Universität Stuttgart

**INSTITUT FÜR
KOMMUNIKATIONSNETZE
UND RECHNERSYSTEME**
Prof. Dr.-Ing. Andreas Kirstädter

Master thesis No. 960
Transport Network Reconfiguration using Deep Learning

| **Methods**	**Topics**
Deep Learning	Multi-layer networks
Performance Evaluation	Optical networks

Background

Novel and higher-quality Internet services fuel an exponential growth of traffic in Internet service providers' transport networks. This leads to a significant increase in resource demand with large variations over time thus requiring more efficient and dynamic operation of future networks. The Software-Defined Networking (SDN) paradigm enables an efficient and dynamic (re)configuration of multi-layer transport networks. Optimal configurations can be obtained by various methods. A current research topic at the IKR is, whether deep learning is capable of finding suitable configurations, too. Projects like Google's AlphaGo and Facebook's face recognition show the huge potential deep learning has to offer.
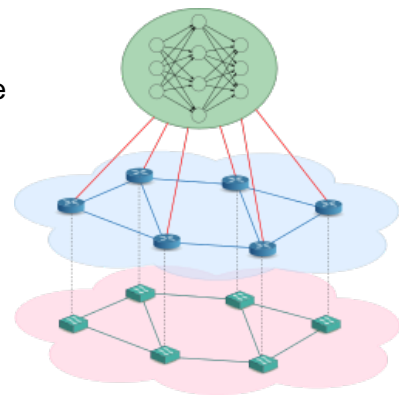
Task

In this project you will design, implement and evaluate a deep learning-based optimization algorithm for the dynamic reconfiguration of multi-layer networks. The algorithm will be integrated into an existing simulation tool. This project involves the following tasks:

- Familiarization with deep learning and the existing framework

- Design and implementation of the deep learning-based optimization module

- Simulative evaluation of both parameterization and performance

Acquired Knowledge and Skills

You will learn to identify a solution approach for a specific problem in the literature, to adapt and to implement it. Furthermore, you learn how to evaluate a complex system through simulation. You will gain insight into multi-layer networks and deep learning. In addition, you will gain experience in using an extensive, modular, object-oriented software framework.

Requirements	**Desirable knowledge**
Programming Experience in Java	Communication Networks II

Contact

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