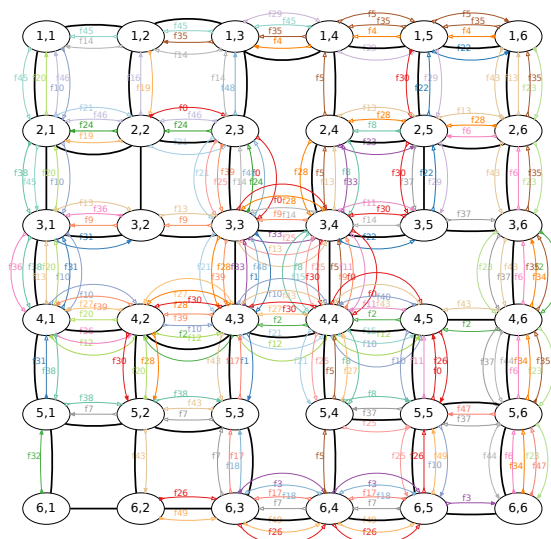


Modeling ATS Queue Levels using GNNs

Motivation

Time Sensitive Networking (TSN) is a set of standards for deterministic service over Ethernet [1]. Asynchronous Traffic Shaping (ATS) is one such standard that does, in contrast to other standards, not rely on time synchronization [2]. An important metric to estimate delay bounds in networks is the occupancy level of queues. The aim of this thesis is to analyze queue occupancy levels using different approaches, including a machine learning approach that relies on Graph Neural Networks (GNNs) [3].



- [1] https://en.wikipedia.org/wiki/Time-Sensitive_Networking
- [2] https://en.wikipedia.org/wiki/Time-Sensitive_Networking#IEEE_802.1Qcr_Asynchronous_Traffic_Shaping
- [3] <https://distill.pub/2021/gnn-intro>

Your Task

- Familiarize yourself with TSN-ATS and GNNs
- Create a datasets using different network simulators
- Apply a GNN approach to predict queue occupancy values
- Evaluate the quality of the approach by comparing queue occupancy values collected using different approaches

Requirements

- Hands-on experience with machine learning, preferably PyTorch
- Basic knowledge of computer networks and communication
- Experience in Python
- Self motivated work approach

Contact

Max Helm helm@net.in.tum.de
Christoph Schwarzenberg schwarzenberg@net.in.tum.de

