Prof. R. Wattenhofer

Puzzle solving with Graph Neural Networks

Recently, we have developed a Python benchmark based on challenging logic puzzles based on the collection of Simon Tatham's Puzzles. Logic puzzles are interesting as they can be solved elegantly using logical reasoning instead of brute force. For many of these puzzles in the benchmark it is possible to create instances of varying difficulty or even varying sizes. While the rules of the puzzle stay the same, it requires a deeper understanding of these puzzles for an agent to adapt to these challenging variants.

In this thesis, we want to use Graph Neural Networks to tackle some of the logic puzzles in the benchmark. By using a graph view of these puzzles, we can create a more flexible and adaptable framework which can easily represent puzzles of multiple sizes and difficulties. As the ultimate goal, we intend to train agents using different approaches and test whether they learn to generalize.
The exact scope of the project is not yet fixed and is up for discussion - we are looking for motivated students to push the limits of solving classical puzzles with new neural techniques.

Requirements: Knowledge in Python, C/C++ and Reinforcement Learning. Experience with PyTorch (or TensorFlow), PyGame and OpenAI Gym is an advantage.
We will have weekly meetings to address questions, discuss progress and think about future ideas.

Contact

In a few short sentences, please tell us why you are interested in the project and about your coding and machine learning background (i.e., your own projects or courses).

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