A brief summary of the paper's goal or techniques introduced (if any)

The strongest current Go programs are based on Monte Carlo tree search (MCTS), enhanced by policies that are trained to predict human expert moves. These policies are used to narrow the search to a beam of high-probability actions, and to evaluate the value of each state during rollouts.

With the recently significant improvement in deep neural networks, AlphaGo uses deep neural networks to reduce the effective depth and breadth of the search tree: evaluating positions using a value network, and sampling actions using a policy network. These deep neural networks are trained by a novel combination of supervised learning from human expert games, and reinforcement learning from games of self-play.

A brief summary of the paper's results (if any)

To evaluate AlphaGo, an internal tournament among variants of AlphaGo and several other Go programs, including the strongest commercial programs Crazy Stone13 and Zen, and the strongest open source programs Pachi and Fuego, is run. All of these programs are based on high-performance MCTS algorithms. In addition, the open source program GnuGo, a Go program using state-of-the-art search methods that preceded MCTS, is included. All programs were allowed 5 s of computation time per move. The results of the tournament suggest that single-machine AlphaGo is many dan ranks stronger than any previous Go program, winning 494 out of 495 games (99.8%) against other Go programs.

AlphaGo has also 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