Research review

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Artificial Intelligence Nanodegree

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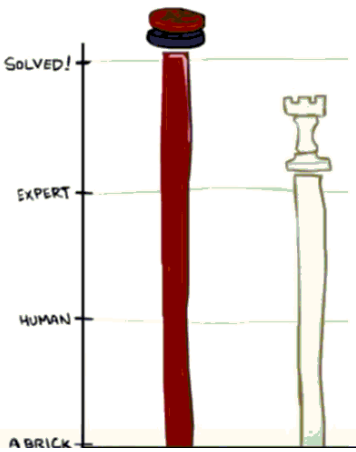
AlphaGo by the DeepMind Team

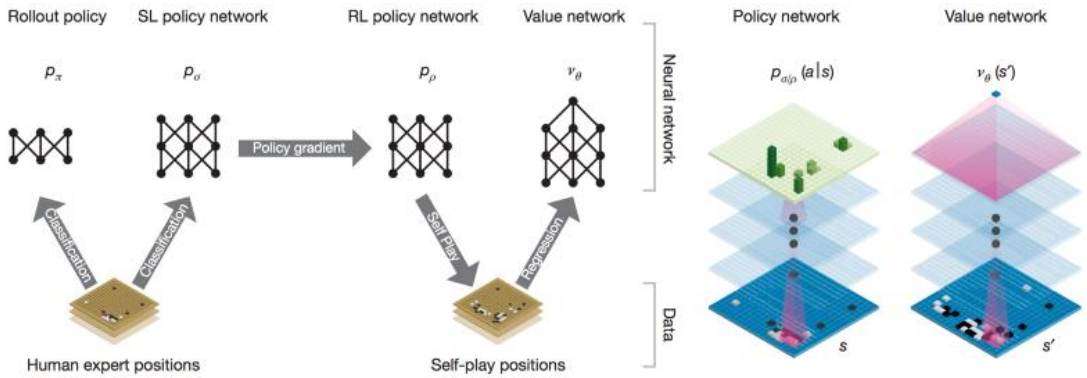
evolution of AI in games:

- **Checkers:** 1950: First computer player. 1994: First computer champion: Chinook ended 40-year-reign of human champion Marion Tinsley using complete 8-piece endgame. 2007: Checkers solved!
- **Chess:** 1997: Deep Blue defeats human champion Gary Kasparov in a six-game match. Deep Blue examined 200M positions per second, used very sophisticated evaluation and undisclosed methods for extending some lines of search up to 40 ply. Current programs are even better, if less historic.
- **Go:** 2016: AlphaGo defeats human champion Lee Sedol in a five-game match. Uses Monte-Carlo (i.e. randomized) tree search with the help of deep learning as opposed to brute force tree search.



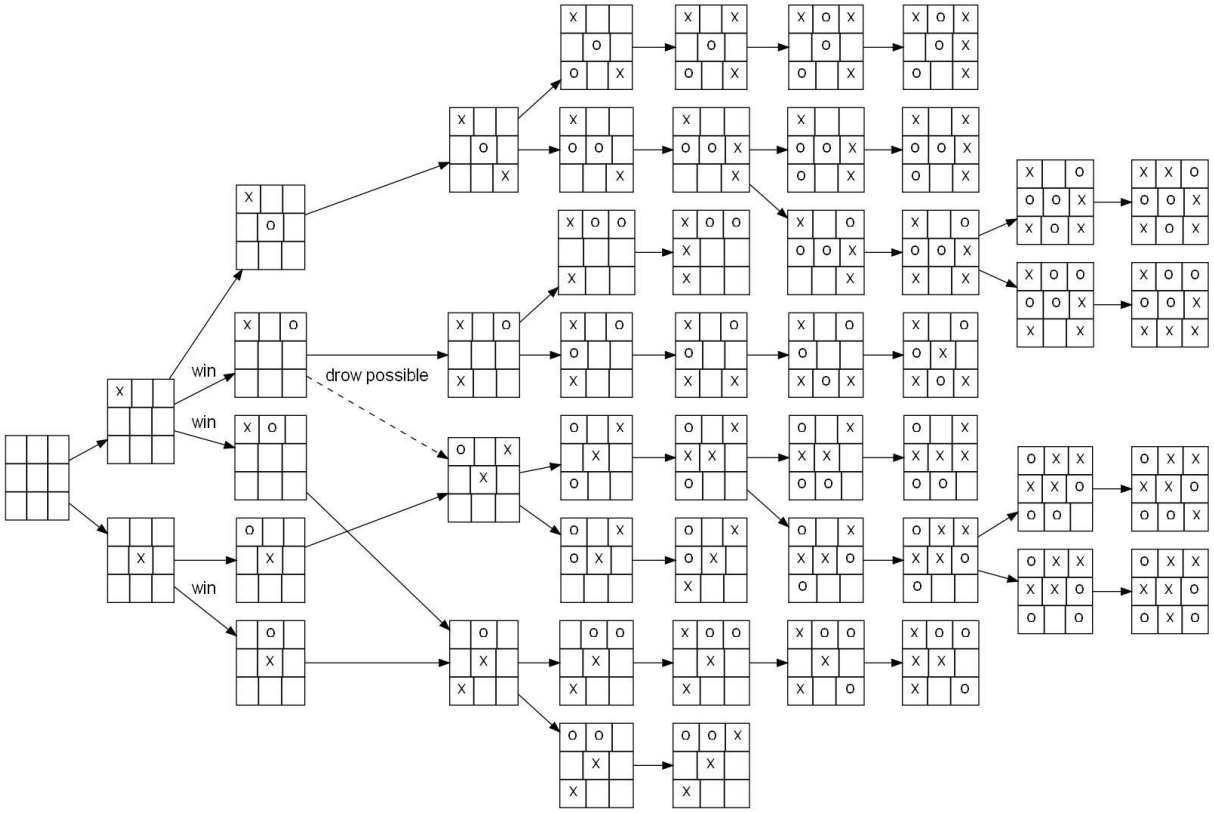
reference: CS 188 Lecture 5: Adversarial Search link

AlphaGo utalize standard techniques: behavior cloning, reinforcement learning, value functions, and Monte Carlo Tree Search (MCTS).



reference: AlphaGo, in context by Andrej Karpathy link

Why Go is challenging?



Source: Wikimedia

Two factors determine the strength of the AI:

- Raw computing power.
- Quality of the evaluation function (source: link) ➔ AlphaGo relies on two different components: A tree search procedure, and convolutional networks that *guide* the tree search procedure.

Results

'AlphaGo seals 4-1 victory over Go grandmaster Lee Sedol' – theguardian

'Huge leap forward': Computer that mimics human brain beats professional at game of Go – Science