

How to Create Self-evolving Artificial Intelligence

Yichuan Liu

School of Computer Science, Wuhan University

yichuan_liu@whu.edu.cn

Abstract: The technical singularity has not been realized because the level of artificial intelligence is not enough. It can also be understood that artificial intelligence is too complicated for itself. Then we can start with simpler artificial intelligence, which is simple enough to improve itself, and get better and better intelligence through iteration. This article proposes some principles: intelligence can improve itself with simple methods that can be realized by itself; intelligence that can continuously evolve itself must be general intelligence; self-evolving intelligence is a recursive system that needs to be studied recursively; Recursion in time and recursion in space are unified.

It is difficult to design an artificial intelligence that can improve itself. Even if it can improved itself, it will soon stop. Because the level of intelligence required to improve AI is high, or AI is built on a complex basis: computer, mathematics and various intelligent models are beyond the understanding of AI, and avoiding these is not very possible. Then we can start with AI built on a simple basis, adapt its foundation and intelligence level, and create AI that can continuously evolve itself. It only needs to design simple initial intelligence and rules, and then use powerful computing power to make intelligence evolve better and better.

The basic principle of self-evolving intelligence is that at a certain stage, improving intelligence does not require a deep understanding of itself, but only some simple methods that can be implemented by itself. Evolutionary computing, artificial life, reinforcement learning, etc. show that intelligence can be generated and evolved according to some simple rules, but their intelligence cannot be further improved to a certain degree. One of the main reasons is that they are limited to solving specific problems and can continuously self-evolving intelligence must be general intelligence, because only general intelligence can solve various problems encountered by itself.

Self-evolving intelligence is a recursive system, which needs to be studied using recursive methods, this is also recursive. When researching, we need to understand the research itself, and we need to be aware that we are humans. Human intelligence is self-evolving. The creation of AI by humans is also a self-evolution in a broad sense. The intelligence that creates self-evolution is actually creating a recursive system in a recursive system. Human beings need to understand their own evolutionary process and apply the principles to create new evolutionary processes, but the current human understanding is superficial. We have not yet understood the direction and dynamics of self-evolution. Systems can evolve more and more complicated because one change causes other changes, and these changes cause more changes. There needs to be an internal connection between changes, otherwise it will not constitute a meaningful structure. As far as intelligence is concerned, improving itself requires new ways to further improve itself. It is not easy to improve intelligence with simple intelligence. For example, it is almost impossible for single-celled organisms to modify their genes correctly, and a large number of attempts will be made to survive the fittest. Populations are intelligent,

individuals are not. At a certain stage, it may inevitably go through a similar blind process. Only after reaching a certain critical point can there be more intelligent methods. At beginning, it is necessary to simulate natural selection, create a large number of slightly different agents, and then choose the appropriate agent, or use similar principles inside the agent. Recursion in time and recursion in space are unified. Self-evolving intelligence reflects spatial recursion at any time, such as a self-organizing system. Initial intelligence, as a simple spatial recursive system, will evolve to become more and more complex using time recursive feature. Time recursive systems and spatial recursive systems have similarities. For example, they have simple parts: the initial value and a part of the system. Only knowing the initial value does not have much effect, only after evolution does it know what will happen; similarly, only knowing a part of the system does not help much to understand the whole.

Self-evolving intelligence resides in an environment and forms a system with the environment and evolves together. Because intelligence itself cannot have all the conditions to improve itself, it needs some external help, which is equivalent to the tools created by intelligence to improve itself. The environment was initially a virtual environment because the rules of the real world were too complicated to be understood by simple intelligence. Intelligence evolves to a certain stage before starting to interact with the real world. The intelligence generated by self-evolution is a kind of pure general intelligence. Just like the baby brain, it only has the principle of intelligence. It needs a process that adapts to the real world and understands and transforms the world through differentiation or guidance to create other agents.

At present, the mainstream AI transforms intelligence into computing, while self-evolving intelligence transforms computing into intelligence. Humans have huge computing power but have not fully utilized it, because humans need to design and improve algorithms. Self-evolving intelligence is actually an algorithm that creates algorithms that can continuously transform computing power into algorithms. Human beings learn to create new intelligence is a leap, and learning to create self-evolving intelligence is also a leap.