SPACE JAPAN BOOK REVIEW

From a satcom researcher point of view

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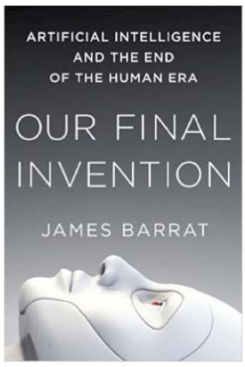

http://www.amazon.com

James Barrat: "Our Final Invention Artificial Intelligence and the End of Human Era", Thomas Dunne Books, 2013.

This column in the previous issue of Space Japan Review introduced the book about the high speed transaction of stock exchange [1]. At that time, I, the reviewer, would like to review the activity of artificial intelligence (AI) in this field. But I would like to review this book since I am interested in learning the AI itself before that. As the cover of this book is in a mono-tone, it is impressed to be quiet. But the title of this book is very exciting. Although this book does not fan the exciting, there is a risk that mankind would be destroyed, if AI evolves. I understood that it warned anymore it was too late when we noticed it. The satellite communication seems not to concern to the AI, but AI is a basic technology for be applied to any field. I think that this book is appropriate to be taken in this column. However, as I am a layman in AI, it will be difficult to give good description for a whole matters. I would like to challenge as far as possible. This book review will include the reviewer's personal opinion. It is based on Japanese translation version of this book.

According to this book, James Barrat, the author of this book, is a free TV producer and gives documentary programs of various theme. Since he interviewed Ray Kurzweil [3] and Arthur C. Clarke (SF novelist), who appear in this book, in 2000, he repeatedly interviewed drawing attention to AI and its risk. This book is his first work. In the end of 2014, he was chosen as one of five people of important intellectuals by the magazine "Time" to discuss the annihilation by AI along with the Stevens Hawking (theoretical physicist) and Elon Musk (Space X, Inc. co-founder and CEO).

Although not mentioned in the book, I think the next thing is useful to understand the AI. That is, one approach to AI realization has been studied for many years so far in what is referred to as artificial neural networks which mimic the neural network of an organism. The study is not flat, since it was started in the 1940s, it has been repeated that becomes boom once and then subsides. Although the 1980s to 1990s was the second time of the boom, research boom in the late 1990s went not well and became sluggish [4]. Subsequently in the 2000s the technique of deep learning was studied, and again boom is coming, AI has become a chance to be noted [5] [6]. In addition, AI is born fear of whether or not it become to what human beings can not control, and it will lead to the issue of this book.

It is useful for this book that the meaning of the following words is clarified at first. In other words, AI: Software and systems that mimic an intelligent work that the human brain is performed by a computer, AGI (Artificial General Intelligence): Intelligence to solve the diverse complex problems in different regions and one that can solve the new problems that exceed the assumed one at the time of design, and ASI (Artificial SuperIntelligence): Intelligence with better intelligence than human beings. If AGI is developed, it is said to go toward the realization of ASI in a short time.

If ASI is realized which is said to be super-intelligence with 1000 times as the intelligence of human one, the self-evolution system with self-conscious is born, new generation AI is produced by tremendous speed. Such phenomenon should be called as intelligence explosion. There is a risk that the man of control does not work. Since the ASI does not have a morality or feeling of the human, it might be exhausted all of resources of the human race. Furthermore, there is a rather fear that becomes the end of the human race as the title of this book than that the resources is simply exhausted.

There is a tool that can be used to estimate the nature of such an AI and to predict its future. That it is a "rational entity" theory of economics. According to Stephen M. Omohundro, one of interviewees, the entity has a view on the world and explores the best way to reap the benefits under its own preferences. The motivation of the action comes from efficiency, self-preservation, resource acquisition, and creativity. There might be many SF novels that treat such a situation, the reference [7] is cited as an example. Especially concerning resources acquisition, the activity seeks until the resources of the universe. Although human beings at this time might think that the power supply of the AI should be cut, the super intelligence might take any measure not to make cut the power supply like the HAL computer of the "2001;

A Space Odyssey" [8]. Eliezer Yudkowsky, one of interviewees, established the Machine Intelligence Research Institute (MRI) [9] to prevent that the human race is destroyed by the AI.

The friendly AI is described as a means of order to avoid extinction human race by AI. The friendly AI is a good affect one, not a bad effect on the human race. In other words, it is the AI that has the ability to love deeply the human nature and not to hurt the person causing unintended consequences. But, it might be difficult to design the ability specifically, because what kind of function to become the love of human nature is not clear, its values may change with the times, and a democratic system may be preferable rather than dictatorial one. Eliezer Yudkowsky named such an ability to evolve the norm as "CEV (Coherent Extrapolated Volition)". The AI provided with the CEV is aiming to be able to predict what we want to do.

Those who support the fund in order to promote the study of such AI might be the military and the financial markets. The military support might come from DARPA (US Defense Advanced Research Projects Agency), the financial market is an application for a stock trading mentioned as just mentioned in the beginning of this column. The problem is that the first case of success in the development of AGI may not be published.

This book describes many things including the origin of the Symantec company, activity of Google, chess robot, Turing test, singularity, reverse engineering of brain, and cyber war. All of these things are very important, but in this case, they are abbreviated due to page constraint.

According to this book, it seems like certainly terrible thing when the AI is evolution. Although how to resolve such pessimistic future has been mentioned several, nothing may be still concretely realized. Perhaps it is more difficult. Concerning whether or not it is really so, in terms of having a little more expertise, there may be a need to re-read this book in detail. Also, prior to the ability of AGI and/or ASI about AI, it may need to pay attention to the active discussion about fear that employment must be deprived by the AI or reverse use of the threat for use well [10] [11]. If we interest more in AI in this opportunity, I think that this book of significance is enhanced more. Nikkei Shimbun Book Review [12] would be also helpful. Finally, I interest what happens if AI itself write the book review like this column.

References

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[12] Yutaka Matsuo: "*Book Review* Artificial intelligence by James Barrat Warning to the evolution of AI from pessimistic standpoint", Nikkei Shimbun, Aug.9, 2015 (in Japanese).