Design of Service Mode of Smart Library based on "Field" Synergy Theory

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Abstract. This article through the integration of field synergy theory and the theory of cohesion between wisdom library service point, through the field of the connection between the three layers of meaning and wisdom library, in order to prove the feasibility of wisdom library application field synergy theory, through the design wisdom library within the field of collaborative service function between the field and puts forward the service mode.

Keywords: Field Collaboration, Intelligent Library, Library Service

1. Introduction of Field Synergy Theory

The field synergy theory was originally a theory in the field of thermodynamics. It was first proposed by Academician Guo Zengyuan [1] of Tsinghua University and his collaborators in 1998. This principle believes that under certain conditions of the velocity field and temperature gradient field distribution, the angle between the two (ie, the field synergy angle) has an important influence on the strength of convective heat transfer. The smaller the angle, the higher the heat transfer performance. Using this theory can reduce the heat loss during heat transfer. It is important to note that the above concept is the field synergy theory applied in the field of thermodynamics. The field mentioned is the field related to the transfer of thermal energy. More than 20 years ago, the team of Academician Guo Zengyuan compared it with electricity, inspiring by potential energy of electricity and relating it to the potential energy of heat, and put forward the concept of "fire accumulation", and then put forward the field synergy theory. Inspired by that this paper associates the corresponding relationship between matter, energy and information. This paper compares the transmission of information with the transmission of energy. Citing this theory to the related research of library science is mainly to borrow its ideas rather than copy it completely. Therefore, this paper will make appropriate adjustments to the concept of field synergy theory in the following to adapt to the research in the field of library science.

2. The Feasibility of the Field Synergy Model in Smart Libraries

2.1. Existence of a "Field" in a Smart Library

Based on the above basic definition of the field, the field in the smart library is summarized from these three levels.
First of all, for the first level, as an existing public space, the library itself naturally has the meaning of "field", and the same is true for graph libraries. Therefore, the first "field" concept is the space of the smart library itself.

For the second level, the scene is to portray all information such as the physical or virtual entity’s scene, characteristics and status. As a treasure house of human wisdom, the library has the mission of preserving and disseminating culture and providing information services for its users. Usually, it is to look up materials, read classics, and feel the unique cultural atmosphere of the library. This is the second level of "field".

Finally, for the third level, the interaction field. The fields involved in the smart library include "information field", "knowledge field", "communication field" and so on. These fields have corresponding forces on the various elements of the smart library, and they are also related to each other, forming a synergistic effect, such as weaving a net, which complement each other, and also as a pair of invisible hands acting together in the service of the smart library.

2.2. Deep Interaction between Smart Library and the "Field"

At present, the personalized service model that has been studied in the field of smart libraries basically only establishes a connection between users and resources. To enhance the intelligence of the library and improve the ability of smart services [2], it is necessary to explore the field that can cover the entire library. The service model of field synergy organically integrates users, resources and the environment to meet readers' increasing information needs and adapt to the development of the times. Based on the three-level "field" of the smart library outlined above, starting from the three basic elements of the library: environment, information resources and users, the following part will discuss the "field" and its relationship between smart services.

2.2.1. Library level. The "fields" of the smart library involved in this level are mainly the first and second level, and also involve the third level of atmosphere field. Needless to say, the space environment is the physical structure of the library itself. The scene is all the information describing the characteristics of the physical and virtual scenes of the object, emphasizing the perception and timely feedback of the changes in the sceneal information. The atmosphere is a completely invisible field of action, which can only be feel and cannot be seen, but it can deeply infect the people in it. For example, the library is always surrounded by a strong cultural atmosphere, and users will be affected by it when they come to the library, and they will be affected by the synergy unconsciously. The smart library itself is a complex system, and this level of field can include the entire complex scene of the smart library. At this level, there have been relevant theoretical research and practical applications based on context, such as context-aware technology and scene-based services.

2.2.2. Resource level. The smart library field involved in this level includes the information field and a knowledge field. The information field is an existing concept. Foreign scholars Fisher and Pettigrew believe that the information field is temporary [3] and can appear in various places at any time. When people accidentally gather in an information field to talk, people's focus will automatically shift from the original instrumental purpose to information exchange unconsciously. This is the generation of information demand, the information field promotes information demand, and then help people solve information needs. Knowledge field is a concept similar to this.

2.2.3. User level. With the promotion and popularization of various smart mobile devices and the application of big data technology in recent years, the interaction between users and the surrounding environment has become more frequent, and the scope of user communication has expanded from real life to virtual networks, forming a intricate social network with the combination of online and offline, virtual and reality. The ever-anywhere access method and the increasingly close social connection between mobile users indicate that in the future, there will be a trend toward a mobile social network that integrates user mobile attributes and social attributes, and combines mobile social network
services and resource services [4]. The social network between users will provide us with a lot of usable information for use by smart libraries. The library can also use its own services to establish a library-based user network to enhance the interaction between users and between users and the library to achieve the synergy between people.

3. Model Design of "Field" Synergy for Smart Libraries

3.1. On-Site Synergy Service Model of Smart Library

3.1.1. Space synergy. Scholar Wang Dongbo believes that today’s world has entered the age of scenes. Demands are determined by scenes [5], and services arise in response to scenes. Scene-based services can fully mobilize people’s senses and perceive the large amount of knowledge contained therein, thereby improving the efficiency and quality of knowledge learning. Libraries need to develop scene service business, which can improve their smart service level. They can take advantage of their own advantages to provide comprehensive, perceptible, and three-dimensional interconnected scene services. The smart library can use its technical advantages to create semi-customized personalized scenes in a dedicated smart space to ensure that each scene has its users, and each reader has a corresponding service scene, helping users focus their attentions and learn the knowledge quicker and be able to maintain it in mind with deep impression for a long time. In addition, the space of physical book reading can be integrated with the virtual electronic reading space, or the virtual electronic reading space of different uses and styles can be combined to ensure the scalability and adaptability of the scene service, and appropriately integrate it with different scenes elements that allows it can display text, images, audio and video and other information formats at the same time. Meanwhile, 3D, AI [6], virtual reality technology and other expression methods are introduced to realize the natural switching of multiple scenes, dynamic interactions between humans and scenes to fully utilize the information resources with complex knowledge structure in it. In this way, the user’s sense of reality and experience can be enhanced, while the user’s reading habits can be guided and upgraded, and the resource utilization rate of the smart library can be improved.

The synergy model is based on the process of: users put forward requirements-space accepts requirements-space processing requirements are transferred to the background for resource retrieval to obtain the resources that need to be displayed-analyze the user needs for more appropriate scene-recommend the scene to the space-the space change the display resource according to the recommended scene-user information needs are met as the complete process structure of the perfect "8". The advantage of this structure is that it simplifies the user's operation steps to the greatest extent, and synchronizes the content and information retrieval such as scene demand analysis and presentation form analysis to the background. Users only need to wait for the result feedback, which reflects the user-oriented service process.

3.1.2. Synergy of resource farms. The construction of the "field" needs to be based on a certain scale of resource sharing. After users enter the scene, they put forward information needs, and the resource sharing platform can ensure that the needs are quickly responded to. The information resource platform needs to realize the connection between the resource layer, the exchange layer, the user layer, and the demand layer, which contains two main functions: the user interface and the demand processing. The user interface is the starting point and end point of the user's information behavior. The user inputs his own information needs through the interface. Use the front-end demand processor to see the user's expression processing as a computer language and enter the exchange layer. The exchange layer needs to receive commands for decoding, and the exchange database needs to work in two directions, acting as a bridge between the resource layer and the demand layer. When the information demand reaches the resource layer [7], the resource processor retrieves the information corresponding to the demand in the data storage bin, collects and feeds it back to the exchange database, and the exchange database processes and communicates the user interface. This is the simple
working model of the information resource platform.

3.1.3. User-based field synergy communication. A smart library can use its own virtuality to establish a user interaction mechanism to compensate for the inability to destroy paper documents and cannot communicate with each other in the past, and increase user interaction mechanisms, which can include interaction between users and users, users and librarians. The interaction can be a paired space experience, or a message-style sentimental discussion, a discussion about a book, a space, or an evaluation or suggestion for the library. All these will help to enhance the user’s sense of participation, strengthen the synergy between the various venues, and truly realize the user-orientation, narrowing the distance between users and the library and its knowledge services [8], and realize the interactions between people and libraries, people and resources, people and services.

The form of the design is to finally achieve high-quality information services for users through the interaction of scenes, resources, librarians and services. Through the cooperation of two or more of them, it eliminates the pain point of the single service form in traditional library services, while catering to the "intelligent" characteristics of smart library services.

3.2. Synergy Service Model between Smart Libraries

Inter-field synergy means to realize the interaction and relevance between the above-mentioned fields, forming multiple small collaborations and one large collaboration, that is, a three-dimensional integration development of space, resource and service.

3.2.1. Space and resources. We are in the era of information explosion, and the pace of life and learning is not consciously accelerated. User access behaviors show fragmented characteristics, and user needs are more personalized. On the one hand, the popularization of fragmented reading makes it difficult for traditional media methods such as text, images, audio, and video to stimulate users' interest. On the other hand, as the scene becomes perceptible and more concrete. The scenes contains in information and knowledge are becoming more and more abundant, and the multi-dimensional scenes of knowledge can be better represented through the scenes. Providing knowledge services through scenes can improve readers' memory and understanding of knowledge, so that it is no longer limited to abstract concepts, but expressed in the form of interactive scenes.

3.2.2. Space and services. The composition of the scene involves many elements such as space and context, social atmosphere, user status and experience, cultural atmosphere, resource construction, etc. The smart library can perceive user needs through the field, and then provide precise and personalized wisdom that varies from person to person [9], and users are treated equally in the service process, and every scene is shaped to meet the needs of users, so that every scene has its users and each reader has his own scene. The scene fully shortens the distance between readers and knowledge, making the expression of knowledge abstract into concrete, and knowledge more accessible. The library needs to constantly adjust the surrounding environment and the synergy of resources to suit the scene elements in order to effectively develop smart services.

3.2.3. Resources and services. In the current era with users as the main body, users' information needs pay more attention to their living environment and expression forms. In addition to visual knowledge such as text images and videos, users also hope to obtain three-dimensional perceptual knowledge services. The resource field can fully mobilize human senses and enable users to fully perceive the large amount of information contained in the scene, thereby improving the efficiency and quality of users' learning. The library can combine its own conditions to mine user needs and preferences in pursuit of providing users with more precise and higher-quality personalized knowledge services.

3.3. Synergy of Multiple Subjects in Smart Libraries
As the main body of the "Internet +" mode, the smart library can realize the intercommunication with other smart platforms such as archives, museums, art galleries, etc., to jointly serve information users. Under the perspective of multiple collaboration [10], the organizational structure of the smart library changes from a single subject to multiple subjects, and each subject cooperates with each other to form complementary advantages, which is conducive to reducing management costs and improving overall efficiency. The multi-subject structure of the smart library is user-oriented, and cooperate with each part.

4. Conclusion
The field synergy theory uses a wide range of "field" concepts to conduct in-depth exchanges between smart library services and information users based on the synergy theory. At the same time, it uses the concept of physical scenes and virtual scenes as the environment design to help users improve the utilization of information resources and obtain a better information experience. Starting from the concept of "field", this paper deeply integrates services, resources and space, and involves multiple subjects, expanding the concept of "field" and the service subject, which helps to achieve resource integration.

References
[1] Gen Li. Field Synergy Principle. Baidu Library, 2014.
[2] Zeng Ziming, Sun Shouqiang. Research on scenario-based services of smart libraries based on sceneal awareness. Books and Information, 2019(04):101-108.
[3] Li Yan. Research on WeChat Community Information Behavior——Based on the Theory of "Information Field". Agricultural Library and Information, 2019, 31(03):56-64.
[4] Xu Tong. Research on user modeling and its application in social collaboration behavior. University of Science and Technology of China, 2016.
[5] Chu Jingli, Duan Meizhen. Smart Library and Smart Service. Library Development, 2018(04):85-90+95.
[6] Sun Shouqiang. Research on the Ubiquitous Smart Service of Smart Libraries from the Perspective of Multiple Collaboration. Library, 2019, (11):52-57.
[7] Xu Daye, Wang Ning. The creation of a library smart service system based on collaborative ecology. Media Forum, 2019, 2(14): 145.
[8] Wang Jing, Song Yingfa, Du Pingping, Bao Jie, Zhang Xia. Research on Service Process Control of Smart Library Based on Synergy Theory. Library Work and Research, 2018, (10): 42-46.
[9] Zeng Ziming, Sun Shouqiang. Research on the scene-based service of smart library based on sceneal awareness. Books and Information, 2019(04):101-108.
[10] Li Yan. Research on WeChat Community Information Behavior——Based on the Theory of "Information Field". Agricultural Library and Information, 2019, 31(03): 56-64.