fully justified. It is not implausible that a more holistic view of, for example, the HOSVD may lead to even better algorithms.

GENERAL OPINION including the strengths and weaknesses of the project

COMMENT

Overall, this is a good project with promising algorithmic developments and impact. However, it has a few weaknesses that would need to be considered before starting the project. None of these weaknesses is major and the project will very likely be very successful.