



Communication and Energy Efficient
Edge Artificial Intelligence Framework
for Internet of Things

Zwischenbericht | Call 18 | Stipendium ID 6801

Lizenz: CC BY

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1 Einleitung

This interim report documents the progress made in the project (Stipendium ID: 6801) up till now, summarizes the major milestones accomplished, and presents an outlook into the remaining tasks.

2 Status

2.1 Meilenstein 1 - <Literature Review>

The first milestone consisted of conducting a thorough review of the literature in order to get a sound understanding of the existing approaches, their strengths, and weaknesses, identify the missing gaps, and explore the open research problems. The output of this milestone resulted in a research question (RQ) that represented a problem that has largely been overlooked by the existing approaches and needed attention.

2.2 Meilenstein 2 - <Methodology>

This milestone consisted of exploring federated learning (FL) frameworks for solving the problem identified in the form of RQ. Although FL has garnered a lot of attention recently, and there exists a multitude of open-source frameworks for developing solutions for FL, we encountered some obstacles, especially regarding finding appropriate open-source datasets and customizing the existing frameworks. We tried to work with the existing solutions. However, it was difficult to incorporate additional functionality needed for answering our RQ, so we decided to develop our own framework. The output of this milestone consists of findings regarding existing solutions and their limitation.

2.3 Meilenstein 3 - <Framework>

The third milestone consisted of developing the FL framework which overcomes the limitations of the existing frameworks and allows federated clients to independently design their own models based on their training data and computation power. We developed a Python Pytorch-based framework that enables clients to train personalized models. We evaluated the performance of the model on an open-source dataset and compared it with the two existing approaches. The preliminary results demonstrate the superiority of the developed framework over the existing solutions.

2.4 ...

3 Zusammenfassung Planaktualisierung

Alle Anpassungen des Planungsdokuments kurz zusammengefasst

We are proceeding according to the planning document and have managed to complete the tasks/milestones proposed in the original planning document. Therefore, no changes are to be made in the planning document, currently.