

YouCallo – Tapping the Knowledge of Social Groupware Systems

Alexander Bachmann, Burkhardt Funk

Institut für Elektronische Geschäftsprozesse
Leuphana Universität Lüneburg
Scharnhorststraße 1
21335 Lüneburg
kontakt@alexanderbachmann.de
funk@uni.leuphana.de

Abstract: Web based groupware solutions that support the creation of communities of practice or ad hoc collaboration have become an essential part of computer supported collaborative work. Online groupware systems often combine communication, document sharing and document-creation features. Even though groupware is actively used for knowledge management purposes by organizations and individuals, research contributions in the fields of knowledge retrieval and expertise location have yet to be included. In this paper we introduce YouCallo, a web based collaboration platform that makes extensive use of groupware, social network and knowledge management technologies. The system uses collaborative filtering and information retrieval technologies to deliver relevant resources and potential experts to groups.

1 Introduction

Ackerman and Halverson classify knowledge management and expertise-sharing systems into four technical directions: repositories, expertise locators, knowledge communities and ad hoc groupings [AH04]. The internet has adopted these four concepts very successfully. Today millions of users use services like download-, and content-platforms, online yellow-pages for services, forums and wikis or groupware platforms. These tools have been proven to be so valuable to their users that today even small and midsize companies start to use them for their intranets.

Groupware solutions combine different tools of these technical directions in order to support collaboration and task completion. For their users, they offer a place where communities of practice [BD91] can come together, communicate, share and create resources and pursue a common goal.

Research on groupware has focused on design aspects [Gr94], task processes and the impact of technology use [DG87][ZB98]. In the last years the focus has shifted to social-emotional factors of group collaboration and how this affects groupware design [Ta09][PPI04].

Even though groupware solutions are used by organizations for knowledge management purposes, the integration of research contributions in the fields of knowledge retrieval [AL01] and expertise location [APV03][HW04] into such systems has been little.

This is surprising, since groupware systems store information highly relevant for successful knowledge management:

- Topic related resources and users: The resources that are shared in a group are likely to be related to one particular topic. The same is true for the users that engage in this group.
- The social network of the user: The user collaborates with members of different groups. These “collaboration-links” form a social network.

The resources shared in groups are in most cases of high relevance for task-completion. These resources are constantly created and shared during the process of a project. While some of them are specific to the project (like talking notes, drawings, etc.), others might be of high relevance to other, similar projects as well (like documentations, case studies, literature, etc.).

The combination of groupware systems with social networks is particularly interesting. With the answer to the question of “who has worked on what project” and the knowledge of “who the users of the system are connected to”, we can identify experts within our social network [DEP92][RVW07] and reduce the psychological cost of asking [AI77].

In this paper we introduce the YouCallo platform, a web based collaboration tool that makes use of modern knowledge management technology. We will show, how the effective use of the groupware’s data, has the potential to significantly increase the reuse of knowledge and assist the sharing of expertise within communities of practice.

2 The YouCallo Platform

YouCallo is a web based collaboration-platform that allows users to manage their own social network, create groups and add resources (i.e. images, videos, files, web links and documents), and collaboratively write articles within these groups.

2.1 Social Network

Each user can maintain a profile including personal information (CV, interests and hobbies) and a profile picture. He can search other users in the platform and add them to their contact list, thus creating links within his social network. Even though, it would have been possible to generate the social network of the user out of the collaborative ties of users within the groups in which they participate, we decided to let the user actively manage his or her social network. This makes the network information more reliable and thus allows us to add further functionality (for example sharing personal information of the user with its confirmed contacts).

2.2 Collaboration

In order to collaborate with others, each user can create groups and invite other members to participate. All members of a group can communicate with each other through forum-posts and collaboratively share resources by posting documents, images, videos, files or web links to the group.

The collaboration of the users is actively supported by the YouCallo platform. The system recommends relevant resources and locates people that are identified to have expertise in the group's topic within the social networks of the group-members.

3 Recommending Resources & Expertise

YouCallo acts as a knowledge intermediary between groups, identifying similar topics and distributing relevant documents between the groups, or recommending experts that might be helpful to achieve the group's goals. The recommendation engine is based on the heuristic that groups who rate the relevance of certain contents similarly, have a high probability of agreeing on the relevance of other documents as well [Go92].

3.1 Resource Recommendation

The recommendation engine uses three approaches to identify relevant resources for groups: collaborative filtering, content filtering and a hybrid approach.

The collaborative filtering approach [Re94] identifies similar groups, by comparing their rating behavior towards resources. Groups which are related to the same resources and rate them similarly are considered to be alike. Now, resources that have been classified as relevant in one group are recommended to other, similar groups.

The content-based filtering approach [La95] simply recommends those resources to the group that have textual similarities with resources that are already related to the group.

The hybrid approach [BS97] identifies similar groups using a content-based comparison (i.e. groups with similar content related to it, are considered as alike). The algorithm then recommends resources to similar groups that are of high relevance to the referring group.

All three approaches have their own advantages and shortcomings. Their combination will ensure reliable recommendations that are independent of the group size and number of related resources.

3.2 Expert Recommendations

The identification of experts is very similar to the “Expert Recommender” system introduced by Reichling et al. [RVW07]. Based on the groups a user has participated in and its related resources, a content-based profile is created for the user. Articles and resources that the user has created or added to the group himself enter the profile with higher weights than those resources added by other group-members.

YouCallo searches for experts that are close to the members of the group (i.e. the fewer people are between the expert and one member of the group within the social network, the better). Only contacts up to the third degree are included into the expert recommendation process. The recommendation engine compares the content-based profile of the group with the content-based profile of the considered users. If the calculated similarity crosses a certain threshold the users are recommended as experts to the group.

4 Conclusion

We believe that groupware systems harbor a huge amount of hidden knowledge that could be of great value for team collaboration and task-completion. Tapping this knowledge is the goal of the new YouCallo platform. In this paper, we introduced a concept of how social network data, and past collaboration results can be used to identify experts and relevant resources for present projects.

A prototype shall now empirically research the quality of these recommendations. Field studies shall also show how users incorporate the expert recommendations into their collaborative work.

References

- [AH04] Ackermann, M.S.; Halverson, C.: Sharing expertise: The next step for knowledge management. In Social capital and information technology. The MIT Press, Cambridge, MA, 2004, S. 273–299.
- [APV03] Ackerman, M.S.; Pipek, V.; Wulf, V.: Sharing Expertise: Beyond Knowledge Management. The MIT Press, Cambridge, MA, 2003.

- [AL01] Alavi, M.; Leidner, D.: Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS quarterly*, 25(1). 2001, S. 107–136.
- [AI77] Allen, T.J., 1977. *Managing the Flow of Technology*. The MIT Press, Cambridge, MA, 1977.
- [BS97] Balabanović, M.; Shoham, Y.: Fab: content-based, collaborative recommendation. *Communications of the ACM*, 40(3). 1997, S. 66-72.
- [BD91] Brown, J.S.; Duguid, P.: Organizational Learning and Communities of Practice: Towards a Unified View of Working, Learning and Innovation. *Organization Science*, 2(1). 1991, S. 40-57.
- [DEP92] Davenport, T.H.; Eccles, R.G.; Prusak, L.: Information Politics. *Sloan Management Review*, 34(1). 1992, S. 52-65.
- [DG87] DeSanctis, G.; Gallupe, R.B.: A Foundation for the Study of Group Decision Support Systems. *Management Science*, 33(5). 1987. S. 589-609.
- [Go92] Goldberg, D. et al., 1992. Using collaborative filtering to weave an information tapestry. *Communications of the ACM*, 35(12).1992, S. 61-70.
- [Gr94] Grudin, J.: Groupware and social dynamics: eight challenges for developers. *Communications of the ACM*, 37(1). 1997, S. 93-105.
- [HW04] Huysman, M.H.; Wulf, V.: *Social Capital and Information Technology*. The MIT Press, Cambridge, MA. 2004.
- [La95] Lang, K.: Newsweeder: Learning to filter netnews. In: *Proceedings of the Twelfth International Conference on Machine Learning*. 1995.
- [PPI04] Powell, A.; Piccoli, G.; Ives, B.: Virtual teams: a review of current literature and directions for future research. *ACM SIGMIS Database*, 35(1). 2004, S. 6–36.
- [RVW07]Reichling, T.; Veith, M.; Wulf, V.: Expert Recommender: Designing for a Network Organization. *Computer Supported Cooperative Work (CSCW)*. 16(4-5). S. 431-465.
- [Re94] Resnick, P. et al.: GroupLens: An open architecture for collaborative filtering of netnews. In: *Proceedings of the 1994 ACM conference on Computer supported cooperative work*. ACM New York, NY, 1994, S. 175–186.
- [Ta09] Tan, W. et al.: Designing Groupware that Fosters Social Capital Creation : Can Facebook Support Global Virtual Team ? In: *AMCIS 2009 Proceedings*. 2009.
- [ZB98] Ziggers, I.; Buckland, B.: A theory of task/technology fit and group support systems effectiveness. *MIS quarterly*, 22(3). 1998, S. 313–334.