Research Review

The field of artificial intelligence (AI) has seen many keystone developments in recent times. In the early days of artificial intelligence, a man by the name of Alan Turing, whom many regard as the father of computer science as we know it today, began questioning whether or not a machine can “think” and respond in a way similar to humans. The way with which Turing tested the ability of a machine to behave equivalent to or indistinguishable from a human is coined the Turing test (Turing). Turing paved the way for much of the future research in artificial intelligence, and his work is relevant to many of the breakthroughs we see even today.

One set of breakthroughs that revitalized the field of artificial intelligence in recent years is the application of AI in the hardware space to create autonomous robots to complete everyday tasks. The first took place in the No Hands Across America competition. “During this tour of America […] two researcher[s] from CMU's Robotics Institute "drove" from Pittsburgh, PA to San Diego, CA using the RALPH computer program. RALPH (Rapidly Adapting Lateral Position Handler) uses video images to determine the location of the road ahead and the appropriate steering direction to keep the vehicle on the road” (“No Hands Across America”). Since then, robots have been created to take over medial tasks from humans. For example, the Roomba vacuum intelligently maps the inside of your home through search and discovery. Then, the robot vacuum compiles a plan and executes while reacting to changes in the environment, such as furniture that has been moved and people or animals that get in its way (Knight).

The last major artificial intelligence advancement I will discuss comes from a category of AI as applied to the game space. Similar to the work being done by Google to play the game of Go, two researchers at Carnegie Mellon developed an agent by the name of Librutus to play no-limit Texas Hold 'Em. “Libratus relied on three different systems that worked together.” Librutus learned how to play Texas Hold ‘Em through trial and error with reinforcement learning entirely from scratch. “Through an algorithm called counterfactual regret minimization, it began by playing at random, and eventually, after several months of training and trillions of hands of poker, it too reached a level where it could not just challenge the best humans but play in ways they couldn't—playing a much wider range of bets and randomizing these bets, so that rivals have more trouble guessing what cards it holds.” While the AI was playing, a second system analyzed the state of the game. This second system focused on solving the end-game. Taking this approach, the first system didn’t have to search all scenarios it had seen in the past and could leverage just the ones most relevant to it. The last system in play was a batch process that ran after game play to remove any patterns in Librutus’ strategy. This allowed the AI to remain unpredictable and “out-bluff a human”–or several of them (Metz).

References

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