



Home / Books / Split Federated Learning for Secure IoT Applications: Concepts, frameworks, applications and case studies /  
Enhancing computational performance in healthcare through federated learning approach

## Split Federated Learning for Secure IoT Applications: Concepts, frameworks, applications and case studies

[← Previous chapter](#)

[Next chapter >](#)

Chapter Item 09 October 2024

Chapter 7

# Enhancing computational performance in healthcare through federated learning approach

**Authors:** Farzeen Ashfaq, N.Z. Jhanjhi, Navid Ali Khan, Sayan Kumar Ray, Gururaj H.L., Amna Faisal, and Shampa Rani Das | [Authors Info & Affiliations](#)

**Publication:** Split Federated Learning for Secure IoT Applications [https://doi.org/10.1049/PBSE025E\\_ch7](https://doi.org/10.1049/PBSE025E_ch7)



Get access

## Abstract



With the proliferation of digital health records and medical imaging data, the healthcare sector stands at the cusp of a data-driven transformation. However, leveraging this wealth of information for computational analysis poses significant challenges, primarily concerning privacy, security, and computational performance. Federated learning has emerged as a promising solution, allowing collaborative model training across distributed healthcare institutions while preserving data privacy. This study explores the rapidly developing topic of healthcare federated learning applications with an emphasis on improving computational performance. We introduce federated learning and its relevance within healthcare contexts, particularly privacy and security challenges inherent in healthcare data sharing. Further, we explore studies involving the application of federated learning in maintaining privacy while improving model performance and assess performance benchmarks of federated learning models utilizing the healthcare datasets. Some other discussed issues include optimization techniques specific to federated learning in healthcare, such as federated averaging and differential privacy, scalability challenges and strategies for resource-efficient utilization within federated learning setups, and recent studies demonstrating the effectiveness of federated learning in various healthcare tasks purpose is to clarify metrics for performance improvement including model precision, convergence rate, resource consumption, resilience to changes in data distribution, and privacy protection. By combining numerous study findings, this chapter provides a comprehensive overview of the crucial role that federated learning plays in improving computer performance in healthcare analytics while preserving data security and privacy.



## Get full access to this chapter

View all available purchase options and get full access to this chapter.

 Get access

Already a subscriber? Sign in as an individual or via your institution

## References

1. | Alowais, S. A., Alghamdi, S. S., Alsuhebany, N., et al. (2023). Revolutionizing healthcare: The role of artificial intelligence in clinical practice. *BMC Medical Education*, 23(1), 689.

[Google Scholar](#)

---

2. | Shortreed, S. M., Cook, A. J., Coley, R. Y., Bobb, J. F., and Nelson, J. C. (2019). Challenges and opportunities for using big health care data to advance medical science and public health. *American Journal of Epidemiology*, 188(5), 851–861.

[Google Scholar](#)

---

[Show all references](#)

## Recommended

### SECURITY ISSUES OF FEDERATED LEARNING IN REAL-LIFE APPLICATIONS

H. P. Zheng, S. Sthapit, G. Epiphanidou, C. Maple

Vol. 2021, Iss. 4 | 13 May 2024

## Federated Identity and Access Management in IoT systems

Benjamin Aziz, Alvaro Arenas, Bruno Crispo

Engineering Secure Internet Of Things Systems

03 July 2024

## Introduction to federated learning, split learning and splitfed learning

Gururaj Harinahalli Lokesh, Geetabai S. Hukkeri, N.Z. Jhanjhi, Hong Lin

Split Federated Learning For Secure IoT Applications

09 October 2024

[View full text](#) | [Download PDF](#)

[About IET Digital Library](#)

[Help](#)

[Contact](#)

[Back to top ^](#)

### Follow IET



---

### About IET

[Our history](#)

### Membership & Registration

### Career & Learning

[Professional registration](#)

### Intelligence & Research

Vision and Strategy

Governance

AGMs

Royal Charter and Bye-laws

Our offices

Our venues

Working for the IET

Adverstising and sponsorship

Join the IET

Benefits of memberships

Manage your membership

Member News

Communities

Professionalism and ethics

IET Library and Archives

E+T magazine

Professional development

Career Manager

Accreditation

Courses and training

IET Academy

Support for employers

Routes to engineering

STEM education

Career support

Engineering jobs

Publishing with IET Journals

Publishing with IET Books

Inspec

Subscribe to our content

Bookshop

Wiring Regulations

Codes and guidance

IET.tv - video content and production

IET Library and Archives

## Events

Events

Search all events

## Get Involved

Volunteering for IET

Young Professionals

Partnerships

Collaboration

Support future generations

Online community

## Impact & Society

Sectors

Government policy and submissions

Thought leadership

Our impact in Scotland

Our impact in Northern Ireland

Factfiles

## Media Hub

Campaigns

Press releases

Media support for members

IET social media

## Awards and scholarships

---

© 2024 The Institution of Engineering and Technology

The Institution of Engineering and Technology is registered as a Charity in England and Wales (no 211014) and Scotland (no SC038698)

Brought to you by Atypon Systems