Project PARTENSOR (T1EΔK-3360)
Deliverable Π3.2: Report on Dissemination (Month 12)

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Chapter 1

PARTENSOR Dissemination

The task of the project PARTENSOR is the development and implementation of efficient parallel algorithms for tensor factorizations, under various factor constraints. The main avenues for communicating our research work to the scientific community is the publication of the research results in top scientific journals and conferences and the established and operation of a web site. In the sequel, we describe our actions towards this end.

Chapter 2

PARTENSOR Web-Site

In October 2018 we have launched the Partensor project site. For our web hosting and our domain names registration we have used the services of "https://www.papaki.com". The available domain names for the project site are

- "https://www.partensor.com"

- "https://www.partensor.eu"

- "https://www.partensor.net"

- "https://www.partensor.org"

The email of the project site is "info@partensor.com".

We have used the CORPORATE+ Drupal template from

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"https://www.morethanthemes.com"

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Drupal is a free and open-source Content Management System (CMS) written in PHP and distributed under the GNU General Public License.

Useful information about the project can be found in the web site. The scope and the goals of the project are briefly described, and the consortium of the project is presented. Also, information about the funding of the project is visible in every page of the Partensor site. More details are mentioned in a dedicated funding section. Publications related to the project, and the upcoming versions of the toolbox, would be available from the project site. The content of the site will be updated throughout the course of the project. The Partensor site is available in two languages, English and Greek.

Chapter 3

PARTENSOR scientific results and related publications

The scientific research related with the PARTENSOR project had started in 2014, during a visit of A. P. Liavas at the University of Minnesota. A result of this visit was the publication of one of the first parallel algorithms for tensor canonical polyadic decomposition (CPD) was published. This algorithm was based on the so-called Alternating Direction Method of Multipliers (ADMoM) algorithm and appeared in the paper

- A. P. Liavas, and N. D. Sidiropoulos, "Parallel Algorithms for Constrained Tensor Factorization via the Alternating Direction Method of Multipliers," *IEEE Trans. on Signal Processing*, Volume 63, no. 20, October 2015, Pages 5450-5463.

This work was further developed in the paper

1. A. P. Liavas, G. Kostoulas, G. Lourakis, K. Huang, and N. D. Sidiropoulos, "Nesterov-based Alternating Optimization for Nonnegative Tensor Factorization: Algorithm and Parallel Implementations," *IEEE Transactions on Signal Processing,* vol. 66, no. 4, Febr. 2018,

which was the basis for the proposal PARTENSOR.

After the submission of the proposal, the team of the Technical University of Crete continued the work on parallel algorithms for CPD with various factor constraints. Work on sparse nonnegative CPD appeared in [1] and work on orthogonal factors appeared in [2], which were presented on June and July 2018, simultaneously with the official start of the project PARTENSOR.

We note that Mr Lourakis (who was a post-graduate student at ECE TUC) participates in the project as member of the NEUROCOM team, while Mr Karakasis is a member of the ECE TUC team (as a post-graduate student).

Ongoing unpublished work under the framework of PARTENSOR exists in the Reports

- Efficient parallel algorithms for tensor factorization (Month 12),

- Tensor models for fMRI processing (Month 12).

The research contents of these reports will be submitted for publication to scientific journals and conferences [3], [4].

Bibliography

[1] G. Lourakis and A. P. Liavas, "Nesterov-based Alternating Optimization for Nonnegative Tensor Completion: Algorithm and Parallel Implementation," *Proc. IEEE 19th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Kalamata, June 2018.

[2] P. A. Karakasis and A. P. Liavas, "Alternating Optimization for Tensor Factorization with Orthogonality Constraints: Algorithm and Parallel Implementation," *International Conference on High Performance Computing & Simulation (HPCS)*, Orleans, July 2018.

[3] P. A. Parakasis. A. P. Liavas, N. D. Sidiropoulos, P. Simos, and E. Papadaki, "fMRI processing with Canonical Correlation Analysis," in preparation.

[4] G. Lourakis, G. Lykoudis, P. A. Karakasis, C. Kolomvakis, J. Papagiannalos, N. Siaminou, C. Tsalidis, and A. P. Liavas, "PARTENSOR: a toolbox for parallel dense tensor factorization," in preparation.