AlphaGo

AlphaGo is the first computer program to defeat a professional human Go player. It was developed by the London based Google DeepMind Technologies to play the board game Go. The first to defeat a Go world champion, and is an arguably significantly the strongest Go.  AlphaGo's algorithm uses a combination of machine learning and tree search techniques, combined with extensive training, both from human and computer play.

AlphaGo has three main components:

1. Policy network: which was trained on high level games to imitate those players.
2. Value network: it can evaluate the board position and say, what is the probability of winning in this particular position.
3. Tree search: it would look through different variations of the game and try to figure out what will happen in the future.

Short explanation:

To play the board game go, firstly Scan the position and come up with what would be the interesting spot and build up a tree of variations then employs the variations nuts and tells that how promising is the output of this particular variations. Normally, AlphaGo tries to maximize its probability of winning but it doesn’t care at all about the margin by which it wins. When it has a slow looking mood that’s maybe an indication that AlphaGo thinks, it has a chance to win. It is a little giveaway.

Crucial points of AlphaGo:

Slack move is the most interesting move of AlphaGo. The slack move is a move that looks lazy. You can see the other better moves and AlphaGo is rejecting them but what I think, AlphaGo teaching is that we have been using score as a proxy for chance of winning. So, the bigger my margin of territory the more confident I am, I am going win by. by fact, AlphaGo says, no. you shouldn’t matter how much you win by. You only need to win by a single point. Why should I be seizing all this extra territory when I don’t need it. The lesson AlphaGo is teaching us are going to influence how Go is played for the next thousand years.

Our Approach:

We created AlphaGo, a computer program that combines advanced search tree with deep neural networks. These neural networks take a description of the Go board as an input and process it. Through a number of different network layers containing millions of neuron-like connections. One neural network, the ‘policy network’ selects the next move to play. The other neural the ‘value network’ predicts the winner of the game. We introduced AlphaGo to numerous amateur games to help it develop an understanding of reasonable human play. Then we had it play against different versions of itself thousands of times, each time learning from its mistakes. Over time, AlphaGo improved and became increasingly stronger and better at learning and decision-making. This process is known as reinforcement learning. AlphaGo went on to detect Go world champions in different global areas and arguably became the greatest Go player of all time.

What is Go:

Go is known the most challenging classical game for artificial intelligence because of its complexity. Go originated in China over 3000 years ago. Winning this board game requires multiple layers of strategic thinking.

Two players, using either white or black stones, take turns placing their stones on a board. The goal is to surround and capture their opponents’ stones or strategically create spaces of territory. Once all possible moves have been played, both the stones on the board and the empty points are tallied. The highest number wins.

As simple as the rules may seem, Go is profound complex. There are an astonishing 10 to the power of 170 possible board configurations more than the number of atoms in the known universe. This makes the game of a Go a googol time more complex than chess.

Some Challenges of AlphaGo:

There was a board game go challenge between AlphaGo(machine) and Lee Sedol(human) in South Korea in 2016.

Lee Sedol said (Winner of 18 World Go titles),

I thought AlphaGo was based on probability calculation and that it was merely a machine. But when I saw this move, I changed my mind. Surely, AlphaGo is creative.

In October 2015, AlphaGo played its first match against the reigning three-times European Champion, Mr Fan Hui. AlphaGo won the First ever game against a Go professional with a score of 5-0.

Following the summit, we revealed AlphaGo Zero. While AlphaGo learnt the game by playing thousand of matches with amateur and professional players, AlphaGo Zero learnt by paying against itself, starting from completely random play.

In late 2017, we introduced AlphaGo, a single system that taught itself from scratch how to master the games of chess, shogi, and Go, beating a world-champion computer program in each case.

Former Chess World Champion Garry Kasparov made a comment, I can’t disguise my satisfaction that it plays with a very dynamic style, much like my own.

Last but not least, The latest version of our algorithm known as MuZero, takes these ideas one step further. It matches the performance of AlphaGo on Go, chess and shogi, while also mastering range of visually complex Atari games, all without being told the rules of any game.

 