Lehrstuhl für Informationstheorie und Datenanalytik (INDA) | RWTH AACHEN UNIVERSITY

Bachelor/Master Thesis / Hiwi Jobs

Multi-objective Reinforcement Learning Method for Multi-objective 6G Network Slicing

Keywords

Reinforcement Learning (RL), optimization, 6G network resource allocation.

Description

Network slicing is a key technology in the 5G era to ensure diversified services with distinct requirements on one infrastructure. It will still be important in the future 6G network as the services provided by 6G will be even more diversified and more heterogeneous.

Deep Reinforcement Learning (DRL) has been widely used for this kind of dynamic resource allocation problem. The network slicing needs to consider several objectives such as delay and energy consumption jointly to improve the user experience. Current methods used in DRL for network slicing convert the multi-objective problem into a single-objective problem which requires predefined weights of preference between different objectives. In this thesis, we propose to use multi-policy methods to approximate the real Pareto-optimal set of the multi-objective problem for network slicing.

Goals

The thesis aims to extend the previous work in RL for network slicing to a multi-objective problem with a client preference prediction mechanism. The steps would be to:

- Understand the necessity of the client preference prediction and the methods that can be applied to solve this kind of multi-objective problem.
- Implement the outer-loop Reinforcement learning for client preference prediction.
- The results of a thorough performance evaluation should indicate whether the client preference prediction approach is effective and what its limitations are (scalability, reliability, etc.).

Requirements

- Solid Python programming skills.
- Basic knowledge in reinforcement learning. Experiences in it is a plus.
- Motivation to learn new material and work efficiently
- Fluent in written and spoken English

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