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KnowSe: Fostering User Interaction Context Awareness

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The CSCW area has recognized the concept of awareness as a critical issue to focus on (Schmidt et al., 2002) since "users who work together require adequate information about their environment" (Gross and Prinz, 2003). The environment of an individual encompasses her connections with other people, as well as with digital resources and actions (tasks or processes). If connections are not clear or hidden to the individual or to the group, the cost is a lack of awareness in the organization (McArthur and Bruza, 2003), which not only leads to inefficient cooperation but can even prevent it from being started. Unveiling the relations between persons, topics, tasks and processes to computer workers facilitates cooperative work by increasing the awareness of the personal social networks and the role of an individual in the organization, a project, or a group. These connections can be created and modeled manually but a better approach is to develop semi-automatic or even automatic tools to create and share them (McArthur and Bruza, 2003). Based on emails, McArthur and Bruza (2003) have computed such kind of connections, and suggest using more global corpora as well as taking into account dynamic ones.

We propose an automatic approach (Rath et al., 2009) for (i) detecting the interaction context of a single user (i.e. the connections between her tasks, her used digital resources and her social network) and (ii) combining the individual contexts for global awareness. Starting from low-level events captured on the user's desktop about the user's interactions with resources and applications, we utilize rule-based, information extraction and machine learning approaches to automatically derive connections, i.e. relations between our context model's entities. For specifying the types of connections and entities we use an ontology-based context model. By following this semantic technology-based approach we benefit from a

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well-defined model and specification of the connections; we then gain two advantages for increasing awareness: (i) representing the relations between the user and her close environment (individual view) and (ii) merging multiple individual context models into a global one (organizational view).

KnowSe (Knowledge Services) is a service-oriented framework that includes this automatic user interaction context detection as well as the following services for supporting the user's personal and collaborative work:

- *Information Need Discovery*: These needs can emerge from an active information request (e.g., a search on a web page) or from a change in the user context (e.g., the switch from one task to another).

- *Proactive Context-Aware Information Retrieval*: Here we focus on utilizing concepts and relations recently added to the individual and organizational context model as a starting point for identifying relevant resources (e.g., people, documents, links, presentations, or folders) via spreading activation on the graph-based representation of the global context model. Furthermore we work on ranking search results (which include resources from personal and organizational knowledge spaces) based on resource usage and interconnectivity. We support user initiated search as well as proactive search.

- *Individual and Organizational Context Visualization*: For the user to explore her environment from her individual and from the organizational perspective we have developed specific visualization techniques for displaying connections between resources, applications and user actions (graph views), and the usage history of resources in applications within tasks (timeline and self-organizing map views).

Acknowledgments

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