Distributed asynchronous optimization methods

Bachelor / Master thesis

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Description:
In this project, we will consider the asynchronous distributed optimization problem in which each node has its own convex cost function and can communicate directly only with its neighbors, as determined by a (directed) communication topology. The student will revise the current literature and develop distributed optimization algorithms that operate fully asynchronously.

Keywords: Distributed optimization, asynchronicity, large-scale problems, machine learning.

Deliverables:

- A thesis in which the current state-of-the-art is briefly described, some methods are implemented and compared, and possibly a new approach is proposed.

Work type: 20% literature review, 40% simulations, 40% theoretical analysis

Tools: MATLAB

References:
[1] Yanling Zheng, Qingshan Liu, “A review of distributed optimization: Problems, models and algorithms”, Neurocomputing, Volume 483, Pages 446-459, 2022.
[2] Tao Yang, Xinlei Yi, Junfeng Wu, Ye Yuan, Di Wu, Ziyang Meng, Yiguang Hong, Hong Wang, Zongli Lin, Karl H. Johansson, A survey of distributed optimization, Annual Reviews in Control, Volume 47, Pages 278-305, 2019.