

Vic Wang

Paper: Mastering the game of Go with deep neural networks and tree search

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Summary: A new approach to compute the game of Go by using deep neural networks which trained by a combination of supervised learning from human expert games and reinforcement learning from games of self-play.

Proposed Solution: Trained the neural networks using a pipeline consisting of several stages of machine learning. First: Trained a supervised learning policy network directly from expert human moves. Second: Trained a reinforcement learning policy network that improves the first step network by optimising the final outcome of games of self-play. Last: Trained a value network that predicts the winner played by the reinforcement learning policy network against itself.

Results: Based on above combination of deep neural networks and tree search, Alpha Go is smarter than any previous Go program, winning 494 out of 495 games (99.8%) against other Go Programs. When against human player, after competed in a formal five-game match with a European Go championships, Alpha Go won the match 5 games to 0 and became the first computer program to defeat a human professional player.