

IMPROVING ORGANIZATIONAL COLLABORATION BASED ON DOCUMENT TAGGING CONCEPT

Cláudio Sapateiro, Bruno Vilhena

Superior School of Technology, Polytechnic Institute of Setúbal, Estefanilha, Setúbal, Portugal

Pedro Moura

SysVision, Edifício Open - Av. das Forças Armadas, n.º 125 - 4.º D, Lisboa, Portugal

Keywords: Tagging, Documents Management, Collaboration.

Abstract: During work processes many collaboration structures rely on documents sharing to feed information needs. To this share be effective involved parties have also to share some common understanding of the meanings of the information that is being exchanged. Personal and communities information and knowledge structures are highly implicit and tends to be invisible to others. In this work we propose a classification of the user's personal electronic assets inspired in the evolving web 2.0 applications concepts: tagging and social bookmarking. By adopting this approach we may profile users/communities knowledge domains and by externalizing this information improve collaboration structures.

1 INTRODUCTION

Both internal and external organizational information flows are supported by a number of documents exchanged in order to keep business processes running. Supply chains, business to business marketplaces, auctions, are all examples of business practices or applications that use information exchanges to combine or interconnect products or services from multiple businesses. Every one of them relies on the exchange of documents that describe the products or services being offered, their buyers and sellers, their origins and destinations, the amount and proof of payment, and so on (Glushko and McGrath 2004). Documents in their various forms become the vehicles that evoke desired behavior, communicate vital knowledge and stimulate appropriate decisions and guide action. With technological advance the digitalized information had increased and people had to deal with a number of different electronic documents, often with multiple versions and from multiple sources. Ideally enterprise data models or enterprise information architecture will solve organization information needs. But too often people don't do adhere as completely or as conscientiously as they should, either by failing to recognize the seriousness

of the problem or because the needed overhead to their work and the lack of support in emergent processes (Markus, Majchrzak et al. 2002) or exceptions in existing ones (Mourão and Antunes 2007). As a result, when existing organizations information systems doesn't offer the needed support to get work done, people embrace in informal relations and make use of their tacit knowledge to accomplish their work. When such unstructured activities occur there can be substantial differences in the meaning and format of information. Of course, for an effective collaboration in information exchange, it is essential for involved parties, that the document supporting this exchange has agreed purpose and associated meaning. It is quite usual find research works proposals to address information silos in organizations (Sapateiro, Gamboa et al. 2004; Novak 2007). The notion of communities as informal social networks based on shared interests or practices has been used as an important unit of analysis of cooperative creation and sharing of knowledge (Brown and Duguid 1991; Dougherty 1992). Also HCI work on sense making emphasizes special needs for supporting knowledge construction during information seeking in unfamiliar, heterogeneous domains and ill-structured work

processes (Qu and Furnas 2005; Russel et al. 1993). In this work we present an alternative approach based on the tag concept, for the usual file manager systems which traditionally are based in folders. The next section will present some related work that address the main concerns that motivate our work. Section 3 will present our proposed approach. In section 4 the developed prototype is presented and we end in section 5 with a discussion of the work done and pointing some future directions.

2 RELATED WORK

In (Glushko and McGrath 2004) is referred Document Engineering as an evolving new discipline for specifying, designing, and implementing the models of documents that support information exchange mechanisms to request or return the results of business processes. The essence of Document Engineering is the analysis and design methods that yield precise models that describe the information these processes require and the rules by which related processes are coordinated and combined. Document engineering emphasizes the use of existing successful best practices in organization information exchange procedures, reducing costs and risks while increasing reliability and interoperability. Nevertheless, this approach focuses in analyzing and improving or proposes models to drive the identified information exchange needs. In our perspective this approach will lack the flexibility in situations that models lack to support real life situations information needs and actors will conduct their information exchange in an unstructured/unplanned/un- previewed way (the discussion of a model guidance *versus* map guidance in supporting business processes spectrum had feed several research works e.g. (Schmidt 1997; Bernstein 2000), but is off the scope of this paper). In such scenario, to collectively construct and share information, groups of people have to establish a shared cognitive and social context against which they can construct shared meanings of information (Gasson 2004). The main processes for sharing tacit knowledge include socialization and internalization (Nonaka and Takeuchi 1995). These processes may face practical difficulties due the absence of explicit representations of community information and knowledge structures. User's and/or group's knowledge structures are highly implicit and invisible to others.

Due the above considerations, our approach focus, concern in more than sharing documents we

attend to share some associated semantic to expose their meanings. From (Boland and Tenkasi 1995) the basic requirements for supporting cross community knowledge exchanges have been described in the model of "perspective making – perspective taking". Its main proposition is that, enabling knowledge exchange requires that shared semantic contexts constructions (perspective making) be made visible and accessible (perspective taking). Interactions between individuals are mediated by artifacts such as diagrammatic models, maps, documents, images, ... named in (Star 1989)(Gasson 2004; Gasson 2005) as "boundary objects". The meaning retrieval of such artifacts is of most importance to achieve a common understanding and promote effective collaboration.

3 PROPOSED APPROACH

We propose a different perspective of traditional file explorers' applications. Inspired by the success of the social book marking and tagging concepts in a number of the so called web 2.0 applications, e.g. Flickr, Delicious, CiteULike, You Tube, ... our proposal consist in the possibility of users tag all their personal electronic assets. In contrast with traditional file explorers based on classifying assets by folders, which is exclusive, tagging is neither exclusive nor hierarchical and therefore can have an advantage over hierarchical taxonomies (Golder and Huberman 2005). Tagging is fundamentally about sense making. Sense making is a process in which information is categorized and labeled through which meaning emerges (Weick 1996). Consider that one wants to classify this article, this could be done in several different ways: authors, research area, keywords, conference, ... In contrast to the traditional folders approach, we can tag the article in all the before mentioned categories. Of course, user can choose if some asset and/or tag will remain private or be publically available, to accommodate the appropriate level of privacy. Nevertheless, when people see benefits that outweigh risks (e.g. public agendas views, surveillance cameras...), they voluntarily adjust their comfort levels by refining privacy and by establishing new practices and social protocols (Palen 1999).

We also include in our proposal a sub versioning server (SVN) to manage assets versions easily. With this characteristic users can share easier their public assets and can do operations such as merge differences from versions or revert to a specific

version. Besides the goals of easily find a specific asset and manage assets versions, based on the user's tag cloud we pretend to characterize users electronic world that will give some underlying semantic in collaboration activities. Figure 1 presents an overview of the mentioned functionalities in a use case diagram.

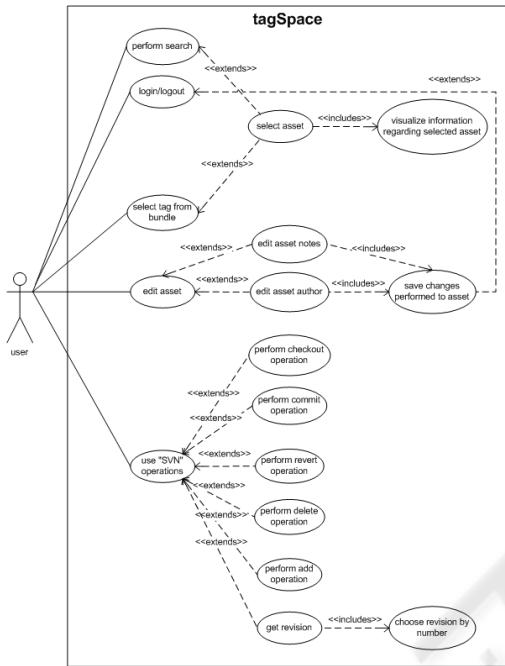


Figure 1: Prototype model.

4 IMPLEMENTATION

Nowadays, organizations distribute work across multiple applications some of empowering personal activities (such as office productivity tools) and others empowering collaboration (such as workflow management systems, ERPs, ...). An aspect emerging in research is what kind of system/tool to deliver, when presenting new concepts. Will it be a completely new tool that users will accumulate with the ones currently in use, or it will integrate smoothly in existing tools and systems? Our approach in the developed prototype consist in having an icon in the user's desktop where he can drop any kind of documents (e.g. doc, pdf, jpg,...) as well as emails and urls. By doing this it will pop an window which allow the user to tag the respective asset(es). To do this he can use any of the existing tags (to avoid duplication for the same meaning) or introduce new ones, see figure 2.

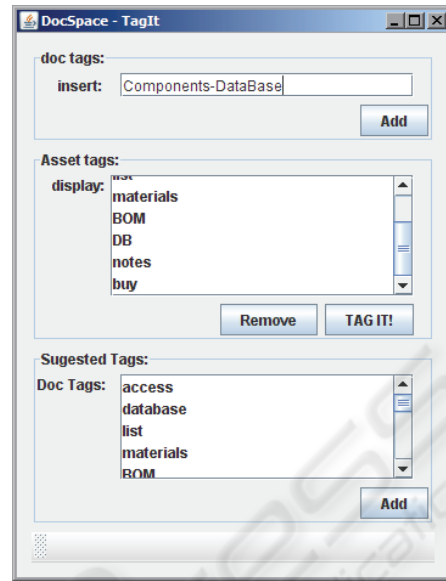


Figure 2: Asset tag window.

By launching our version of a file explorer the TagSpace, see figure 3 and 4, user can navigate in his/her tag cloud. By choosing a tag, a list of assets classified under it, is presented. In the opposite direction, i.e. by selecting an asset, the tags used in its classification will highlight. The tags display font size will be bigger when the tag will have more associated assets. The bottom pane of the application presents two tabs. The first one, presents in the figure 3 will display current selected asset properties: creator, date of creation, date of last modification, identification icon, associated annotations,...The second tab, presented in figure 4, will display versioning operations, such as commit version, checkout, revert, ...

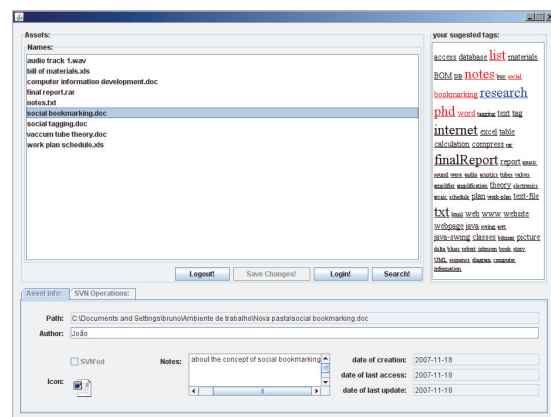


Figure 3: TagSpace window with document properties tab highlighted.

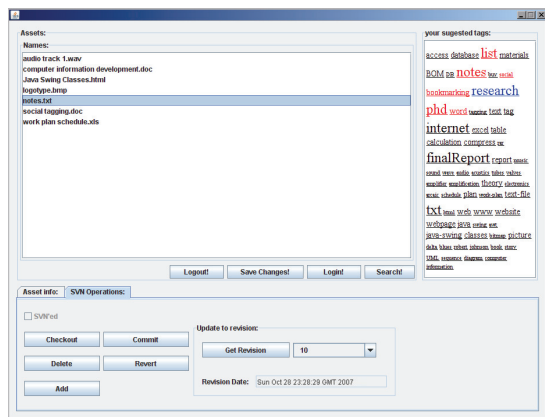


Figure 4: TagSpace window with version control tab highlighted.

5 DISCUSSION AND FUTURE WORK

The work presented in this article constitutes a contribution for the construction of a shared meaning in organizations communities from existing personal digital assets, aiming to improve collaboration efficiency and knowledge exchange. Inspired in the recent concept of tagging and social bookmarking we present an application that allows users tag all his/her electronic assets. In this way, it is possible a user characterization based on their tags cloud constituting a contribution to a semantic interpretation of user knowledge.

As future work we intend to further develop the presented concept and prototype to improve collaboration, supporting social tagging of the shared assets. Of course this leads to a problem of compatibility between personal and social tag clouds that we must address. We also pretend to deliver a visual representation of the tags cloud and their relation, in order to facilitate perspective taking (Boland and Tenkasi 1995) of user's knowledge domain. The use of the proposed application shouldn't require overhead work to the user; as so, we intend to integrate our application in the typical "open ..." and "save..." applications menu items.

As soon as these topics are incorporated in the prototype, it is essential to test and evaluate the prototype in an organization. As referred in (Markus, Majchrzak et al. 2002), once a new system is introduced to support a process the actual way of conducting that process changes. When systems are introduced in an organization environment, some tend to think that the work will be done fundamentally in the same way but more efficiently

and quickly. This is rarely true, the work system changes often in an unintended, unanticipated and often undesirable way. In order to validate the proposed concept and prototype we must evaluate its usage against organizational elements such as organizational communications and social interaction (Vyhmeister, Mondelo et al. 2006). The evaluation will consider specific issues of the problem domain that we address like efficiency on documents recall (personal and social) and effective user and community characterization.

ACKNOWLEDGEMENTS

This work was partially supported by the Portuguese Foundation for Science and Technology, Project POSI/EIA/57038/2004.

REFERENCES

- Delicious. <http://del.icio.us>
 Flickr. <http://flickr.com>
 Bernstein, A. (2000). How can cooperative work tools support dynamic group processes? Bridging the specificity frontier. CSCW.
 Boland J.R., Tenkasi R.V.: "Perspective Making and Perspective Taking in Communities of Knowing", *Organization Science*, 6,4 (July-August) 1995
 Brown, J.S., Duguid, P.: *Organizational Learning and Communities of Practice*, *Organization Science*, Vol.2, No. 1, pp. 40-57, Feb., 1991
 CiteULike. <http://www.citeulike.org/>
 Dougherty, D.: Interpretative barriers to successful product innovation in large firms. *Organization Science*, 3(2), 1992
 Gasson, S. (2004). A Framework For Behavioral Studies of Social Cognition In Information Systems. *ISOneWorld*.
 Gasson, S. (2005). A soft system analysis of social cognition in boundary-spanning innovation. 38th Hawaii International Conference on System Sciences.
 Glushko, R. J. and T. McGrath, Eds. (2004). *Document Engineering*.
 Golder, S. A. and B. A. Huberman (2005). *The Structure of Collaborative Tagging Systems*. Information Dynamics Lab, HP Labs.
 Markus, M. L., A. Majchrzak, et al. (2002). A design theory for systems that support emergent knowledge processes. *MIS Quarterly*.
 Mourão, H. and P. Antunes (2007). Supporting effective unexpected exceptions handling in workflow management systems. SAC, Seoul, Korea.
 Nonaka, I., Takeuchi, H.: *The Knowledge-Creating Company*, Oxford University Press, London 1995.

- Novak, J. (2007). Helping Knowledge Cross Boundaries: Using Knowledge Visualization to Support Cross-Community Sensemaking. HICSS.
- Palen, L. (1999). Social, individual and technological issues for groupware calendar systems. CHI, ACM.
- Qu, Y., Furnas, G.: Sources of Structure in Sensemaking. Proc. of ACM CHI 2005, Extended Abstracts and Applications, Portland, Oregon, USA, April 2005
- Russell, D. M. et al.: The Cost Structure of Sensemaking. Proc. ACM INTERCHI'93, pp. 269-276, 1993
- Sapateiro, C., H. Gamboa, et al. (2004). Q-Online: Integrating a questionnaire system in an organization. ICEIS.
- Schmidt, K. (1997). Of maps and scripts. ACM.
- Star, S. L., 1989. The structure of ill-structured solutions: Boundary objects and heterogeneous distributed problem solving. In Distributed Artificial Intelligence, Vol. II. Morgan Kaufmann Publishers Inc., San Mateo CA, pp 37-54.
- Vyhmeister, R., P. R. Mondelo, et al. (2006). "Towards a Model for Assessing Workers' Risks Resulting from the Implementation of Information and Communication Systems and Technologies." Wiley InterScience (www.interscience.wiley.com).
- Weick, K. E. (1996). Sensemaking in organizations. Newbury Park, CA: Sage.
- You Tube. <http://www.youtube.com/>