Chair of Communication Networks
TUM Department of Electrical and Computer Engineering
Technical University of Munich

Bachelor's Thesis

Reimplementation and Extension of a Machine Learning Pipeline for Virtual Network Embedding

At the heart of many computer network planning, deployment, and operational tasks lie hard algorithmic problems. Accordingly, over the last decades, we have witnessed a continuous pursuit for ever more accurate and faster algorithms. We propose an approach to design network algorithms which is radically different from most existing algorithms. Our approach is motivated by the observation that most existing algorithms to solve a given hard computer networking problem overlook a simple yet very powerful optimization opportunity in practice: many network algorithms are executed repeatedly (e.g., for each virtual network request or in reaction to user mobility), and hence with each execution, generate interesting data: (problem,solution)-pairs. We make the case for leveraging the potentially big data of an algorithm's past executions to improve and speed up future, similar solutions, by reducing the algorithm's search space. We study the applicability of machine learning to network algorithm design, identify challenges and discuss limitations. We empirically demonstrate the potential of machine learning network algorithms in one case study, namely the embedding of virtual networks (a packing optimization problem) using a prototype implementation.

Advisors

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