

If these AI bots can master the world of StarCraft, they might be able to master the world of humans

Artificially intelligent bots built to play StarCraft are battling it out in Newfoundland and Labrador

[CBC News](#) Posted: Sep 24, 2017 5:00 PM NT Last Updated: Sep 24, 2017 5:00 PM NT

For the next two weeks, a closet-sized beige room in Memorial University's computer science department will be the site of an intergalactic quest.

On one level, it's a quest to become the dominant power in the Koprulu Sector in the Milky Way.

But on another, it's a quest to master life-scale complexity with artificial intelligence.

"This is the most complex problem we've ever applied to artificial intelligence," said David Churchill, a computer science professor at Memorial University.

"If it works for this, it works for everything else."

Churchill is heading up this year's Artificial Intelligence and Interactive Digital Entertainment Starcraft AI Competition, a leading international interstellar battle royale for artificial intelligence programmers.

People from Stockholm to Japan have submitted bots programmed to play StarCraft: Brood War, a 19-year-old real-time space-battle strategy game played over the internet.

The goal is to rule the Koprulu Sector and, in the process, discover new ways for artificial intelligence to handle complex human situations quickly, accurately and efficiently.

The 'bonjwa'

Conquering StarCraft with artificial intelligence is a hot battle right now, and Churchill is a noted captain. Hardcore StarCraft players might even call him the "bonjwa" of StarCraft AI, a term used to describe a dominating player.

He got into AI just a few years ago, when he wrote an algorithm that ultimately beat him at a game called Ataxx.

"I realized I had created something more intelligent than *me* at a particular thing," he said. "And that blew my mind."

This year he was an advisor to Google's DeepMind team when they partnered with Blizzard, the makers of StarCraft, to build tools that would help AI researchers build better StarCraft bots.

Both DeepMind and Facebook are sponsoring this year's AIIDE tournament. Facebook even has a bot battling in the space war.

'Like playing soccer while playing chess'

AI juggernauts like DeepMind and Facebook — and Churchill — are interested in StarCraft because it's complex enough to be a good simulation of real life.

"StarCraft is so complex, anything that works on StarCraft will work in any other problem," said Churchill.

Players control dozens or even hundreds of individual things at once: ships, buildings, fighters. Each of those things have dozens of moves: go up, down, left, right, engage shields, fire.



They bang keys on the keyboard with their left hands while frantically clicking buttons on the mouse with their right.

There are leagues of professional StarCraft players who train for upwards of 12 hours a day, measuring their agility and swift decision-making by actions-per-minute or APMs.

Top players have APMs of 500 or higher.

That's eight clicks or keystrokes per second.

"I would argue that StarCraft is the most complex game that humans are able to play," said Churchill.

"It's like playing soccer while playing chess. You need intense mental focus combined with superhuman

finger and arm dexterity, and superhuman strategic intelligence."

'Such a big number, it doesn't even matter'

The bots that get the furthest in the AIIDE tournament — and the bots Churchill thinks will eventually be good enough to beat a human StarCraft player — would combine search and learning AI techniques.

That would allow them to determine all possible moves from any possible position at any one time, while figuring out which moves could work and which would result in fiery, pixelated death.

That's how DeepMind's AlphaGo was able to [beat a professional human Go player](#) in 2015. But compared to StarCraft, Go is child's play.

'I'm not super interested in building the best StarCraft bot. I'm interested in using StarCraft to develop the world's best artificial intelligence.' - *David Churchill*

The number of possible games that could play out on any Go board is enormous: 10 million times the total total number of atoms in the universe, squared.

The number of possible StarCraft games is impossible to calculate.

"It's such a big number, it doesn't even matter anymore," said Churchill.

Robot dominance is five years away

Building a bot that could handle StarCraft could lead to AI technologies that could change the way we handle complex systems and huge amounts of data in industry, health care and technology.

"Personally, I'm not super-interested in building the best StarCraft bot," Churchill said. "I'm interested in using StarCraft to develop the world's best artificial intelligence."

Churchill says we're about five years off from being able to beat StarCraft world champions with artificial intelligence; the best bots now play like a mediocre human.

But competitions like AIIDE and the DeepMind bot-building tools for the latest StarCraft release are a great way to get there.

"We can't just throw more computation at [this problem]. New techniques have to be discovered for this," he said.

"When it comes to computer science and AI research, it's not necessarily like we're trying to run the four-minute mile and we're taking a second off every day. An idea tomorrow could cut processing time exponentially."

And that could change everything.

May the best bot bonjwa win.