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Summary: AlphaGo

Over the last few decades, game playing through artificial intelligence has allowed computer systems to become competitive even against professionals and masters of any given game. For simple games such as tic-tac-toe, algorithms can immediately discern winning moves by expanding all possible game states and choosing moves sequentially that will lead to victory. However, with more complex games such as chess, the space of possible moves is much too large to enumerate, so other algorithms must be employed. Google's AlphaGo has recently defeated the world champion of Go, an ancient game boasting number of board states on the order of 10^{170} unique board states. Google

First, AlphaGo uses a convolutional neural network structure to learn the board state from camera images. Using neural networks for image detection is no new approach; however, what becomes of the board state is revolutionary. AlphaGo operates in 3 phases while learning: supervised learning, reinforced learning, and value function learning. First, the model is shown different board moves, makes predictions, and has these predictions judged by a professional to determine how good or bad the current move was. Of course, this process is time consuming and expensive, as the human thought process cannot be automated. Given the experience of human interaction, the model can learn at very high rates. Next, the model enters a reinforcement state, where it essentially plays itself with its newfound information given by the professional in the previous state. This allows for greatly enhanced speeds of learning, although the quality of information is not necessarily ideal. Through randomized Monte Carlo search algorithms, AlphaGo is able to estimate values from each state in a given subtree of game moves, and choose that which maximizes the likelihood of success.

Overall, AlphaGo is an incredible success, and is acknowledged as the future of artificial intelligence. Having beaten the world Go master 5 games to 0, it is obvious that the system has been effective in its learning. Given that Go is not deterministic, but rather, humanly intuitive, some argue that the AI system has developed a sense of intuitive learning, not simply decision making based on determined functions. While the thought of machines having the ability to out-think their creators is quite daunting, this technology will be sure greatly influence the lives of millions, and could be produced into cheap systems that can improve the quality of life for those unable to be helped currently.