







Home / Books / Split Federated Learning for Secure IoT Applications: Concepts, frameworks, applications and case studies / Splitfed learning methods for natural language processing

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

✓ Previous chapter
Next chapter >

Chapter Item 09 October 2024

Chapter 4

Splitfed learning methods for natural language processing

Authors: Amna Faisal, N.Z. Jhanjhi, Sayan Kumar Ray, Gururaj H.L., Farzeen Ashfaq, and Shampa Rani Das Authors Info & Affiliations

Publication: Split Federated Learning for Secure IoT Applications https://doi.org/10.1049/PBSE025E ch4



Abstract

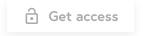




The growing importance of data privacy has spurred the development of novel techniques for training natural language processing (NLP) models without compromising user confidentiality. This chapter explores two such techniques: federated learning (FL) and splitfed learning (SFL). FL enables distributed training on private datasets across devices, sharing only model updates with a central server. SFL, a sub-technique, takes a further step by splitting the model itself for training on both local devices and a central server, exchanging only intermediate results. This chapter explores SFL for privacy-preserving NLP tasks like text categorization and question answering (QA). Traditional approaches often necessitate centralized data storage, raising privacy concerns. FL and SFL address this by enabling distributed model training on user devices without sharing raw data. We discuss the benefits and shortcomings of each approach, highlighting FL's ability to handle complex models while acknowledging its potential communication overhead and performance limitations. We emphasize the relative newness of SFL and the early stages of research on its application in NLP tasks. Finally, we explore potential areas for future work, including reducing communication overhead, investigating optimal model architectures, and developing robust methods for handling non-IID data. Overcoming these challenges can ensure FL and SFL techniques have a promising future in NLP, enabling powerful model development while safeguarding user privacy.

Get full access to this chapter

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



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

References

N

<u></u>

0

	Aledhari, M., Razzak, R., Parizi, R.M. and Saeed, F., 2020. Federated learning: A survey on enabling technologies, protocols, and applications. <i>IEEE Access</i> , 8, pp. 140699–140725. Google Scholar
2.	Ullah, F., Srivastava, G., Xiao, H., Ullah, S., Lin, J.C.W. and Zhao, Y., 2023. A scalable federated learning approach for collaborative smart healthcare systems with intermittent clients using medical imaging. <i>IEEE Journal of Biomedical and Health Informatics</i> . Google Scholar

Show all references

Recommended

SECURITY ISSUES OF FEDERATED LEARNING IN REAL-LIFE APPLICATIONS

H. P. Zheng, S. Sthapit, G. Epiphaniou, 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

Vision and Strategy

Membership & Registration

Join the IET

Career & Learning

Professional registration

Professional development

Intelligence & Research

10/28/24,	12:46 PM

Events

Splitfed learning methods for natural language processing | Split Federated Learning for Secure IoT Applications

	- F 3		e ie i i ik koneenneine
Governance	Benefits of memberships	Career Manager	Publishing with IET
AGMs	Manage your membership	Accreditation	Journals
Royal Charter and Bye-laws	Member News	Courses and training	Publishing with IET Books
Our offices	Communities	IET Academy	Inspec
Our venues	Professionalism and	Support for employers	Subscribe to our content
Working for the IET	ethics	Routes to engineering	Bookshop
Adverstising and sponsorship	IET Library and Archives	STEM education	Wiring Regulations
Adverstising and sponsorship	E+T magazine	Career support	Codes and guidance
		Engineering jobs	IET.tv - video content and production
			IET Library and Archives

Events	
Events	
Search all events	

Volunteering for IET
Young Professionals
Partnerships
Collaboration
Support future generations
Online community

Get Involved

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