Knowledge Transfer and Knowledge Discovery - New Improvements for the Corporate Decision

Christian Gütl,
Institute for Information processing and Computer supported new Media (IICM),
Graz University of Technology, Austria, (cguetl@iicm.edu))

Axel Jurak,
Institute for Information processing and Computer supported new Media (IICM),
Graz University of Technology, Austria, (ajurak@iicm.edu)

Josef Moser,
Institute for Information processing and Computer supported new Media (IICM),
Graz University of Technology, Austria, (jmoser@iicm.edu)

Dietmar Neussl,
Institute for Information processing and Computer supported new Media (IICM),
Graz University of Technology, Austria, (dneussl@iicm.edu)

Maja Pivec,
Faculty of Mechanical Engineering, University of Maribor, Slovenia (maja.pivec@uni-mb.si)
Institute for Information processing and Computer supported new Media (IICM),
Graz University of Technology, Austria (mpivec@iicm.edu)

Abstract: For a commercial company it is very important to be able to transfer relevant information to corporate knowledge. Therefore, a new concept must support and manage the information-to-knowledge and the knowledge-to-information cycle by using trustworthy knowledge repositories and personalised retrieval systems. The xFIND system represents an approach to a future-oriented knowledge system, which supports the corporate decision-making process combined with the interaction and collaboration between employees and users outside the company. It processes Intranet and Internet sources. xFIND offers features to handle the information life cycle and fits into the concept of a knowledge management environment.

1. Introduction

The implemented prototype of an intelligent search system xFIND (Extendable Framework for Information Discovery) is based on HIKS [Dietinger et al. 99]. A very important subject was found in the field of corporate knowledge management. Informed and well-trained employees are becoming more and more important for companies and their success on the global market. By providing users with information, advice and experiences relevant for the particular situation, helps to improve their problem solving. The decision-making process is substantial to the management at any level and every part of a company. Consequently relevant and qualitative information has to be provided. To reach this goal a new concept for information gathering, distribution and managing is needed.

In [Chislenko 97] value-added services for the knowledge process may include specialised knowledge repositories, retrieval systems and semantic search engines. Furthermore, reputation broker agent certification systems and recommendation systems should be taken into account. An automated subject classification system, a quality rating system and dynamic document maintenance should offer added values. Personal needs with respect to the current problem (task specific, position specific), previous experience and references to further domain knowledge (e.g. problem base, background library and communication with experts) have to be taken into account for every employee. Not only the active demand for information has to be supported but also a optional offer of additional information should automatically be given to the users too. Problem solutions and relevant, qualitative information from users must be archived and be problem-dependably provided to other users. *"Consequently, many business activities require access to a variety of information systems both within and across organisational boundaries."* [Huang et al., 99] In the knowledge gathering process internal and external information has to be taken into account. The internal information can be located at central corporate systems (e.g. Intranet system, knowledge bases). Relevant documents may also be saved on PC stations of employees. The Internet represents an important external information source. Because of the variety of document formats and information services, an open and extendable knowledge system is required. Such a system should integrate various systems or provide an API for co-operation during the management process. In [Huang et al., 99] an

analogy to the classical marketing notation "product life cycle" is described. Here, the information life cycle *"can be divided into four stages: introduction (creation), growth, maturity and decline."* Bearing in mind this model, a future-oriented knowledge system should be able to manage pieces of information over the life cycle. An important feature of the retrieval process is to provide users with original information and additional information, and to consider additional information for the ranking process.

2. The Concept of xFIND (Extendable Framework for Information Discovery)

The xFIND system handles the information life cycle and fits into the concept of a knowledge management environment. Because of platform independence xFIND is implemented in Java. In order to achieve scalability xFIND is splitted into following three main parts: the Gatherer, the Indexer and the Knowledge Broker.

The **Gatherer** performs the task of visiting servers and gathering information from various sources as well as pre-processing the document data. It identifies a wide range of data like title, keywords, links, images and other embedded objects like Java applets. It also creates an electronic fingerprint of each information object. Fingerprint satisfies the need for trustworthy information in case of replication and allows detecting the origin of every piece of information. xFIND allows a wide range of configurations for pre-processing this data as well as handling meta data sets (Dublin Core [Weibel et al., 98], LOM [Hodgins et al., 98] and a special xFIND set) and their conversion to each other. Best performance and reduction of server and network load can be reached by using a local Gatherer. Local Gatherer can be configured to search for read-protected information. The Gatherer gets only a subset, original information remains protected. Furthermore, highly dynamical information can contact xFIND and external systems for information may be taken into account.

The pre-processed data can be fetched or sent compressed to one or more Indexers. Any **Indexer** may be specialised on a particular topic or can be dedicated to a work group or a department. Only authorised Indexers are allowed to operate with Gatherers. The Indexer's task is to allow the Knowledge Broker to assign words, phrases and meta data to documents, and to provide statistic data (e.g. term frequencies). It also contains descriptions of information sources (e.g. web areas) or documents, and it manages the communication with external systems (external information bases, ranting systems, ACF, archiving systems, etc.). The later, if trusted, are allowed to send additional information to the xFIND system or can inform the xFIND system about new or modified pieces of information. XFIND allows replication of one Indexer to arbitrary other ones. Fingerprints (public and private keys) for all pieces of information will guarantee original documents.

The starting point for user interactions is the **Knowledge Broker.** It is also considered as the main part of the whole system and designed for a distributed concept. Knowledge Brokers distribute their search queries to a particular set of Indexers corresponding to the current problem as described below. Furthermore, past search results and user ratings may be considered to improve future search queries and the quality of information. Knowledge Brokers can be specialised on a particular topic and are able to transform the employees' problems into proper search queries. Knowledge Brokers can be individually tailored for a division, a department, a group of employees or even for a single user. This includes a specialisation of Knowledge Brokers that satisfies the needs of a particular unit (e.g. a small research group or sales division). The system also provides a Personal Knowledge Broker. Quite similar to an agent system the Personal Knowledge Broker is adaptable to user habits and their current problems. Combining it with an ordinary web browser, additional information can be provided (quality ratings, annotations, similar documents, dynamic generated links, etc.).

3. Conclusions and Future Work

The introduced xFIND system is a step to the next generation of knowledge processing and opens a way from information society to knowledge society. The systems distributed architecture leads to scalability and efficiency. First experience shows interesting application in the business (e.g. decision-making process). In the field of WBT the system introduces new paradigms of combining static and dynamic information repositories. Further development of the system deals with the usage of software agent systems and automatic classification.

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