

Firstly, we should further improve the health care system. Government should ensure that people are accessible to medical services when struck by diseases.

Secondly, a comprehensive training system should be established. Medical services do not have the characteristics of public goods, but good doctors are. If the doctors become freelance, competing hospitals will have no incentive to train doctors. Therefore, the government should establish a clinical training system to ensure the quality of medical services.

Thirdly, the government should provide basic medical services to fulfill the medical needs of low-income groups. One concern of marketization is the limit of excellent medical resources in the short term and differentiated medical services, which will cause it impossible to guarantee the health services of middle and lower income groups as excellent doctors have entered the high-end market and the rest are not qualified enough. This is indeed a problem very likely to arise in the process of marketization. In present medical market, the prices go wrong and patients obtain scarce medical resources by spending a lot of time queuing or asking favors or paying at a much higher price from the scalpers. This is the typical characteristic of planned economy. Although marketization of medical services may impair the benefits of patients of low-income in the short term, from a long-term perspective, the value of medical services is clarified through the market and more talented people will thus be willing to be a doctor. When the suppliers in the medical market are improving, the bottom line will be a lesser problem. But the increase of good doctors is a process, during which time, in order to ensure the welfare of low-income groups, the government should supply some high-quality medical services to low-income groups at a low price in collaboration with referral system. They should also build up a sound clinical training system, improve the overall ability of the reserved medical personnel and be a guardian of primary health care institutions.

Fourthly, the government should supervise the market and punish misconducts. Because of the asymmetry information in medical services, the gaining of such information is marked with the characteristics of public goods: the more it is shared, the higher its value. But the production of information requires a huge cost. Yet, the market that is driven by profits lack such motivation and power to produce and supply medical information. Government has a responsibility to change the asymmetric information in medical services and implement necessary regulation and punishment.

*Translator/Hua Zhiyun*

## Further Exploration of Artificial Intelligence Requiring Cooperation from Both Political and Business Sides

Liu Jia, *Dean of School of Psychology, Beijing Normal University*

### ***An Expected Result from AlphaGo, an Indication of New Life Form***

The exponential development over the past two years has proven that artificial intelligence has the advantage to beat human brain over the game of go. Early in October 2015, AlphaGo had beaten Fan Hui, a 2-dan go professional and reigning 3-time European Champion, at a solid victory of 5:0, which already indicated that the power of artificial intelligence should not be ignored. The result of the game war between machine and human mind this March, as usual, would not be surprising, for it is just a matter of time for computer to win over human mind. If AlphaGo were not to defeat Lee Sedol this year, it is bound to in the next one or two years. And one or two years, compared with the long and extensive span of wisdom evolution, could just equal to the present. Therefore it is safe to say that the unparalleled emergence of AlphaGo will mark as a milestone in the evolution and revolution of civilization and intelligence.

The core working mechanism of AlphaGo is centered on Deep Learning, an artificial neural network. However, early in 1980s, the artificial neural network, simulating the working manner of human brain, has already come into being with the peak development in 1990s. Yet due to the limits on computing capability and storage capacity of computers then, artificial intelligence failed to show a solid ability on problem-solving, thus being put aside at the time. Therefore, what remains at the core of AlphaGo, the Deep Learning, has remained all the same; what has changed is the improvement on the computing capability to resolve complicated problems as well as on the storage capacity. One thing worth noticing is that what AlphaGo has revealed is not only the breakthroughs on the go, but more significantly, the huge revolution that artificial intelligence will bring into various fields, one of which is automatic driving. Once prevailed, self-driving will greatly improve logistics efficiency while immensely trimming down the cost, transforming both the industrial and GDP structures of a nation. Automatic driving is not something unreachable in the far distance; instead, it will become one of the major transport ways in the next five or ten years. When that comes, human driving will turn into a competitive sports game or a way for recreation just as horse riding. Hence, the emergence of AlphaGo neither tells the losing out of human being in certain area nor the demise of human

*The victory of AlphaGo, an artificial intelligence program, not only signals the start of a new round of industrial evolution but also indicates that life will evolve toward a new form. Human beings should embrace this new life carrier so to achieve standing inheritance of knowledge and experience of its race. Both the government and investors should cultivate long term strategic investment insights so as to seize new economic growth points.*

dignity; instead, it announces the beginning of a new round of industrial revolution.

However, while cheering at the fact that computer has liberated human being from the simple repetitive work, we should also come to realize that such advancement would also mean a fading of superiority in mankind or even the extinction of itself. As the interconnection and computers' capabilities continue to improve, artificial intelligence will develop further, releasing numerous labor force which otherwise would take up simple and repetitive work. These released labor force will shift into doing work of more creativity and in return help to enhance the development of artificial intelligence. Once the singularity comes, artificial intelligence will generally surpass human wisdom, which means the future of human beings will run into gradual demise, just as the human ancestor *Homo Neanderthalensis* once did. The coming of singularity is not far away – radical opinions hold that it will come into reality in 2050, and from a conservative point of view, the author reckons that it will happen within 100 years. In other words, such a historical moment in the evolution of civilization and intelligence may be witnessed by our generation. But it is worth pointing out, in particular, that such replacement is not the cruel genocide inflicted upon one species by another as shown in the movie *the Terminator*, an absolutely hostility between human wisdom and artificial intelligence. On the contrary, the distinction and replacement of a species by another is only a natural phenomenon if looking from the perspective of life evolution. Human itself is only a tiny part of biological evolution, just as the then dinosaurs in the whole journey. If silicon-based life is a better form for survival, then it is natural for life to transit from carbon-based ones to silicon based ones. In this sense, human being is not running into extinction but continues to exist in another life form. It is an expansion of civilization, a progress of intelligence.

### ***Embracing, Instead of Impediment***

In most Hollywood blockbusters, artificial intelligence normally represents the terminator of human being. It is just due to such an anthropocentrism mindset that some people try to prevent artificial intelligence from out of control through preemptive measures. The most famous one shall be what is described as The Three Laws of Robotics in Isaac Asimov's *I, Robot*, a science fiction collection: One, a robot may not injure a human being or, through inaction, allow a human being to come to harm.; second, a robot must obey the orders given it by human beings except where such orders would conflict with the First Law; three, a robot must protect its own existence as long as such protection does not conflict with the First or Second Laws. However, this worry or restriction

is both impracticable and redundant. Why impracticable? Just as we are not sure about how human being develops its self-consciousness during the 400 million years of evolution, we are not quite able to precisely control every step in the progress of artificial intelligence. This is because evolution tends to have the nature of explosive growth. Therefore having accurate and planned control of the evolution of artificial intelligence is far more difficult than a controlled and orderly release of the power from an H-bomb explosion. Then why redundant? The key of evolution lies in the inheritance and development of civilization. The carrier of human intelligence – human body, has inborn shortcomings. Body is fragile, for any problem in an organ (for example, the necrotic of liver because of liver cancer) may cause the death of the whole body; for computers, however, all it requires is only a change of the components when a breakdown happens. This fragility in human body means that all the experience accumulated, knowledge acquired and wisdom developed along the growth of the individual entity will disappear with the demise of the entity; descendants can only learn what their predecessors left through pieces of words, shards of memory. In this sense, the knowledge and experience of human race is not easy to be reserved and passed on and thus not easy to be shared and learned. Such being said, why don't we just put aside the stubborn clinging onto the form of body and embrace the new form of life? Instead of making every effort to take precautions against artificial intelligence, it is better for us to infuse our wisdom and emotion into the machine, evolve with the new life form and head toward the immortal with a new life form.

### ***Discovering New Economic Growth Point with Long Term Strategic Insight***

Human brain, the research focus of psychology and brain science, is the best teacher for artificial intelligence. To have a profound understanding of the nature of human psychology and the working mechanism of human brain will bring essential inspiration to the evolution of artificial intelligence. But this does not necessarily mean that artificial intelligence should completely copy the working mode and rules of human mind just like if cars are to surpass human being's speed, it is not to imitate the way human walks but to invent the wheels for cars. By the same token, human being can map out a unique evolutionary path for artificial intelligence based on the unique features of artificial intelligence such as big data storage and high speed computing.

Among the 100 priorities put forward at the Two Sessions this year, to develop brain science and brain-like intelligence technology has remained on top of all. Both of the subjects are closely related to the development of

artificial intelligence. However, compared with advancement in developed countries, studies in China still lag behind in terms of both breakthrough and innovation. This is not to say that China lacks the interest or chance in exploring this field, but that so far we do not have the motivation as strong as the Western countries. The reason that Google develops AlphaGo is not for taking a lead in playing go, but for seizing the opportunities in major business demand and national emergencies such as financial trading, precaution and intervention in individual or state crisis. This strong driving force is helpful for the conversion of theoretical studies towards actual application. However, in China, most of the investors are “the coal owners”, a rich group with very little education who made their fortune overnight through coal trading business. They have large amounts of capital but lack strategic investment insights. As the coal owners cannot make a good judgment on the pioneering new things which will lead future human development as well as become the new growth point for economic development, they have directed too much capital onto those low-end (such as O2O) or short-sighted (such as smart phones) projects. For some real high-tech companies based on the development of brain science, such as Deep Mind, the company which develops AlphaGo, the coal owners cannot see the huge potential. Therefore, from the author’s viewpoint, it is necessary for both individual and institutional investors to cultivate their insights through acquiring knowledge about the latest development in the scientific front, or they should hire professionals to help make judgment. For governments, there are at least three things it can do: First, listening to the voices and embracing the new ideas from the forerunners and leaders of each industry. For this, think tanks can act as an idea gatherer to assist the policy makers in keeping up with the latest progress of the times. Second, encouraging innovation and entrepreneurship and supporting the development of high-tech industries. Third, cultivating the creativity and critical thinking of the people through quality education. The current educational system has extremely ignored the part that gifted education could do, which is why it is difficult to cultivate industrial geniuses and talents. Hence, it is a must to promote the talent education among the people.

*Translator/Wen Jieling*