Selection process - AAPG 2024 Step 1

SCATE

Project Coordinator

Name : KUMAR
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PROJECT SYNTHESIS

Funding instrument

Funding instrument (mandatory) : JCJC - young researchers

Project identity

Acronym : SCATE

Title of the project in French : Décompositions de tenseurs évolutives pour l'analyse de données

Title of the project in English : Scalable tensor decompositions for data analytics

Duration of the project : 48

Research type : Fundamental research

Scientific evaluation panel (CES) : Axe E.05 - High-performance computing, digital models, simulation, applications - CE46

Memory effect

Was the project submitted during the last edition of the call (AAPG 2023) ? : Yes

Would you like the evaluation committee to have access to the previous version of your project and to the final report of the committee sent the previous edition to assess the evolution of your project? : Yes

Explain the changes made between the project submitted to this edition of the call and the project submitted to the previous edition of the call :
This project is in the complementary list of AAPG 2023. I am resubmitting the same project . More precisely, It has the same coordinator, the same team, the same funding instrument and the same title. We have slightly updated the dissemination strategy.

Abstracts

Abstract (non confidential) in English :
Tensors are multi-dimensional arrays and used to store data in several domains, e.g., data mining, neuroscience, scientific simulations and computer vision. Tensor decompositions help to identify inherent structure of data, achieve data compression and enable various ways of data analysis. The computational and memory requirements of tensor operations grow exponentially with the number of dimensions. It is paramount to devise parallel tensor decomposition algorithms which make effective utilization of the modern computing systems. The principal challenges are data transfer costs of tensor operations and limited parallelism exposed by most existing algorithms. This project aims at solving these challenges and proposing new decomposition algorithms which scale well on current and future computing systems. Finally, the proposed algorithms will be implemented for large scale distributed systems and evaluated on several real-world tensors.

Abstract (non confidential) in French :
Les tenseurs sont des tableaux multidimensionnels utilisés pour stocker des données dans plusieurs domaines, par exemple pour la

fouille de données, en neurosciences, dans les simulations scientifiques et pour la vision par ordinateur. Les décompositions de tenseurs permettent d'identifier la structure inhérente des données, de les compresser et de les analyser de diverses manières. Les besoins en calcul et en mémoire des opérations tensorielles augmentent de manière exponentielle avec le nombre de dimensions. Il est primordial de concevoir des algorithmes parallèles de décomposition de tenseurs qui utilisent efficacement les systèmes informatiques modernes. Les principaux défis sont les coûts importants de transfert de données et le parallélisme limité de la plupart des algorithmes existants. Ce projet vise à résoudre ces défis et à proposer de nouveaux algorithmes de décomposition qui s'adaptent bien aux systèmes informatiques actuels et futurs. Enfin, les algorithmes proposés seront implantés sur des machines de calcul distribuées à grande échelle et évalués sur des tenseurs provenant de divers domaines applicatifs.

ERC keywords

ERC keywords
PE06_06 - Algorithms and complexity, distributed, parallel and network algorithms, algorithmic game theory
PE06_12 - Scientific computing, simulation and modelling tools

Panel keywords

Committee keyword
parallélisme massif, hiérarchique et hétérogène
HPC
algèbre linéaire

Open keywords

French term	English term
Compromis communication-calcul	Communication-computation tradeoff
Coûts de communication	Communication costs
Décompositions tensorielles	Tensor decompositions

Sustainable Development Goals (SDG)

French term	English term
Aucun objectif de développement durable ne correspond à mon projet	No SDG matches to my project

Additional information

Would you like your project to be labelled by one or more competitiveness clusters?

No

Does the project involve one or more research infrastructures?

No

Do you plan to apply for co-funding with an ANR partner?

No

Partnership

Category	Organisation	Laboratory	Scientific leader	Amount of funding
Public	Institut national de la recherche en informatique et automatique	Centre Inria de Lyon	KUMAR Suraj	298 387,00

RNSR number : 202224236C

Name of the laboratory : Centre Inria de Lyon

Name of the hosting authority : Institut national de la recherche en informatique et automatique

SIRET of the hosting authority : 18008904700161

Name of the delegation : fields not filled in

Partner category : Research organization

Mailing address : 56 Boulevard Niels Bohr

Additional address : fields not filled in

Zip code : 69603

City : VILLEURBANNE

Country : France

Last name	Email
KUMAR Suraj	**suraj.kumar@inria.fr**
MARCHAL Loris	loris.marchal@ens-lyon.fr
UCAR Bora	bora.ucar@inria.fr

CV of scientific leaders

I confirm that the CV are complete. October 19, 2023 at 12:37 PM

Project overview

I confirm the choice of the instrument "young researchers" and the scientific evaluation committee "Axe E.05 - High-performance computing, digital models, simulation, applications - CE46". I understand that these two pieces of information cannot be modified during the selection process of the call. : Yes

Commitments

If one or more entities outside the competitiveness clusters show an interest in your project, would you be willing to study the possibility of a national partnership?

We, the participants in this project - whether applying for funding or not - undertake to have sought and obtained the agreement of our superiors to participate in this project.

We, participants in this project - requesting funding or not - undertake to consider the sex and/or gender dimension in our research project, in terms of scientific and methodological approach, whatever the field for a production. quality knowledge.

Each principal investigator or applicant of each French partner requesting funds (does not concern foreign partners) formally undertakes to: - Have communicated all the information concerning his/her application procedure (in particular administrative and financial information) to his/her hierarchy and/or to the persons empowered to legally engage the institution managing the aid (that is to say the future Beneficiary, recipient of the aid and contracting partner of the ANR where applicable), or their representatives/delegates - Have obtained their prior agreement before submitting the project proposal to the ANR.

We, the participants in this project - whether applying for funding or not - undertake to abide by the national charter of ethics for research professions and the ANR’s charter of ethics and scientific integrity.

We, the participants in this project - whether applying for funding or not - undertake, in case of funding, to guarantee immediate open access to peer-reviewed scientific publications and to adopt a FAIR (easy to Find, Accessible, Interoperable, Reusable) approach to research data in line with the principle of "as open as possible, as closed as necessary".

We, the participants in this project - whether applying for funding or not - undertake to actively promote scientific, technical and industrial culture through knowledge transfer activities towards citizens and decision makers.

We, the participants in this project - whether or not we are applying for funding - undertake, together with all the participants in the project, to abide by the mechanism for the protection of the nation’s scientific and technical potential (PPST in french).