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

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Chapter 4

# Splitfed learning methods for natural language processing

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## 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.



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