

Bachelor-Praktikum Federated Learning

Lehrstuhl Data Systems - WS 2025/26

Nikita Agrawal

10. Oktober 2025

Agenda

- 1 General information
- 2 What is federated learning and what do you need it for?
- 3 Checkpoints for Praktikum
- 4 Closing Remarks

Verwendbarkeit

General information about the Bachelor internship (INF 105):

Verwendbarkeit	SWS	LP
Angewandte Informatik (Bachelor)	} 4	6
Informatik (Bachelor)		
Lehramtsstudiengang Informatik (Staatsexamen)		
Prerequisites		
INF 107 - Konzepte der Programmierung		
INF 109 - Algorithmen und Datenstrukturen I		

Tasks

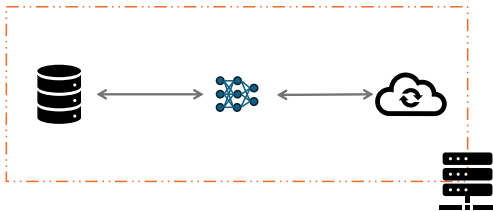
- Conceptualizing your own work
- Setting up a suitable environment
- Programming a (federated) machine learning program
- Presentation of the results (report & lecture)

Evaluation criteria

- Development of individual algorithmic and implementation skills
- Systematically developing code
- Communicative competence - presentation of solution
(Written report & Final presentation & Code documentation)

Bring calculation to the data instead of the other way around

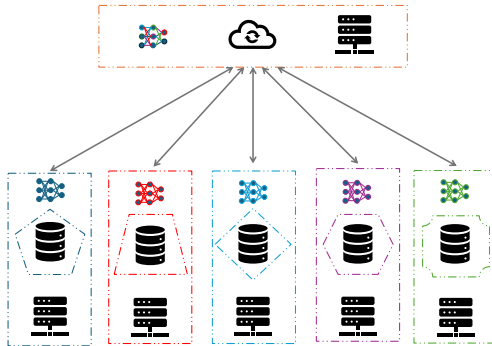
- In classic machine learning (ML), (all) data is sent to a central server.
- The server receives data and calculates a solution using 'big data'.



Simplified sketch of a central machine learning architecture: Model and (collected) data are stored centrally.

Bring calculation to the data instead of the other way around

- In federated learning (FL), the 'clients' (local data) traditionally communicate with the 'server' (strategy) in order to exchange metadata (parameters).



Federated learning architecture with a central server: The clients have individual, private data sets and a copy of the global model, the server “averages” the learning progress and sends updates to the clients.

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- Faster learning via 'exchange of learning success'
- 'Age of mobile devices' (54% of the world's population own a smartphone [1] (2023))

Checkpoints

- Introduction event - check
- Teaching the fundamentals (2 sessions)
- Independent work: Templates are available online
- Tutorial offer: opportunity to ask questions and get support
- Closing events (dates, see below)

Appointments

- Session 1: 20.10.2025, 11:15 - 12:00, S 110
- Session 2: 27.10.2025, 11:15 - 12:00, S 110

Closing Remarks

- Participation mandatory for all
- Hold a prepared presentation
- Focus on the problem/solution - do not go through the code line by line!
- Submission of the final report (deadline: 15 March)

Sources



K. B. MATTHEW SHANAHAN, *The state of mobile internet connectivity report 2023*, GSMA, London, UK, (2023).