

Forschungspraxis

# Towards Digital Network Twins: Can we Machine Learn Network Function Behaviors?

Digital Network Twins can help to improve future network operation and management significantly. A Digital Twin of a network is a digital representation that is coupled to the real network. It can be used to perform experiments e.g. to improve the operation of the real network. Running a detailed model of a network as a Digital Network Twin can be quite challenging. Either the computational effort is too high to run the model somehow in real-time or the abstraction level is too high so the Digital Twin does not represent the real network closely enough. Here Machine Learning could be a solution. Instead of accurately modeling the behavior analytically, a machine learning approach observes and learns the behavior of a network and its elements and may lead to a model that is less complex to use for a Digital Twin. Research in this direction is still at its infancy, however.

This research internship should investigate the ability of current machine learning approaches to learn the behavior of network functions. For this task, exemplary network functions, e.g., written in P4, should be set up in a virtual and a hardware testbed. The setup should further contain traffic generators to benchmark network functions and monitoring installations to observe the behavior of the network functions. The collected data should then be used to train machine learning models. The core question is whether how far the behavior of network functions can be learned and abstracted with machine learning models.

## Advisors

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