

Research Review

Review of AlphaGo

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Goal

The game of Go has long been viewed as the most challenging of classic games for artificial intelligence owing to its enormous search space and the difficulty of evaluating board positions and moves.

The deepmind team hope they can create a new Go agent to achieve superman performance in Go and defeat a human professional player in the full-size game.

Techniques

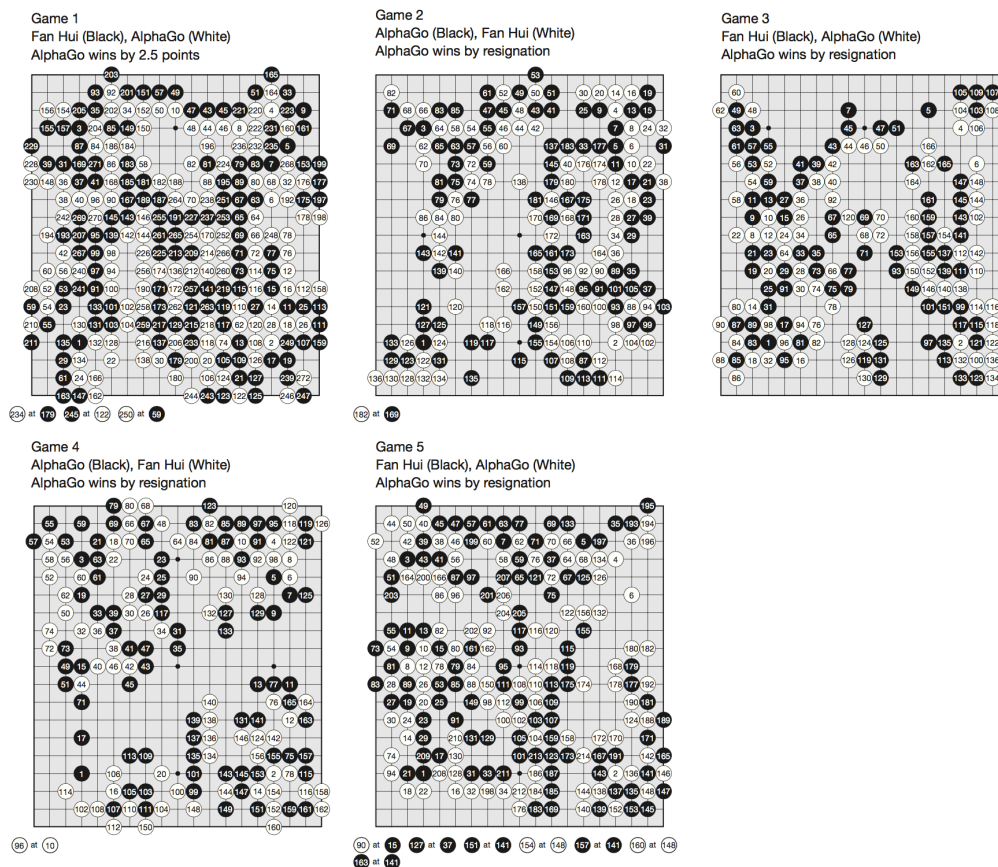
In order to achieve the goal, the paper of AlphaGo introduces a new method to computer Go that uses 'value networks' to evaluate board positions and 'policy networks' to select moves.

They use Monte Carlo tree search (MCTS) to estimate the value of each state in a search tree. And inspired by Convolution Neural Network, AlphaGo regards the board position as a 19x19 image and use convolutional layers to construct a representation of the position.

To sum up, networks evaluating positions using a value network, and sampling actions using a policy network, which reduce the effective depth and breadth of the search tree.

In addition, the Deepmind team let AlphaGo learn human expert games, and reinforcement learn from games of self-play.

Result



AlphaGo achieved a 99.8% winning rate against other Go programs, and defeated the human European Go champion by 5 games to 0.

This is the first time that a computer program has defeated a human professional player in the full-sized game of Go, a feat previously thought to be at least a decade away.