



# Federated Learning on Edge Devices for Intelligent Energy Systems

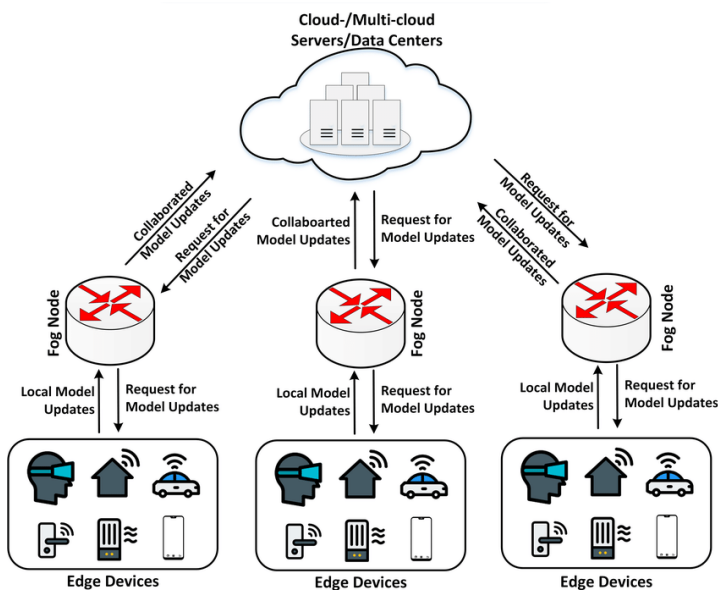
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## Motivation

**Almost done with your studies but need a student job?  
Or you also want to do your Master thesis or project?  
Are you interested in Machine Learning,  
but you have data privacy concerns?!**

Intelligent energy systems (e.g., smart meters) and their back-end services (e.g., grid load predictors) are sold as “the solution” to the energy crisis. How about energy-data privacy of these services?

**Federated Learning** allows for smarter models, lower latency, and less power consumption, all while ensuring privacy.



The goal is for you to learn, understand, plan, and successfully implement a Federated Learning framework on Edge Devices for Energy use-cases; e.g., Energy Consumption Prediction.

## Goals and Tasks

- ✂ Neural Architectural Search (NAS) for Prediction Networks
- ✂ Quantizing and Deploying NNs on Edge (e.g., RPi, Jetson)
- ✂ Implementing TinyML on microControllers (e.g., MCUNet)
- ✂ Implementing a Federated Learning framework
- 📅 Continuous Progress Documentation and Reports
- 💡 Collaboration with Colleague Students and Industry

## 📄 Contract

- ✅ **Position:** Studentische Mitarbeiter-in
- ✅ **Monthly salary:** €1.105 Brutto
- ✅ **Commitment:** 6 to 12 months
- ✅ **Weekly hours:** 20

## Schedule

- > Reading related work and first steps
- > Intermediate presentation or poster
- > Implementing, experiments, ...
- > Writing Thesis/Report
- > Final presentation

## Courses & Deliverables

- ✅ **Master Project**
  - Project code (Git)
  - Report (L<sup>A</sup>T<sub>E</sub>X)
  - Presentation (pptx)
  - Poster (L<sup>A</sup>T<sub>E</sub>X)
- AND/OR –
- ✅ **Master's Thesis**
  - + **DiplomandInnenseminar (CS)**
  - Initial presentation (pptx)
  - Project code (Git)
  - 60+ Pages Thesis (L<sup>A</sup>T<sub>E</sub>X)
  - Final presentation (pptx)
  - Poster (L<sup>A</sup>T<sub>E</sub>X)

## Recommended if you're studying

- ✅ CS
- ✅ ICE
- ✅ SEM

## Prerequisites

- > Deep Learning Course
- > Signal Processing Course
- > Regression, Prediction, Forecasting
- > Tensorflow, PyTorch, Scikit-learn, Numpy
- > Willing to Learn MLOps on Edge Devices

## 📧 Contact

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