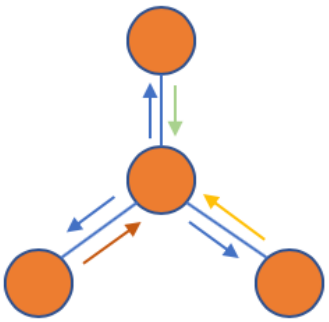
ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Distributed Computing

Prof. R. Wattenhofer

Agent-based Graph Neural Network



Lately, applying deep learning to graph-based problems has gained a lot of interest. Graph neural networks, in particular, achieved great success in knowledge graphs, reinforcement learning, chemistry, or physics simulations. These models are mostly based on the message passing framework, where nodes exchange messages over the edges and update their states based on all of the aggregated incoming messages. However, the current models generalize poorly to larger graphs and have trouble relaying long-range information over the graph. These problems have also been encountered in distributed computing before. The answer to them were the sub-linear randomized property testing algorithms, which allowed for probabilistic graph feature detection in time smaller than input size.

In this thesis we will aim to bring the performance boost offered by those sub-linear algorithms to graph neural networks. We will construct a novel graph neural network architecture, where a group of randomized agents act on the graph to come up with a solution to the task.

Requirements: Strong motivation, 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.

Interested? Please contact us for more details!

Contact

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