



at Aoyama Gakuin University

# Better understanding of humans needed in age of AI

Aoyama Gakuin University hosted the Asahi Education Forum on Dec. 15, 2018. Discussions focused on humanities education in an age when artificial intelligence extends into more aspects of society.

The symposium was part of a series organized by The Asahi Shimbun in conjunction with 15 universities.

The university, based in Tokyo's Shibuya Ward, established a research institute on singularity in spring 2018 to study how AI affects society.

Singularity is the hypothesis that rapid technological evolution will one day create AI that is so powerful that it can control humans, rather than the other way around.

## Keynote Speech

### A perspective only possible through human intelligence

The forum began with a keynote speech by Shinichi Fukuoka, a biologist and professor at Aoyama Gakuin University's School of Cultural and Creative Studies.

Excerpts of the speech follow:

As a child, I loved insects and often gathered butterfly eggs and caterpillars. Caterpillars form a chrysalis and stop moving for about two weeks before a butterfly emerges from the pupa.

If an alien from outer space was to see a butterfly and caterpillar, it would not likely be

able to immediately decide the two were the same living organism because of the dramatic change that occurs over only a few weeks.

I held a question in my heart as a child asking "What exactly is life?" That is a question I continue to ask even now as I work as a biologist.

The greatest discovery in biology in the 20th century occurred in 1953 when the double helix structure of DNA was unraveled. But looking back on the history of science, one finds that completely different views were held about the building blocks of life.



Shinichi Fukuoka

In 1944, the Austrian physicist Erwin Schrodinger wrote a book titled "What is Life?" in which he attempted to explain the mysteries of life through a physics approach. In his work, Schrodinger wrote that life was possible because it resisted the law of entropy. That law states that everything that has order moves in the direction of disorder. Thus, buildings deteriorate, and hot coffee and passionate love eventually turn cold. But only living organisms continue to maintain a high level of order within their cells.

However, even Schrodinger was unable to explain the process living organisms used to maintain that order.

In order to live, we must continue to eat. The particles from the food we eat are scattered throughout our bodies and become part of the body. At the same time, another process is also unfolding, namely, particles that had made up a part of the body are removed and discarded outside of the body. In other words, by eating we are able to substitute various parts of our own bodies, which are constantly being destroyed and built anew. The me of yesterday is not the me of today. In biological terms, the me from one year ago is a completely different person.

But the rebuilding process does not occur perfectly so oxidized materials and garbage remain and gradually accumulate. For that reason, living organisms cannot completely defeat the law of entropy and that is why humans are not immortal.

When thinking about what is life, I believe it is "a condition of dynamic equilibrium." In a state of dynamic equilibrium, destroying takes precedence over creating. Something cannot be created unless something is destroyed. The instability caused by destruction is utilized to create the organism anew. At the same time, entropy is also constantly

being thrown away. Like a Zen riddle, change continues relentlessly in order to prevent change. In order for a living organism to not change in a major way, it is constantly undergoing minor changes. Life exists as a phenomenon under a condition of never-ending balance. That is why living organisms are flexible and variable and can create a new condition of equilibrium even if it suffers from illness or injury.

Is artificial intelligence capable of understanding a view of life as dynamic equilibrium in which the contradictory acts of decomposition and synthesis occur at the same time? I believe it is extremely difficult for AI to understand such a view.

An AI-like perspective is a mechanistic one. Like a flip book, such a perspective views the movement of objects first disassembling time before reconnecting it again. But humanities, which is the scholarly endeavor to more deeply understand humans, is not like that. It is an approach that seeks to recover the traditional view toward nature that is totally different from the flip book style of an AI-like perspective. A view of dynamic equilibrium is also one that only human intelligence can pull off.

For that reason, my conclusion is that "Singularity is never here."

## Panel Discussion

Following the keynote speech, a panel discussion was held on the theme of the future of universities during an age when AI expands and the humanities must create. Besides Fukuoka, the other participants were Yasuo Kobayashi, a professor (Special Appointment) at Aoyama Gakuin University's Graduate School of Cultural and Creative Studies, Toru Nishigaki, a professor at Tokyo Keizai University, and Chiyori Mizuno, a professor at Aoyama Gakuin University's College of Literature. The moderator was Kiyoshi Isshiki, education coordinator at The Asahi Shimbun.

Excerpts of the panel discussion follow:

**Isshiki:** I would like to ask panelists to talk a little about themselves as a way of introduction.

**Nishigaki:** After working at a private-sector company, I entered the world of research at university and have thought much about the relationship between AI and philosophy. I hold some fear that the emergence of AI will turn humans into parts of a machine. I would like to contribute today from the perspective of warning that AI should not be used as a tool for control.

**Kobayashi:** I worked for many years at the Komaba campus of the University of Tokyo (where the College of Arts and Sciences is located). Today, I would like to think about how humans should deal with the threat from AI from a liberal arts perspective.

**Mizuno:** My specialization is European art history from the Middle Ages to the Renaissance. Today when the singularity hypothesis is being talked about along with the possibility of AI exceeding human intelligence, I believe we are once again being asked to think about what it means to be human. I would like to use this opportunity to think about that question.

**Isshiki:** I would like to first of all ask all of you about the relationship between humanities and AI.

**Kobayashi:** In relation to the keynote speech, I would like to ask Professor Fukuoka a question. The living organisms that you referred to are based on individual organisms, but such organisms have multiplied as a species, or a collection of individual organisms. I believe there is a difference when living organisms are considered as individuals and as a species.

**Fukuoka:** Other than humans, the species is the basic unit for thinking about living organisms so the most important thing is survival of that species. The accepted view of living organisms was that individual organisms were



Toru Nishigaki:

### Use as tool to satisfy human souls, not for control

nothing more than a tool for the species. But humans are the only species that stands outside of that view of living organisms. Beyond thinking about the importance of the species, each individual human is thought of as important. There is value in every new life that is born.

**Kobayashi:** So you are saying that the uniqueness of humans is because the existence of individual humans is extremely special. But that leads to the next question, which is how did such individual humans come to be formed. I believe it is linked to the formation of language. At the most fundamental part of humanities is the desire to understand the individuality of humans. But now, there are concerns that the emergence of AI will lead to something very different.

We may be entering an age of crisis where the consciousness of individual humans may be lost as they become entangled in the network made up of a huge amount of information. I believe that is the question those in the humanities must think seriously about.

**Nishigaki:** There are increasing instances of "creative acts" by AI. For example, AI has been used to create haiku and the end result is not all that bad.

But carefully reading the contents, one finds that AI has gone over many different past works to create a new patchwork. In other words, it is only plagiarism or an imitation. Because AI does not have an image of words, its haiku cannot be called art.

Much has been made of AI beating champions in "shogi" and go, but because the number of board game situations is finite, it is only to be expected that AI will be strong because it can make 100 million calculations



Yasuo Kobayashi:

### AI-created haiku given meaning by 'I'

in a second. But that is not evidence that AI is smart.

**Isshiki:** Among the questions submitted by the audience is one that asks if any works by AI, which does not understand meaning, can be considered art? How do you feel about this Professor Mizuno.

**Mizuno:** There is a plan to use a 3-D scanner to create a new work in the 21st century by using algorithms on an original work by Rembrandt. It is an example like the haiku created by AI because it would be a Rembrandt created by technology. But it would only be a deduction from a past work and could not be called a creation of art. The material nature of the painting and the historical nature accumulated on the painting's surface would be overlooked. I feel it would be nothing but a concentration of what is most Rembrandt-like and then reconstituting the painting using homogeneous pixels.

At the same time, art also changes along with the times so I feel it will also be an opportunity to think about what art is through the perspective of technology.

**Isshiki:** From the standpoint of the times, isn't there a need for specialists in the humanities themselves to also change in some way?

**Kobayashi:** I might shed tears after reading a haiku created by a computer. In such a case, would the haiku be a fake one? I do not think so because it is "I" that gives meaning to the haiku. It is not the case that only the creator



Chiyori Mizuno:

### Opportunity to think about 'What is art?'

knows the meaning and that all I can do is to be taught it. I can also pass on the meaning to a third person. That is the starting point of human culture. In that sense, all truth exists in the here and now. There is no "present" in AI. An important responsibility of humanities is to resolutely protect the creation of meaning in a "present" that is open to others.

## Summary

### Importance of humanities to only increase

A summary by Isshiki after the conclusion of the forum focused on the role of humanities at universities in the future.

He wrote:

Aoyama Gakuin University established its singularity research institute in 2018. Singularity is the hypothesis that AI will develop to an extent that it will one day go beyond the human brain. The aim of the research institute is to look into the effects AI will have on society from the perspective of the humanities.

One theme of the panel discussion was to ask if the development of AI would lead to an increased importance of the humanities or decreased significance.

The participants were all famous professors with a wide range of learning that mixed humanities with the social and natural sci-

**Nishigaki:** After properly acknowledging the fact that AI does not understand meaning, it is desirable to utilize AI in order to satisfy the soul of humans and make their actions richer. For example, I believe using AI as a tool for studying foreign languages will lead to improvement in the foreign language ability of the Japanese. It could also be done cheaply. It would not be a bad idea to use AI as a tool to think about the humanities.

**Mizuno:** AI has one aspect as a technological and practical knowledge as well as the possibility that it could be a universal knowledge that exceeds humans. Through the humanities, I would like to prevent a situation in which AI threatens human thinking and emotion.

**Nishigaki:** I believe it will be important to create a Japanese-style liberal arts in this age of AI. Liberal arts is a concept that came from the West and is linked with the singularity hypothesis. In today's world, there exists an exclusionist nationalism on one hand along with a globalism that is only concerned with the pursuit of profit on the other. Those two aspects are engaged in a struggle, but I feel there should be a way of thinking that is different from both aspects. I believe today's discussion will provide a hint for constructing such a thinking.

ences. During discussions in the waiting room before the start of the forum, a number of highly interesting comments were made about the relationship between humans and AI. Some were so revealing that I wanted them to save it for the actual session. But such eager discussions were continued in the panel discussion.

The participants were in general agreement that AI would not go beyond humans. While the humanities will likely utilize AI, I do not think anything will be learned from AI because AI does not have mind and is unable to understand the true meaning of words. Through the discussion, I came to feel that the importance of knowing humans will only increase the more AI develops, and that something like "human studies" will become necessary.

## Aoyama Gakuin University

Aoyama Gakuin University has its roots in three schools established early in the Meiji Era (1868-1912) by missionaries sent to Japan from the Methodist Episcopal Church in the United States. It was established as a university

under the new Japanese educational system in 1949 and currently has two campuses, one in Tokyo's Shibuya Ward and the other in Sagami-hara, Kanagawa Prefecture. About 19,000 students matriculate at 10 colleges, schools and 12 graduate programs. The College of Community Studies will be opened in 2019 when the university celebrates its 70th anniversary.