

Self-replication of Internet Communication

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Abstract: *In systems science, self-replication refers to the system or subsystem in the absence of a specific external system produces offspring related to its own structural system, such as the propagation of organisms is a self-replication, self-replication, therefore also called self-reproduction. Self-replication system is an important form of system self-organization. There is chose relationship between self-replication and self-growth, self-adaption, slightly more complex self-growth or self-adaption should contain some kind self-replication.*

Phenomena of self-replication exist in the internet communication system widely. Both self-growing and self-adaption in the internet communication system contain self-replication of internet communication elements. In this sense, self-replication of internet communication is the basic style of self-organization of internet communication.

Keywords: Internet Communication, self-replication, self-growth, self-adaption, self-organization

1. A Summary of self-replication of internet communication

A self-organizing system must be a dynamic evolutionary and "living" system, which will not be static, rigid balance system. In the evolution of self-organizing system, only synergy of all subsystems can maintain the stability of the system and thus form a new ordered structure and function. Since self-replication is often in terms of a subsystem in self-organizing system. Macroscopic self-organizing system structure and function may remain relatively stable, but the specific subsystem state is changeable. The states of each subsystem are changing, each subsystem is in a certain life cycle, so it can appear and disappear. Some subsystem collapses, but at the same time new with the same structure and function of subsystems emerges. For example, in a stable ecological system, the specific number of a species possesses relative stability, biological procreation between individuals has relatively stable characteristics. Thus, specific biological

populations will gradually metabolism over time. This self-replicating phenomenon is the developing structure of ecosystem's self-organization. Similarly, the specific cell of an organism's metabolism will be constantly out of aging cells, while continually produces new cells, which is cell's self-replication, while the structure and function of the organism to maintain stability. For a self-organizing system, on the whole, the system has a number of some subsystems, which does not change because of individual subsystem changing its state, to prove in which exist the self-replication of the subsystem. This shows that, the self-replication is the reason why the state of system's self-organizing forms can maintain stability. Because of self-replication, a self-organizing system in a time period as a whole remained stable, but the subsystem will be endless change. Stability of the macro-system and activity of the micro-subsystem harmoniously coexistences in a self-organizing system, which can make the whole take on order

status of the dynamic evolution.

The self-replication of internet communication has similar features. In the internet communication system, since the self-replication has two aspects: the time structure which the self-organization of internet communication forms, and the metabolism of the internet communication system. The former is relatively stable, the latter is changeable. Both are the embodiment of the self-replication of internet communication.

The time structure which the self-organization of internet communication forms can be seen as self-replication of internet communication system structure and function. In internet communication system, the system structure and function in a certain period of time can be kept relatively stable, and specific element of the system is a great change, this is a very common phenomenon. For example, a site's overall structure and user interface remain relatively unchanged, but the specific content of which is frequently updated. The new information content is often kept in the internet, while some contents retreat from the current page and enter into the website database of historical documents, which prove that the site's structure exist self-replication. The general structure and content of the site home page is relatively stable, but the specific content will change constantly over time, then we can say that the site's information content and structure exists self-replicating phenomenon.

This time structure which the self-organization of internet communication forms can be viewed as the simplest self-replication. In the self-organizing process, a internet communication system presented in an orderly evolution of the state, after some time if the ordered state of the system remains the same, this is a simple

self-replication. Obviously, such self-replication is very common. As a network user creating a blog, then over time, the network user posts more and more, but the blog page of the structure and style is relatively stable, new post will be directly displayed in the blog home page, the previous post will be posted out home page, which shows that the structure and style of blog sites have the characteristics of self-replication. Because systems possess self-replication, the orderly state which internet communication system forms in the process of self-organization can exist steadily, and they can not become instability for the movement of subsystem or elements.

Research shows that network users in general cannot understand and cognitive network topology that also exist self-replicating phenomenon. In the process of internet communication systems' development and evolution, network topology communication has relative stability, this stability through the self-replicating process of topology structure to achieve. For example, the hyperlink macro-structure of Internet node has characteristics of power law, most nodes have only a few hyperlinks, while a small number of nodes has a large number of hyperlinks. The process of network development in the Internet, Internet of the macro-structure remained unchanged, the new node build more hyperlinks with the original node that has many hyperlinks, showing typical features of uneven distribution. This indicates that the topology of the internet communication system exists self-replication in the evolution.

Similarly, the metabolism in internet communication system is also self-replicating phenomenon. The information content of internet communication exists the phenomenon of

self-replication. With life systems, internet communication system also showed very strong metabolic characteristics. In the internet communication, information's metabolic is the basic expression: Google's first "cache" feature proves that a specific web page has life cycle; an online community (BBS) posts will appear as time goes drifting down. Similarly, a website to survive, need to constantly update their content, site update rate is closely related to their living state. However, while the information content of internet communication metabolism, the network's overall structure and function remain relatively stable, which proves that the information content of internet communication exists the phenomenon of self-replication. Only new information contents of internet communication can replace the old content, a Web page is gone, but there is another website created to replace the original page's location and function.

Internet communication system's self-adaption and self-growth are founded on self-replication. The self-replication of internet communication shows that behind the ever-changing content of internet communication, there is a relatively stable structure and function, self-replication is the important factors to maintain its structure and function.

2. The improvement about self-replication of internet communication

Internet communication system can maintain the system structure and function of the basic stability, thereby achieving self-organizing evolution by each element's self-replication. Internet users through their own efforts can improve the self-replication of internet communication 、 realize extended promotion of information content

of internet communication and structure and function, make the internet communication system achieve a more harmonious state.

Self-replication of internet communication is one form of self-organization. Therefore, improving self-replication of internet communication should follow the law of self-organization and strive to meet the operating mode of the internet communication environment. In the specific operation process of internet communication system, to improve the self-replication of internet communication, network users have two forms: experiment and simulation of internet communication mode or function, and imitation and transplanted of internet communication mode or function.

2.1 Experiment and simulation of internet communication mode or function

Internet communication system is a huge system, any network users are unable to internet communication system on the macro-control. Therefore, we can use the means of experiment and simulation to test the adaptability of internet information or services. After the success of the experiment or simulation, apply it to internet communication system formally, so you can avoid detours, cost savings, lay the foundation for self-replication of internet communication.

For example, Google established the "Google Labs" is a try for experiment and simulation of internet communication mode. General Internet users can through "Google Labs" reflect the specific needs of their own, put forward their own ideas and thoughts; the same time, Google will make public the project being developed through "Google Labs", to listen to users comments and suggestions (see Figure 1). This network laboratory style, avoids the blind introduction of services, avoids the consequences of

working worse, unsustainable development after launching a service function. A service function in the "Google Labs" listens to the views of users and when continuous improvement is completed, Google will put it to the formal application. Into the formal application process, also the services principle, structure and function to achieve the result of replication amplification, so that the services also achieved self-replication. Clearly, Google through the "Google Labs" operation opens up the smooth development path for services' self-replication. Through the "Google Labs" introduced many services, such as audio and video search, book search, they expanded the Google's services, repeatedly performed outstanding functions for Google's jumping.

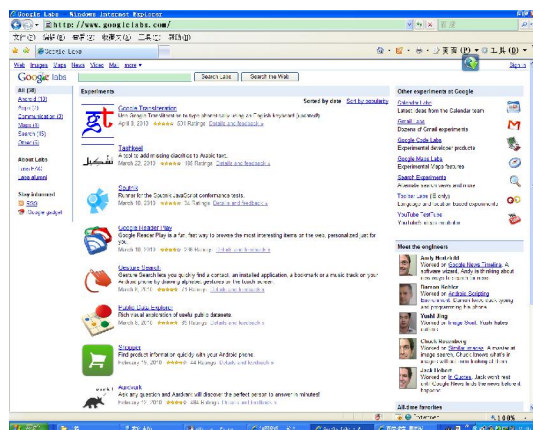


Figure 1: "Google Labs" page (2010-03-10)

The other which is similar to experiment and simulation of internet communication are online games. Upon completion of online games, online game players are usually invited to try out online games, finding the problems and improving online functionality. This is a kind of experiment and simulation, also can facilitate the successful commercial operation in the network game, realizing self-replication of the game functions.

2.2 Imitation and transplantation of internet communication mode or function

Imitation and transplantation of internet communication mode or function is an important mode of developing self-replication of internet communication. Often the successful launch of an information services and the smooth running soon after a group of followers imitate. They replicate the successful internet communication mode or function, re-establish similar internet communication mode or function in cyberspace, to some extent improve the self-replication of internet communication.

For example, Baidu search engine in many ways are similar to Google search engine, Baidu is generally believed that this is the success of the Google services simulation. Google is the biggest search engine, Baidu is the largest Chinese search engine, which have similarities in the search function. Meanwhile, the search engine Baidu and Google search engine, their interfaces are similar, some services are overlapping, such as Baidu's "cached" on a direct imitation of the Google search engine. Baidu such imitation and transplantation is successful, better copy the Google search engine features and operation mechanism.

In real internet communication, in order to imitate and transplant for the expression of self-reproduction are many. For example, Baidu and interactive encyclopedia imitates Wikipedia's structure and mode of operation. Some sites with specific services such as SNS sites often copy similar sites' forms, this is a very common phenomenon of internet communication.

In addition, the reproduction of internet information can be seen as a special kind of imitation and transplantation, it is also self-replicating forms of internet information. Through reproducing internet information, although the network does not increase the amount of information, the network released

the increasing volume of information.

Self-replication as a form of self-organization of internet communication is the performance of internet communication systems' dynamic development. The process of internet communication systems' formation and development is a self-organizing process. In self-organizing process of internet communication system, self-creation self-adaption、self-growth、self-replication

are common forms of self-organization.

Each form of self-organization is a very complex phenomenon of self-organization, they reflect the complexity of internet communication system from different levels. Internet communication system through its self-organization evolves and upgrades its capabilities, having a growing influence and role for development and progress of human society.

References

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