

Towards Resilient and Robust Asynchronous Linear Systems Solvers for Edge Computing

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Wearable healthcare devices, content delivery systems, and smart home devices are pushing applications, data, services and, consequently, large-scale computations away from centralized environments onto the network, closer to the requests. Newly emerging technology of *edge computing*, where networked, autonomous devices work collaboratively to achieve a common goal through the synergy of humans and machines, requires asynchronous, flexible and resilient algorithms for decentralized processing, communication and predictions in heterogeneous environments. While the benefits of developing autonomous capabilities are multifold, edge computing systems are subject to device failures, partial data losses, or security attacks, and hence require multidimensional resilience solutions. In this talk, we will present our recently developed resilience and robustness improvements when solving linear systems of equations with asynchronous Jacobi (ASJ) method. Inspired by the ADMM (Alternating Direction Method of Multipliers) and average consensus push-sum, we derived rejection and update criteria that allow to restore the convergence of the original ASJ method in the presence of data corruption or communication delays.

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