Prof. R. Wattenhofer

Agent-based Graph Neural Networks with Communication

We want to build on top of Agent-based Graph Neural Networks, a recent work from our group, and extend them with communication between agents. In the original framework, multiple agents take walks on a graph and learn to make predictions. The only way for them to communicate is by visiting the same node as other agents and leaving bits of information. This limits cooperation and information exchange between agents significantly. We, therefore, want to work on better ways to let agents communicate directly with each other.
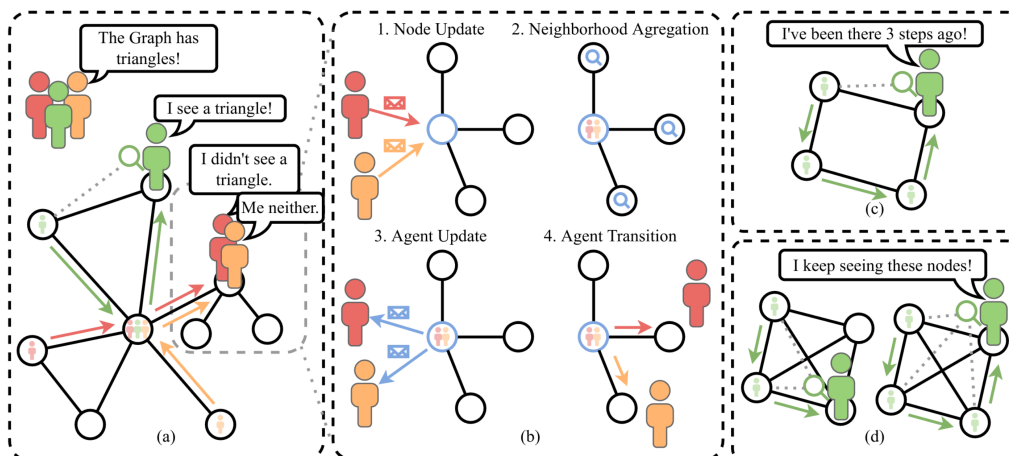
This project will consist of practically implementing new approaches and thoroughly investigating their effectiveness in empirical studies. At the same time, finding the right communication patterns requires thought and theoretical analysis of the required properties. If you do not already have knowledge about Graph Neural Networks, this is the perfect opportunity to dive deep into state-of-the-art research.

This original Agent-net paper that this project will build on can be found here: link

Requirements: Ability to work independently and determined to obtain results, creative thinking, knowledge of Machine Learning and Python. Ideally has worked with graph learning frameworks such as pyG before.

Contact

- Florian Grötschla : fgroetschla@ethz.ch, ETZ G63

- Beni Egressy: begressy@ethz.ch, ETZ G94