University of Asia Pacific

Artificial Intelligence and Expert System (CSE 403)

Department of CSE

Assignment No: 01

Topic/Question: AlphaGo vs AlphaGo zero, Turing Test, Deep Blue, IBM Watson

Date of Submission: 14 Jan, 2021

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AlphaGo vs AlphaGo zero:

Overview:

AlphaGo's team published an article in the journal Nature on 19 October 2017, introducing AlphaGo Zero, a version without human data and stronger than any previous human-champion-defeating version. By playing games against itself, AlphaGo Zero surpassed the strength of AlphaGo Lee in three days by winning 100 games to 0, reached the level of AlphaGo Master in 21 days, and exceeded all the old versions in 40 days.

DeepMind claimed that it generalized AlphaGo Zero's approach into a single Alpha Zero algorithm, which achieved within 24 hours a superhuman level of play in the games of chess, shogi, and Go by defeating world-champion programs, Stockfish, Elmo, and 3-day version of AlphaGo Zero in each case.

AlphaGo is an artificial intelligence (AI) agent that is specialized to play Go, a Chinese strategy board game, against human competitors. AlphaGo is a Google DeepMind project. The ability to create a learning algorithm that can beat a human player at strategic games is a measure of AI development.

AlphaGo vs AlphaGo zero:

It also differs from previous versions in other notable ways.

1. AlphaGo Zero only uses the black and white stones from the Go board as its input, whereas previous versions of AlphaGo included a small number of hand-engineered features.
2. It uses one neural network rather than two. Earlier versions of AlphaGo used a “policy network” to select the next move to play and a “value network” to predict the winner of the game from each position. These are combined in AlphaGo Zero, allowing it to be trained and evaluated more efficiently.
3. AlphaGo Zero does not use “rollouts” - fast, random games used by other Go programs to predict which player will win from the current board position. Instead, it relies on its high-quality neural networks to evaluate positions.

All of these differences help improve the performance of the system and make it more general. But it is the algorithmic change that makes the system much more powerful and efficient.

Turing test:

Researchers (Alan Turing) in the United Kingdom had been exploring "machine intelligence" for up to ten years prior to the founding of the field of artificial intelligence (AI) research in 1956.

Turing test competitions have been held for more than 20 years, and the strategies the robots employ have changed over time. Where originally the stumbling blocks were simply understanding the questions asked by the judges, now the bigger challenge is in answering them in a human-like manner. In recent years, winners have started changing the subject, asking questions of the judges, and simulating moods and typos.

The big breakthrough behind Eugene, the University of Reading's winner, was in giving the robot the persona of a 13-year-old boy. "Our main idea was that [Eugene] can claim that he knows anything, but his age also makes it perfectly reasonable that he doesn't know everything," said the robot's creator, Vladimir Veselov. It also makes affectations like misspellings look more plausible than they would coming from an "adult".

Deep Blue:

Deep Blue was a chess-playing computer developed by IBM. It was the first computer to win both a chess game and a chess match against a reigning world champion under regular time controls. And it was best known for being the first artificial intelligence construct to ever win a chess match against a reigning world champion, Grandmaster Garry Kasparov, under regular time controls.

As the successor to Chiptest and Deep Thought, earlier purpose-built chess computers, Deep Blue was designed to succeed where all others had failed.
Deep Blue used custom VLSI chips to execute the alpha-beta search algorithm in parallel, an example of GOFAI (Good Old-Fashioned Artificial Intelligence).
The system derived its playing strength mainly from brute force computing power.

IBM Watson:

Watson is an IBM supercomputer that combines artificial intelligence (AI) and sophisticated analytical software for optimal performance as a "question answering" machine.
he Watson supercomputer processes at a rate of 80 teraflops (trillion floating point operations per second). To replicate (or surpass) a high-functioning human's ability to answer questions, Watson accesses 90 servers with a combined data store of over 200 million pages of information, which it processes against six million logic rules. The system and its data are self-contained in a space that could accommodate 10 refrigerators.
Watson is used for natural language processing, visual recognition and machine learning. Build and train AI models, and prepare and analyze data, all in one integrated environment. Intelligent data and analytic asset discovery, cataloging and governance to fuel AI apps. Build and deploy chatbots and virtual assistants.
Watson's basic working principle is to parse keywords in a clue while searching for related terms as responses. Applications for Watson's underlying cognitive computing technology is almost endless. Healthcare was one of the first industries to which Watson technology was applied. Watson Analytics is one of the primary implementations of Watson technology.