Searching by learning: Exploring artificial general intelligence on small board games by deep reinforcement learning

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Stellingen

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1. Classical Q-learning converges in General Game Playing slowly, and a simple Monte Carlo Search improves the speed. [This thesis. Chapter 2.]
2. The interaction impact between hyper-parameters suggests the need for balancing searching and learning in AlphaZero. [This thesis. Chapter 3.]
3. Summation of policy loss and value loss is not always the best loss function; it can serve as a default compromise choice. [This thesis. Chapter 4.]
4. Monte Carlo Tree Search enhancements can improve the start phase of AlphaZero. Properly determining the length of the start phase of using such enhancements can further improve the training. [This thesis. Chapter 5 & 6.]
5. AlphaZero-like self-play can be used to master complex single player combinatorial optimization game with a ranked reward mechanism which reshapes game outcome as win or loss. [This thesis. Chapter 7]
6. In deep reinforcement learning, searching and learning are usually combined to master different complex tasks, but it is hard to say which one is more important.
7. Self-play training heavily depends on the self-play examples, which suggests the importance of generating high quality training data, which can be provided by expert players.
8. We are still far away from achieving Artificial General Intelligence, although deep reinforcement learning has shown impressive ability of mastering a part of specific complex problems.
9. Just do it and never give up.
10. Life is like a game, everyone is a player. You can not change the game rules, but you can determine the objective you wish to achieve. It is impossible that every player is a winner, but it is possible that every player enjoys the process of playing the game.