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“Refined Convergence and Topology Learning for Decentralized SGD with Heterogeneous Data”

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Abstract

One of the key challenges in decentralized and federated learning is to design algorithms that efficiently deal with highly heterogeneous data distributions across agents. In this work, we revisit the analysis of Decentralized Stochastic Gradient Descent algorithm (D-SGD) under data heterogeneity. We first exhibit the key role played by a new quantity, called neighborhood heterogeneity, on the convergence rate of D-SGD. We then argue that neighborhood heterogeneity provides a natural criterion to learn data-dependent topologies that reduce the detrimental effect of data heterogeneity on the convergence of D-SGD.

Bio: Batiste Le Bars is a postdoc at Inria Lille under the supervision of Aurelien Bellet and Marc Tommasi from Inria and Anne-Marie Kermarrec from Epfl. Before that, He completed a PhD in applied mathematics at Centre Borelli, ENS Paris-Saclay, under the supervision of Nicolas Vayatis and Argyris Kalogeratos.