THE EVOLUTION ROAD MAP FROM THE ORIGIN OF LIFE TO THE INTELLIGENT UNIVERSE

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ABSTRACT

The Theory of Evolution by Darwin revealed the law of evolution of lives, from primitive to advanced, from simple to complex. Similar evolution can also be seen on the Internet: the four decades of the Internet show that the Internet's development is not orderless. Instead, through the analogy and contrast between the Internet and human brain structure, evidences show that the evolution of the Internet is highly resembling that of human brains. Enlightened by neurology, we plotted the "virtual brain structure" for the Internet. We found that the Internet has the tendency of infinite expansion and growth, and have come to the conclusion that the Internet will eventually extend to the whole universe. According to the research, we have formed a roadmap of evolution from the origin of life to the Intelligent Universe.

INTRODUCTION

From the review and examination of the history of the Internet, we have found that the structure of the Internet has strong resemblance to that of human brain. We proposed a structure of the Internet Virtual Brain. On the special dimension, on the other hand, we noted that the Internet has the tendency of infinite expansion and growth. We created five figures to illustrate the expansion of the Internet from the Earth to the whole universe.

The Darwinian has proved the process of evolution from the single-cell microbody to human. However, the evolution after human life is still unknown. We attempted to combine the evolution of lives and the evolution of the Internet, to form a roadmap of evolution from the origin of life to the Intelligent Universe. This roadmap will be illustrated in Section 4.

THE ORIGIN OF LIFE, AND THE THEORY OF EVOLUTION

In 1859, C.R. Darwin published his revolutionary book The Origin of Lives, in which he argued that all lives on the Earth evolved from a common ancestor; lives have biological relations. Darwin proposed selection of the nature to explain the cause of evolution, thus established a scientific theory of evolution, revealing the law of the development of lives [1].

The commonly held scientific belief is that the lives on the Earth evolved following such roadmap: from the most primitive non-cell organism, evolved to prokaryotes with cell structure, from prokaryotes with cell structure to Single-celled eukaryotes, and then follow different directions of evolution, there appeared fungi, vegetable kingdom, and animal kingdom. In the animal kingdom, the evolution manifested from the primitive flagellate to multi-cell animal, to chordate, and further to vertebrates. The fishes in the vertebrates evolved to amphibian, then to reptiles, which branched to mammals and birds. A branch of mammals further evolved to one that has high level of intelligence,

which is human[2].

We will borrow the scientific illustration of the evolution from the primitive non-cell structure to human, to be the first part of our evolution roadmap from the origin of life to the intelligent universe.

FROM THE BIRTH OF THE INTERNET TO THE FORMATION OF THE INTERNET BRAIN

The Internet was born in 1969 as APARNET, a computer internetwork by the Advanced Research Project Agency (APAR) of the of the U.S. Department of Defense. The applications on the Internet developed from simple forms in the early days such as ftp, email, BBS, developed to the rich forms of today, Although the original purpose of the Internet (APARNET) was to facilitate the connections and the communications among computers, the great significance of the Internet proved to be way beyond such original intention[3].

Looking back to the evolution history of human, it is a history of the extension of human sensing and motion organs. Stick extended arms, stone extended fist, car and train extended legs, telescope and microscope extended eyes, drums, trumpets, and telephone lines extended ear and mouth in signal transmission. The highway networks, railway networks, airlines networks, and ocean liner networks eventually realized the networking of human limbs.

At the same time, the extension of human brain never stood still either. Knot-tying, counting rod, abacus are all examples of early day computing tools that extend the human brain. Then the electronic computer born in the US in 1946 substantially extended human brain. And then in the 1950s there came the communications among computers – the digital communications[3].

The forty years since the ARPANET, there emerged desktop computers, laptop computers, and smart phones, everyone of which increased the time human brain connected to the Internet. The information and knowledge inside human brain constantly interacts with those on the Internet. The history of the Internet indicates that the Internet is not only the internetworking of computers, but rather for the connection of human brains through internetworking of computers .

If the fundamental function of the Internet is to connect human brains rather than only computers, the this connection itself should have a structure relevant and similar to that of what it connects – the human brain. Observing the Internet's development since 1969, we noticed this similarity with more and more evidence[4].

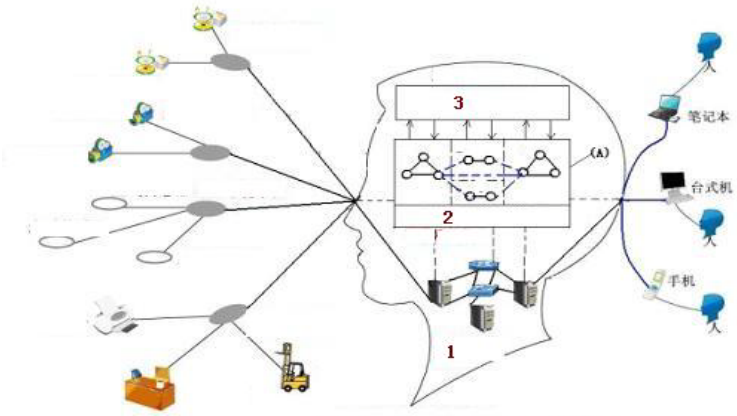
From the 1990s, video cameras connected with the Internet had started to be used in homes, factories, and public places such as intersections and squares. This new system is to the Internet as vision and hearing systems are to the human nerve system[5].

Also in the 1990s, sensors placed in soil, air, bridges, building began to be connected to the Internet, sending data to monitors through the Internet. Since 2009, the Internet of Things featuring networks of sensors began to take off world wide. These networks are similar to the Somatosensory nerve systems in human brain[6].

In the first ten years of the 21st century, it is not uncommon to see cases in which doctors perform surgery through networks from distance. These applications of controlling machines or equipments from a distance are similar to the motion nerve system in human brain [7].

In cloud computing, Numerous users obtain the services provided by these gigantic servers through simpler clients (as compared to full-fledged stations)[8]. At the same time the data captured by the "vision," "hearing," "body sensing," and "motion""nerve systems" are all transmitted to cloud servers, where they are processed and searched/queried. The cloud computing is very similar to the central verve system in human brain[9].

It is enlightened by these evidences, we developed the following illustration for the "virtual brain of the Internet"[10](Figure 1):



1. Internet core server
2. Internet Operating System
3. Internet Information Ocean

The evolution of the Internet from the original four connected computers to the eventually complete "virtual brain of the Internet" is not achieved in one strike. Instead it is a gradual and evolutional process. Based on the development of the Internet, we plotted six figures as the second part of the evolution roadmap from the origin of life to the intelligent universe.

THE INTERENT'S SPATIAL GROWTH FROM LABORATORY TO INTELLIGENT UNIVERSE

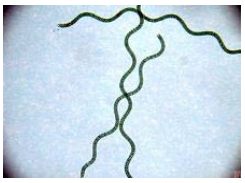
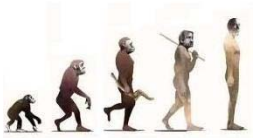
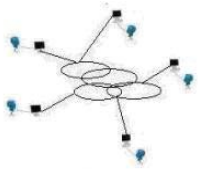
October 29, 1969, the computers at Stanford and UCLA connected for the first time, which was the prototype of the Internet. Since that point, in 42 years, the Internet expanded from the U.S. to covering the Americas, Europe, and Asia. All continents are now completely covered by the Internet.

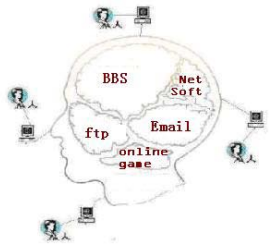
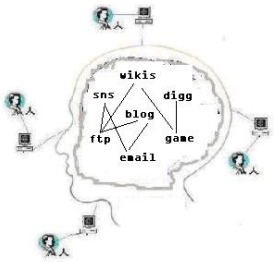
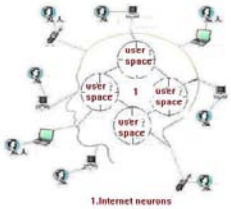
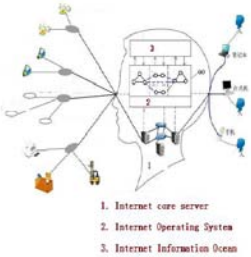
The Internet's expansion is not limited to the Earth: every step of mankind's exploration into the outer space marks the expansion of the boundary of the Internet: the moon explorer, the Mars explorer, or the deep space explorers Voyager I and II, all pushed forward the boundary of the Internet to the "Interplanet." We can reasonably speculate that as the evolution of mankind, the

Internet will certainly expand to the further dep space. Given time, the development of mankind will expand the Internet to cover the Milky Way galaxy, and in an infinite time, eventually expand to the whole universe. We discussed in Second 2 that the structure and functions of the Internet will be similar to those of the human brain; therefore, a Solar system, a Milky Way galaxy, and a universe that is connected by the Internet can be referred to as intelligent Solar system, intelligent Milkyt Way galaxy, and intelligent universe ("Universe Brain").

We will use four figure to depict the expansion of the Internet from intercontinental to intelligent universe, as the third part of the roadmap from the origin of life to the intelligent universe.

The roadmap from the origin of life to the intelligent universe

Sequence number 1	Sequence number 2	Sequence number 3
 The origin of life (figure from the Internet)	 The age of bacteria and blue algae(figure from the Internet)	 The age of trilobite; explosion of lives (figure from the Internet)
Sequence number 4	Sequence number 5	Sequence number 6
 The age of fishes(figure from the Internet)	 The age of amphibians (figure from the Internet)	 The age of dinosaurs and reptiles (figure from the Internet)
Sequence number 7	Sequence number 8	Sequence number 9
 The age of mammals (figure from the Internet)	 The age of evolution of man (figure from the Internet)	 1969, Internet was born; mankind entered the Internet Age
Sequence number 10	Sequence number 11	Sequence number 12

 1969-1983: The Internet had only a few functions	 Since BBS'birth in 978,its functions span off and there emerged many new services such as news, e-commerce, blogs, wikis.	 The spin-offs of BBS combined with other early applications of the Internet
Sequence number 13	Sequence number 14	Sequence number 15
 Internet applications further merged and synthesized, forming the "quasi-neuron" structure based on personal (Internet) space	 As the emerge of the Internet of Things and with cloud computing, the virtual brain structure of the Internet is taking form	 The virtual brain of the Internet that covers the whole Earth (figure from the Internet)
Sequence number 16	Sequence number 17	Sequence number 18
 The virtual brain of the Internet that covers the whole Solar system; it can be referred to as "intelligent Solar System" or the "Solar System Brain" (figure from the Internet)	 The virtual brain of the Internet that covers the whole Milky Way galaxy; it can be referred to as "intelligent Milky Way" or the "Milky Way Brain" (figure from the Internet)	 The virtual brain of the Internet that covers the whole Universe; it can be referred to as "intelligent Universe" or the "Universe Brain" (figure from the Internet)

CONCLUSION

Through the examination and organization of the development history of the Internet, this study developed and described the roadmap of evolution from the origin of life to the Intelligent Universe. It has the following significance:

1. Filled in the blank of the Darwinian after the evolution reached the human.

2. Established a model for the future of the Internet, and provided a foundation for future scientific research and commercial applications/extensions.
3. Through the proposed model of the Intelligent Universe, pointed out the direction of the evolution of lives.

Although this study pointed out the ultimate result of the evolution of the Internet is the Intelligent Universe, or the Universe Brain, there are still three issues that need to be explored and addressed:

1. How will the Intelligent Universe overcome the constraints of time and space in its operation?
2. What would be the direction of the next stage of evolution for the Intelligent Universe?
3. What could be the factors pushing forward the lived toward the direction of the Intelligent Universe?

References

References are available from the first author upon request.