Research Review

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1 Introduction

In *Mastering the game of Go with deep neural networks and tree search* authors describe how they used deep neural networks along with tree search to develop a new Go playing agent **AlphaGo**.

2 Methodology

Because of the size of GO search space all existing playing agents used some sort of tree search to find approximate value for each state. Almost all of them use MCTS enhanced by policies that are trained to predict human expert moves. These agents are able to achieve strong amateur level. However the new approach presented uses Deep Learning to improve the performance along with tree search. Technique used is to first train the agent using supervised learning which is which helps predict expert moves. As the next step authors developed a reinforcement learning policy network that improves itself by self-playing its earlier incarnations. At this point, the agent was able to win 80% of 100,000 simulations against strongest open soure program, Panchi. For the final stage, a value network was developed that focused on evaluating positions to figure out the estimated value for the alphago player. The purpose of this network adjusts the policy towards the correct goal of winning games, rather than maximizing predictive accuracy.

3 Result

To test the agent, authors ran tournaments among AlphaGo and various commercial or open source Go agents, such as Crazy Stone, Zen, Panchi and Fuego. AlphaGo managed to win 494 out of 495 games (99.8%) against other Go programs. To check if the agent could beat a human player at professional level, a formal 5 match competition was held between AlphaGo and *Fan Hui*, a three time European Go champion and a dan 2 professional. Deep learning gave AlphaGo the ability to select moves intelligently and evaluate them precisely, mimicking the behavior of a human player.***AlphaGo won 5-0!!***.

After the publication, another tournament was held in March 2016 between AlphaGo and *18-time world champion, Lee Sedol*. AlphaGo was able to defeat Lee Sedol, 4-1.