

Communication-Efficient Federated Learning

Tech ID: 34170 / UC Case 2025-818-0

BRIEF DESCRIPTION

A groundbreaking algorithm that significantly reduces communication time and message size in distributed machine learning, ensuring fast and reliable model convergence.

FULL DESCRIPTION

This technology presents a novel approach to federated learning that addresses the critical challenge of communication bottlenecks by transmitting only a single scalar value instead of high-dimensional parameter sets during the model update phase. This method dramatically lowers bandwidth requirements and communication time, facilitating scalable, efficient, and privacy-preserving machine learning across distributed networks.

SUGGESTED USES

- » Scalable federated learning solutions for Internet of Things (IoT) devices and mobile applications.
- » Efficient distributed learning systems for edge computing environments.
- » Resource-constrained scenarios requiring minimal data transmission and low energy consumption.

ADVANTAGES

- » Drastic reduction in data transmitted, minimizing communication time and bandwidth usage.
- » Guaranteed convergence for reliable and efficient model updates.
- » Significant scalability improvements allowing for more devices to participate in federated learning.
- » Potential for enhanced security and privacy through gradient obfuscation.
- » Simple and robust encoding process for facile integration into existing systems.

PATENT STATUS

Patent Pending

RELATED MATERIALS

- » Rostami, M., Kia, S. S. (2024). FedScalar: A Communication efficient Federated Learning. arXiv.

CONTACT

Edward Hsieh
hsiehe5@uci.edu
tel: 949-824-8428.



OTHER INFORMATION

CATEGORIZED AS

- » **Biotechnology**
 - » Bioinformatics
- » **Communications**
 - » Internet
 - » Networking
 - » Wireless
- » **Computer**
 - » Security
 - » Software
- » **Medical**
 - » Software
- » **Security and Defense**
 - » Cyber security

RELATED CASES

2025-818-0

UCI Beall
Applied Innovation

5270 California Avenue / Irvine, CA
92697-7700 / Tel: 949.824.2683



© 2025, The Regents of the University of
California
[Terms of use](#)
[Privacy Notice](#)