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Designing Big Data Environment for Knowledge Collaboration

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***Abstract*— Knowledge demands of the researchers are composed of three levels, that is, basic demands, expectations and excitement requirements. Among these the excitement requirements play a decisive role in the knowledge collaboration and innovation. Based on the big data environment, the research on knowledge collaboration is carried out for scientific researcher's which includes three aspects as follows. Firstly, a huge amount of scientific data of researchers is added to the big data environment and then a deep mining and analysis are made in order to extract the qualities of knowledge which represent the academic abilities of researchers and finally to build a database that stores the knowledge qualities of researchers. Secondly, a set of researcher's demands are built by use of the behavioral and active data of researchers. The model of applying knowledge discovery will excavate the different levels of research needs of researchers from the discrete data of research groups. On this basis a mapping model between the knowledge and demands of researchers is established. Therefore, the suitable knowledge will be passed to the appropriate researchers at the right time by means of knowledge discovery system which will facilitate the accomplishment of the knowledge collaboration between knowledge and scientific researchers. Thirdly, by the establishment of a mapping model between the set of scientific researcher's demands and qualities of knowledge, the knowledge collaboration between a scientific researchers and another researcher will be accomplished.**

Keywords*— *big data environment ; demand discovery ; knowledge collaboration ; knowledge discovery ; excitement requirements

I. INTRODUCTION

At present, the innovation of science and technology has become a strategic problem of the world that needs attention and cooperative innovation is an important way to realize it.

When compared todividual knowledge innovation, cooperative innovation is one in which cooperation of different individuals and competition among them can complement each other so as to create a better performance and synergy to generate the effect of "1+1 > 2" [1].In order to realize the collaborative innovation the knowledge must be made as a foundation and at the same time protection. However, traditional sense of knowledge collaboration is based on specific people under study (assuming that certain people or groups have established the demand). However, knowledge collaboration should not only be between knowledge and knowledge but it should also include collaboration of people and knowledge as well as collaboration of people and people [2]. Obviously, this goal is difficult to achieve using traditional methods of analysis. Behavioural factors of humans fully reflecting the person's needs can be fully explored to achieve the optimal objective knowledge collaboration only in large data environment.

With the development of big data technology, all data related to scientific research personnel's such as text, pictures, audio, video, HTML is stored and processed. As a result the size and the frequency of the information is increasing day by day as the scientific quantitative analysis provides abundant data [3]. Such comprehensive and complete data storage can be refined and we can analyze all the data that is associated with the research feature of every scientific research personnel. But in the traditional information environment, we can either record or process structured information. The description of a person usually uses the information construction method of feature model in today's information and data environment. Because the description and modeling of the main factors on knowledge (the researchers) feature affects the result of innovation collaboration directly, the current knowledge collaboration still has many limitations. It is difficult to stimulate knowledge innovation inspiration in scientific research personnel.

The demand is the greatest driving force for innovation. Finding the demand is the starting point of knowledge innovation. The famous KANO model defines three levels of customer demands namely basic needs, expectations and excitement needs [4]. For researchers, the demand for knowledge can be divided into three levels: the basic needs, the expected demand and the exciting demand of knowledge. The researchers expected demand is only vague awareness of need and is the demand that becomes gradually clear under the inspiration of the knowledge service personnel or other factors; the "exciting demand" is a demand that researchers don't realize but can bring them surprise and inspiration. These two types of demand especially excitement demand can inspire researchers to spark innovation and thus play a decisive impact on knowledge innovation. Research and practice in recent years has been the basic understanding and meeting the first two levels of scientific research and the third level namely the excitement of hierarchy of needs in the traditional information environment is more difficult to achieve. But the characteristics of large data environment determine the realization of "excited" because the demand in big data is obtained by big data analysis and forecasting techniques. It not only has high accuracy, fast speed and can be predictable but can also predict the future research needs of scientific research personnel from large data environment and technology thus focusing on the discovery of new knowledge, constantly surprises in the knowledge level for scientific research personnel.

II. SYSTEM CONSTRUCTION

Knowledge collaboration in large data environment is nothing but the use of massive data of scientific research personnel related in network environment; mining it and analysing it. It includes finding the scientific researcher's knowledge characteristics and different levels of scientific research needs; the establishment of the corresponding model; realize the collaboration between knowledge and people, people and people; meet the researchers "excited" demand; resulting in knowledge innovation to achieve the purpose of spark and knowledge innovation.

With the development of Internet information is fragmented. We can't maintain authenticity due to scientific research personnel behaviour analysis. The needs and interests of scientific research personnel are diverse, distributed and constantly changing. The real needs and wants of scientific research personnel cannot be captured by existing technology. In big data environment, personal activities can act as comprehensive record and true portrayal of the researchers. These records produce a huge amount of structured, semi-structured and unstructured data. Thus provides abundant data resources to quantitative analysis. The knowledge of collaborative research in big data is shown in Figure 1. Application of big data analysis methods [5, 6] helps us to explore data complexity; uncertainty feature description method to describe extraction and integration of knowledge and behaviour data of scientific research personnel from heterogeneous data sources; discretize 、 mining and analyse the data to discover the knowledge characteristics and demand of scientific research personnel and finally establish knowledge characteristics library of researchers. The model proposed in Figure 1 gives the mapping mechanism between the knowledge and the demand matching; scientific researchers knowledge characteristics and demand matching and finally matching the results back to the appropriate scientific research personnel (" user" on figure 1) for knowledge collaboration.

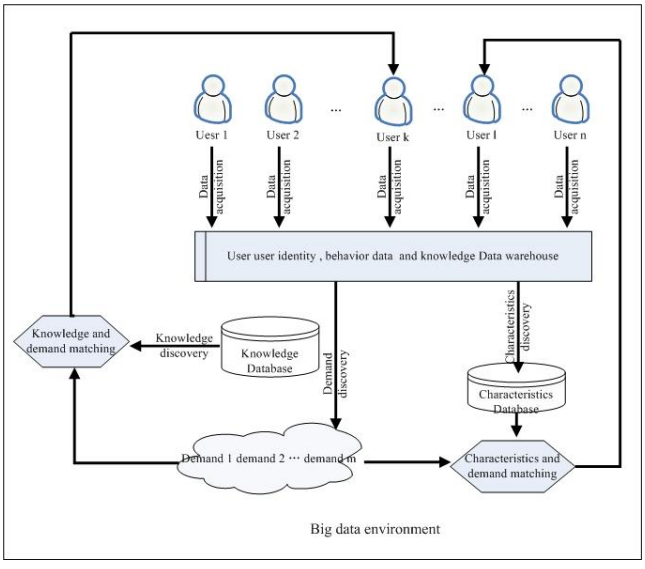

Fig. 1 Knowledge collaboration system schematic diagram in the large data environment

A. Data oriented researchers expected demand and demand that leads to excitement.

Researchers found that the level of demand is directly related to the satisfaction of knowledge collaboration. In traditional information environment knowledge requirement of scientific research personnel is through cluster analysis of explicit information by marking the behaviour of researchers. This discovery mechanism can be found in scientific research personnel basic needs and expectations but researchers don't realize that the excitement of demand is incapable of action. In large data environment, timely mining activities such as behavioural data analysis of the researcher's unconscious and conscious participation; establishing requirements discovery mechanisms; identifying research personnel's needs of all levels can lead to identification of knowledge collaboration attitude of the researchers.

B. Mapping scientific researchers knowledge characteristics and demand set (human knowledge collaboration)

In the traditional information environment the main factors of knowledge collaboration of researchers is simplified. The collaborative process of scientific research personnel's role and behaviour factors, cooperative partner selection and mode of operation is not considered. In this project full consideration of scientific research personnel's role and behaviour factors, cooperative partner selection and mode of operation is considered using a large data analysis method to extract the scientific researcher's knowledge trait index, accurate representation of research personnel's knowledge through knowledge characteristic that helps in mapping the scientific researcher's knowledge characteristics to the demand set.

III. SOLUTIONS AND TECHNOLOGIES

System is designed that can establish the scientific research personnel's needs for knowledge discovery and scientific researcher's knowledge base to achieve the purpose of knowledge collaboration. To solve this the former is collected from the actual research and social environment of scientific research personnel's and scientific research personnel related to a variety of network information such as log data through the data processing methods followed by the knowledge formation process to carry on processing and the analysis of all kinds of data. Finally through the visual analysis of data characteristics a knowledge discovery model is prepared. The latter is introduced to describe the scientific researcher's knowledge traits that mean collaboration between researchers and scientists. Through analysis of the factors influencing the innovation ability of scientific research personnel, traits framework of scientific research personnel is constructed, this framework system forms the basis of the knowledge base to extract the data. Therefore, the system is applied to the following key technologies:

A. The demand for knowledge discovery technology research group

Researchers often have knowledge awareness that is not clear. Knowledge discovery technology can find the demand for knowledge of scientific research personnel from scientific researcher's personnel activity data. The demand that application needs are: groups of research work of the data set through analysis; excavates the knowledge demand that may exist. The same demand may be mapped to many researchers at the same time there may be multiple demands that map to the same scientific research personnel. Application form on the basis of knowledge collaboration can bring researchers together and thus leads to higher knowledge collaboration satisfaction.

IV. CONCLUSIONS

The system will store details about the scientific researcher's knowledge and thus will form model of researcher's knowledge demands and characteristics of scientific research personnel. Not only this model will be able to establish demand and knowledge; demand and scientific researchers characteristic mapping model; realize the knowledge collaboration of knowledge and people. In order to meet the expectations of the research personnel the demand and exciting demand are to be differentiated accurately and timely and thus promote knowledge innovation of scientific research personnel.

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