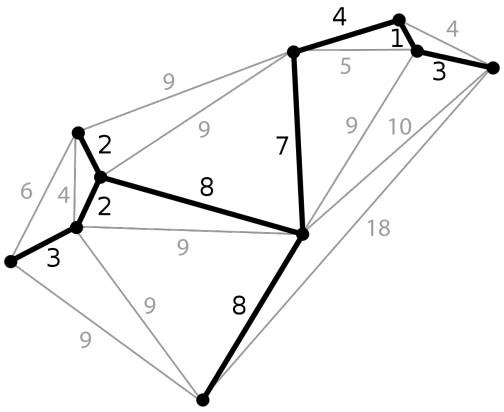
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Distributed Computing

Prof. R. Wattenhofer

Graph Coloring with Deep Learning



Combinatorial optimization problems are often encountered in the real world, such as the quintessential example of the traveling salesman problem, vehicle routing, wireless communication scheduling and many more. However, solving these problems exactly is very computationally expensive. That is why we usually resort to heuristic approaches. As deep learning models have proved to be very powerful approximators we aim to bring this power to combinatorial optimization.

Applying deep learning to combinatorial optimization is not straight forward. Obtaining ground truth data is expensive. Maybe we can do without it?

Deep learning models usually do not generalize well to larger samples then the ones they were trained on. But input size invariance is essential if we want to come up with a generic solution for such problems.

In this project we will focus on the graph coloring problem and try to address these issues, starting from existing graph neural network models.

Requirements: Interest in combinatorial problems. Knowledge in deep learning, or a solid background in machine learning. Experience with Python and TensorFlow or PyTorch is an advantage as well as knowledge in graph theory, distributed computing and graph neural networks. We will have weekly meetings to address questions, discuss progress and think about future ideas.

Interested? Please contact us for more details!

Contact

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