Alpha GO Paper Review

The Research paper was presented by Deepmind team at google, explaining the process and technique used with alphaGo in playing the GO game against the top professional players.

Introduction:

The Game Go is considered as one of the toughest board game, due to its enormous number of possible legal moves. For solving the similar board games, it could be calculated of b^d (b=breadth, d=depth) possible sequence of moves if represented in tree structure. For GO its around 250^{150}, which can take forever to calculate one optimal move.

Technique:

AlphaGo team used Monte Carlo Tree Search (MCTS) method with combination of deep learning to achieve human level accuracy (even better) in achieving winning percentage of the game.

Each simulation traverses the tree by selecting the edge with maximum action value with bonus (depends upon prior probability). The leaf node may be expanded, but not always, as processed by the policy network (a supervised learning network trained with human expert moves) to predict the output and stored as prior probabilities. At the end of a simulation, the leaf node is evaluated using value network (neural network to predict winner) and a Reinforcement learning fast fallout policy (which is trained by playing self and rewarded for wining).

Result:

AlphaGo wins 99.8% against the human professional Go players. Also it won 77%, 86% and 99% of handicap games against CrazyStone, Zend and Pachi respectively. The distributed version of AlphaGo was significantly stronger, 100% winning against other programs.