

Cognitive Memory Inspired Search Refinement on Life Science Literatures

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With the fast growing life science literatures on the Web, for scientific researchers, the difficulty of finding the most relevant results is especially obvious when they do not have enough experience to formulate their queries that exactly reflect their needs. Human learning theory emphasize that when human is trying to acquire new knowledge, if the knowledge source is relevant to his/her previous knowledge structures in memory, the learning process will be smoother and more convenient (Bransford 2000). In addition, for literature search, the users' previous knowledge background (more specifically, user interests) can be acquired through their publications. Hence we propose to provide user interests as contexts for literature search. Nevertheless, user interests are dynamically changing all the time, and users' literature search motivations seem to be related to their recent retained interests. Hence, acquiring scientists retained interests is one of the essential prerequisites for this study.

For most scientists, their research interests are shifting all the time. If one always publish on a specific topic, it shows that he/she is very active in this field and is very likely to continue his/her research in this topic, if it has been a long time that one publish on a topic, the possibility for him/her to come back to it is very small. The phenomenon shows that the process on the decrease of interests is very similar to the forgetting mechanism in cognitive memory (Ebbinghaus 1885). Hence, it is rational to develop retained interest models based on the forgetting models of cognitive memory.

It is emphasized that the forgetting mechanism in memory can be quantitatively described as a power function (Wickelgren 1976). Based on the forgetting model introduced in (Anderson 1991), we developed a retained interest model to acquire users' retained interests (Zeng 2009). Based on the proposed model, we extract researchers' retained interests and use the acquired interests to refine vague or incomplete queries when life science researchers search literatures on the Linked Life Data (LLD) Search Engine¹ (The main literature dataset is Medline). The Context-aware Linked Life Data Search Engine² (The Screen shot is shown in Figure 1) is developed on top of the LLD Search Engine. When users try to search some literatures that contain the specified keywords, the most relevant results that are related to their own retained interests are ranked to the top.

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¹ <http://www.linkedlifedata.com/>

² <http://www.wici-lab.org/wici/context-aware-LLD>



Figure 1. Context-aware Linked Life Data Search Engine