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Enterprise Knowledge Recommendation Approach Based on Context-aware of Time-sequence Relationship

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Abstract

Enterprise knowledge recommendation approach combines two elements of knowledge and context. And knowledge and context composed context data pool. Knowledge consist of associated knowledge elements. Context refers to the time context. Based on the analysis of time context, considering the effect of time context on knowledge recommendation. Gantt chart is applied to describe the time-sequence relationship in the knowledge recommendation process. And through visual analysis of R programming language, it confirms the importance of time context. Enterprise knowledge recommendation approach is proposed based on context-aware. It improves the knowledge recommendation accuracy, and helps employees' knowledge reuse effectively.

Keywords: Context-aware, Gantt chart, Knowledge recommendation, Knowledge management, Time-sequence relationship;

1. Introduction

In the era of big data, along with the rapid spread of the Internet and information technology, knowledge resource has shown explosive growth. Many enterprises to build a knowledge management system, providing knowledge service for enterprises and knowledge workers[1]. The existing knowledge management system exist knowledge overflow and knowledge disorientation phenomenon, which makes the knowledge index need to spend a lot of time and energy. Fast response and personalized recommendations have become natural trends for all businesses. This is particularly important for content-related products and services, such as consulting, news, and knowledge management in an organization[2]. Active push is knowledge search engine that push knowledge actively based on knowledge usage scenarios. Knowledge push can solve knowledge overflow phenomenon, is an important development direction of knowledge acquisition and knowledge reuse[3].

Existing recommendation algorithms based on the content of the recommendation algorithm[4], based on the project of collaborative filtering[5], based on the user's collaborative recommendation[6], model for collaborative

filtering[7], recommendation based on social network analysis method[8], and the recent rise of the recommendation algorithm based on network structure[9]. After studying the commonly used knowledge push approaches, Mingjian Zhou and Qiang Liao[1] presents a knowledge push approach based on attribute similarity. The approach analyses the knowledge set that has been viewed by user, and gets user's interest information by calculating the attribute similarity of the knowledge set, then matches the attribute similarity of the unviewed knowledge with the interest information to judge whether the unviewed knowledge is satisfied with user's interest. On the basis of attribute similarity, Xiaoling Zhao etc.[3] aim at the problem of knowledge push, the models of knowledge pushing based on knowledge usage scenario and knowledge base drove by usage scenario are proposed. Semantic similarity is used to calculate the similarity between knowledge usage scenario and knowledge index. According to the relationship between knowledge and knowledge usage scenario, knowledge is recognized and pushed to the task. It happens that there is a similar case. Tingpeng Liang[2] proposed that an Internet recommendation system that allows customized content to be suggested based on the user's browsing profile is developed. The method adopts a semantic-expansion approach to build the user profile by analyzing documents previously read by the person. Yang Xiao etc.[10] proposed a knowledge recommendation algorithm based on tripartite graphs network structure to solve the problem of the user cold start and less popular item recommendation. It embedded the degree of the network structure into the similarity degree, considered the project' degrees and weights and the label' degrees and weights impacting on the recommendation algorithm.

In order to solve the knowledge overflow and knowledge disorientation phenomenon in knowledge management system, improve the service ability of the enterprise knowledge resources, and promote enterprise knowledge continuous increment. Meihong Shi[11] proposed that a business process-oriented and knowledge requirement-driven construction method for active knowledge push service system. However, after effectively research the mechanism of compatible match base on application circumstance, Hua Hu[12] presented a model, called ACKM (application-circumstance-based, KM). Personalized knowledge recommendation systems integrated with knowledge contexts are also an important method to improve the reusing efficiency and sharing property of knowledge. Besides, effective combination of context and knowledge makes the process of knowledge pushing more intelligent, and improve the accuracy of the knowledge-based services pushing[13,14]. In this paper, we express time context with time-sequence relationship, and propose enterprise knowledge recommendation approach based on context-aware.

2. Methodology

2.1. Context-aware expression based on time-sequence relationship

Context is a description of the future situation and a series of facts that can be developed from the initial state to the future state, which emphasizes that the context is a dynamic change. We use the change of time-sequence relationship to describe the context-aware process. And the context-aware is applied to the enterprise knowledge recommendation. When employees receive parts processing tasks in the department, the old employees can rely on their own knowledge and experience to complete the task. However, in many cases, the task executor usually encounter the following situation during missions. The task executor has a certain ability, but has not been in contact with the processing of such parts. The task executor engaged in this kind of work, but because of the long time, already can't remember much about the process. The task executor is a newcomer who needs the necessary knowledge to guide him to finish the task. In this situation, how to obtain knowledge that matches task has become the most important issue. When we are faced with this situation, it is to retrieve relevant knowledge through various means. In such an era of knowledge overflow and knowledge disorientation, it has become a very difficult thing for us to search for knowledge passively. In the face of such difficulties, there is a very traditional solution that all knowledge of machining parts is pushed to the staff at once. Then the staff to carry out the necessary screening and sorting according to the processing sequence of parts. However, the traditional method has his disadvantages, knowledge cannot be pushed effectively with time context of the staff machining process. And as a result, we construct an enterprise knowledge recommendation approach based on context-aware of time-sequence relationship to solve this dilemma.

In the production process, take the production of gear plant as an example. Excluding a series of tedious machining process. The machining process of the gear can be roughly divided into the following steps. Including