About two months ago, AlphaGo, a famous artificial intelligence (AI) program developed by Google DeepMind that plays Go at a very high level, attracted attention from all over the world since it was going to join a match against Ke Jie, who currently ranks No.1 in the world. Go is known as the most complex board game in the world, as it has trillions of quadrillions of possible moves, which disables computers to use traditional algorithm like enumeration to find optimal solutions. However, the DeepMind team used the Monte-Carlo tree search algorithm. This algorithm simulates a few cases and find the move that has the highest probability to win rather than a must-win derived from enumeration, considerably reducing the computational work, which finally helps AlphaGo destroy humans’ last hope, Ke Jie, with a 3 to 0 sweep. In fact, early in the year, AlphaGo, using the account name “Master”, swept all his opponents in unofficial online games against the topmost Go players in the world with a record of 60 to 0. These facts arouse fear from us humans and we cannot stop thinking: how powerful is AI? Will it be able to completely replace humans in the future? “Should we destroy the machines?” (Brownsword)

Such fear is heavily exaggerated in the series of movies, *The Terminator*, in which human beings are regarded as the source of all sins and hunted by robots with a smart AI and a seemingly impeccable body. It is comprehensible to see such views when AI becomes too smart, especially when it shows crushing physical and intellectual advantage over humans such as in battling and calculating. Humans have been dominating the world for tens of thousands of years and no other creature is able to shake human’s position in its development. Thus, when a lifeless computer is about to show its extraordinary power that potentially threatens human, people become afraid of it, imagining that people lose control of it and it hunts them mercilessly like what we do to other animals. Fortunately, our current technology does not support such a horrible creation of AI, but it is still noteworthy to know the question: What should we do in order to make AI less threatening and serve people more?

In the award-winning science fiction movie, *Her*, director Spike Jonze gives us his answer: building a helpful and thoughtful operating system. Samantha, despite an AI, has feelings, which is the reason for her thoughtfulness and the drive for her user Theodore to fall in love with her. Such an operating system is fairly successful as an assistant to enhance our life. For instance, Samantha attempts to convince Theodore to date Olivia Wilde to cheer him up. Her ability to learn and grow psychologically is impressive which enables her to serve people better. Even though Theodore falls in love with Samantha but is later abandoned and hurt again by his AI soulmate, compared to the world-destroying Ultron’s ambition in the movie *Avengers*, Samantha’s benevolence deserves our respect and appreciation. In my perspective, such an AI is quite desirable. However, in our real world, Siri, a voice assistant developed by Apple as well as one of AIs that resemble Samantha most in our current technology stage, still has too many defects. It is only able to do simplistic things and understands human language at a very low level. Besides, its voice sounds more like a machine rather than a human. In the future, Siri will be more productive and more helpful like Samantha but with less emotion. AI of this type is probably the kind people feel most comfortable and satisfied with.

It is good to know that recently a chatterbot called Eugene Goostman became the first AI to pass the Turing Test, a test designed for machines to determine their ability to generate human-like responses to human testers. As is reported, “this chatterbot explicitly depends on both whiteness and masculinity in order to perform persuasive intelligence.” (Fancher). This illustrates that the chatterbot is embodied as a white boy, and it also astonishingly has favorites and emotions. Although its performance is still actually far from ideal, it is exciting that we have made visible progress from 0 to 1. This means that we successfully, though not perfectly, demonstrate the ability to create a humanized machine. Nonetheless, in the near future, it is very likely to see such AI being greatly improved and personalized to serve various users in order to offer them the best experience, as our technology advances.

The future seems so promising. However, what makes our current AI look so heartbreaking? What limits the development of AI? To address these problems, we have to mention Hierarchy Theory and Moore’s Law. The former emphasizes the importance of observing the connection between hierarchical levels to solve problems of great complexity, and the latter asserts an every-two-year doubling in the number of components per integrated circuit. The direct relationship between these laws and questions seems to be vague. As a matter of fact, these theories are able to aid us in unpacking the essence of problems so that we can resolve them correctly and easily. According to the hierarchy theory, we are supposed to observe and find the most basic unit of AI, which is integrated circuit, the very core component of computer, of central processing unit (CPU). Integrated circuit is responsible for all the computation work, and computation processes the order we input and returns us with a response. If we upgrade the integrated circuits, the speed of computation accelerates, which lowers the time of processing and enables computers, which has higher hierarchy than integrated circuits, to deal with large data, for instance, the simulation of a Go game. It is true that AlphaGo uses a more advanced algorithm to reduce the processing time. However, the Monte-Carlo algorithm also requires a strong ability of computation, since it simulates a huge number of games to derive the highest winning probability for a single move, which is the best way to implement the program with our current technology. If our integrated circuit is good enough, we can certainly use the algorithm of enumeration to ensure a 100% winning percentage. This is why the study of quantum computer becomes so significant, since it deals with data exponentially faster than normal integrated circuits. Limited to the ability of computation, our current AI is less smart than we expect it to be, because it fails to deal with so many complex orders. Luckily, Moore’s law has been proven accurate by the fact since 1975 and the period of doubling is even shorter, which is 18 months. As we develop better integrated circuits, AI will improve dramatically and help us in a variety of aspects such as auto-driving and translating. Only with the support of better physical units and better algorithms can we anticipate a smarter AI.

In addition, as is discussed above, algorithm also plays a pivotal role. Besides Monte-Carlo tree search algorithm, machine learning is also irreplaceably crucial. If we compare AlphaGo as a baby, the former algorithm helps it walk, and the latter teaches it to run. With learning ability, AlphaGo can store the pattern into its hash table (a kind of memory structure) and next time it is able to solve similar puzzles in incredibly limited amount of time. This also illustrates the use of Hierarchy theory, because AlphaGo collects data from observation and builds hierarchical connection among them so that it can resolve problems more easily. Besides AlphaGo, for instance, in order to be a considerate personal assistant, AIs are supposed to remember users’ preferences, creating a dynamically-optimizing user experience. Moreover, “A machine can use such models to make predictions about future data, and take decisions that are rational given these predictions.” (Zoubin). The importance of machine is beyond words.

To conclude, the prospect of AI remains to be promising, even though it might look perilous when it becomes too smart. The birth of AlphaGo does not mean an end to human Go games. Instead, it marks the beginning of a new era that people can practice their skills by matching against computers. People invent cars but never give up running. The upgrade of technology aims at constructing a more fantastic world and the rise of AI will greatly help us reach that goal. Will AI be allowed to evolve to possess self-consciousness for better service? Time will tell us the answer.

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