Special Issue

Advancing Privacy-Preserving Federated Learning: Innovative Frameworks and Protocols

Message from the Guest Editors

The increasing demand for data privacy and secure machine learning has fueled interest in federated learning (FL)—a paradigm that enables the training of machine learning models across distributed devices and servers without centralized data collection. This aligns closely with the core themes of Entropy, including information-theoretic security, uncertainty quantification, and the trade-offs among privacy, utility, and efficiency. Despite its promise, federated learning still faces critical challenges in guaranteeing robust privacy in the context of realistic adversarial models. This Special Issue invites high-quality, original research that advances the theoretical foundations and practical implementations of privacy-preserving federated learning, grounded in information theory, entropy-based analysis, and cryptographic mechanisms. We especially welcome interdisciplinary contributions that explore the intersection of machine learning, cryptography, and information theory. Studies that provide measurable security guarantees, resource-efficient protocols, and scalable system designs are of particular interest. We look forward to receiving your contributions.

Guest Editors

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Message from the Editor-in-Chief

The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

Entropy is an online open access journal providing an advanced forum for the development and/or application of entropic and information-theoretic studies in a wide variety of applications. *Entropy* is inviting innovative and insightful contributions. Please consider *Entropy* as an exceptional home for your manuscript.

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