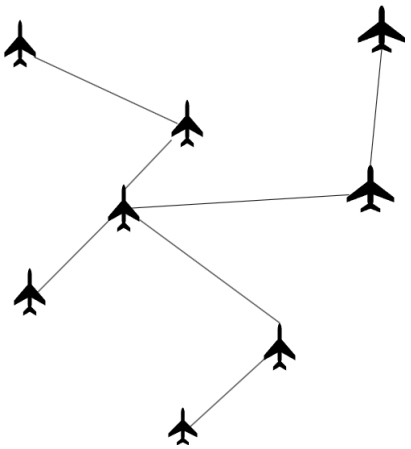
Chair of Network Architectures and Services
School of Computation, Information, and Technology
Technical University of Munich

Thesis M.Sc.

Reinforcement Learning for Goal-Oriented Route Selection in Airborne Networks Based on Performance Modeling

Motivation

Efficient route selection is paramount for optimizing network performance in the dynamic environment of Airborne Networks. Building upon a developed performance modeling algorithm that estimates path delay based on flow characteristics (packet size and number of packets) and link conditions, network nodes should autonomously determine optimal routes with a Reinforcement Learning Algorithm based on specific performance goals; e.g., minimizing packet delay, maximizing network throughput, preventing congestion or multi-objective optimization.



Your Task

- Literature Research
- There is already a performance modeling algorithm, which is a Graph Neural Network. Building upon a performance development algorithm, student should develop reinforcement learning aspects: Q function and reward.
- Creation of a simulation environment to assess the developed Reinforcement Algorithm.

Requirements

- Knowledge of Machine Learning, particularly Reinforcement Learning concepts and algorithms.
- Basic understanding of Wireless Communication principles, specifically Network layer.
- Proficiency in PyTorch would be a plus Experience with the NS-3 network simulator would be a plus
- Motivation ;)

Contact

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