

ASPIC: Awareness-based Support Project for Interpersonal Collaboration in Software Engineering

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Abstract—Research the problems caused by the difficulties in GSE with acquiring and maintaining awareness: sufficient contextual information to be able to properly cooperate with others.

Research Area - Awareness in collaborative Software Engineering

I. RESEARCH PROBLEM

In collaborative work it is essential to have knowledge about the context in which you are working to properly cooperate with others [1], [2]. With information about the context we mean information about the other members in the project team, their activities, information about the state of the project and so on. This information is essential because this knowledge is necessary for coordinating actions, managing coupling, discussing tasks, anticipating others' actions, and finding help [1], [2], [3]. The complexity and interdependency of software systems (e.g., [4]) suggest that this is also the case for collaborative software development. In scientific literature the term 'awareness' is often used to denote this [1], [5]. Dourish et al. use the following definition: "An understanding of the activities of others which provides a context for your own activity" [5].

Awareness information is distributed among the members of the project team as follows: Actors display information on a shared medium while other actors monitor the medium and acquire information from it [1]. In this process, both monitoring and displaying are activities that are not necessarily conducted with the full attention of the actor. Often when expressing this varying degree of attention dichotomies are used, such as: explicit versus implicit, deliberate versus automatic, conscious versus subconscious, focused versus unfocused and active versus passive. However, as emphasized by Schmidt [1], the distinction between these notions is not categorical but merely one of degrees.

When team members are not sharing a physical work environment they are outside of sensory range of each other. Therefore information exchange between them becomes infeasible without some kind of technological support. This can be dealt with by providing other ways of acquiring the required information, like using the telephone or email to ask a question. However, in general, such solutions are inferior

to the way contextual information is shared in a traditional co-located setting, in the sense that in comparison it (i) takes more effort because the communication is more intentional [6], (ii) is more obtrusive [7], (iii) happens less frequently [8], [9] and (iv) contains less information [6], [10]. As such we can conclude that sharing awareness information is more difficult in a distributed setting. Due to the nature of the challenges associated with GSE, it is plausible to assume these challenges originate from having insufficient access to information regarding the work context: a lack of awareness.

II. RESEARCH FOCUS

The goal of ASPIC¹ is to develop solutions to the problems caused by the difficulties with acquiring and maintaining awareness in GSE. In this research the focus will lie on making the sharing of information a more passive activity because (i) this will likely lower the effort to share awareness information, (ii) cause this information to be more recent and (iii) improve the quality of the information as well. To do this we will first identify the information from the context of a project that is important to coordinate and integrate the activities of the members of the development team. Following this we will select those information items for which there is a lot to gain with respect to sharing awareness information in a more passive way, and develop supporting technology to accomplish this. Summarizing, we can define the following three research questions²:

- RQ*₁: What types of contextual information are important in collaborative software engineering?
- RQ*₂: For which of those types is there a lot to gain with respect to sharing awareness information in a more passive way in a distributed environment?
- RQ*₃: How can sharing awareness information in a more passive way be valorized by technological support?

III. EXISTING SUPPORTING TECHNOLOGY

To further illustrate our intentions we will provide a few examples of technological solutions which make it possible to more passively share awareness information of a specific

¹See: <http://www.aspic.ewi.tudelft.nl>

²Due to the early phase of this research, this document is a joint proposal. At a later time a subdivision will be defined.

type in a distributed environment. These examples show that both acquiring information in a more passive way and offering information to people in a more passive way, are possibilities to help support awareness in a distributed setting. The first tool we mention, *Communico*, is a tool we developed in this research and a paper illustrating it is published in the International Conference on Global Software Engineering 2010.

Communico [11]: A tool which automatically gathers information about conversations in Microsoft Office Communicator and makes information about these available to the project team. It is also possible to view information about past conversations. Finally the tool offers functionality to directly use the gathered awareness information by joining an ongoing conversation.

Palantir [12]: A tool which automatically gathers information about ongoing changes (which are not yet committed) in the workspace and makes this information available in the development environment and context of developers (Eclipse). An extension called *Workspace Activity Viewer* [13] also makes this information available in more general contexts and with respect to how ongoing changes progress over time.

Tesseract [14]: A tool which automatically gathers information about: (i) project files, (ii) communication between developers and (iii) information regarding issues; from: (i) the work space, (ii) the email logs and (iii) the bug tracking system and makes this information available in a way that interrelations between the various data items are visualizable by the user.

World View [15]: A tool in which information regarding the make-up of globally distributed teams can be saved as well as information about these teams, like the local time, whether there is a public holiday and the preferred methods of communication for each team member. Furthermore information regarding dependencies in the workspace is gathered automatically from the repository system. All this information is made available to the members of the development team as overlay information on Microsoft Virtual Earth.

IV. RESEARCH MOTIVATION

This research has potential to become part of the body of knowledge of GSE since within the GSE community decreasing the impacts of distance on software engineering work is a long lasting quest. It is plausible this research will provide breakthroughs in this respect, since the problems with lack of awareness are currently not sufficiently addressed in research regarding the reduction of the impact of distance on distributed work. Much research focuses on reducing the importance of having knowledge about the context of the project, for example by modularizing the work and thus reducing the amount of distributed collaboration. Such an approach however only attempts to cope with the problems and not to solve them. This research will attempt

to do so by targeting the lack of awareness in a distributed setting itself.

Societally spoken this research also has the potential to provide a breakthrough, because it could solve an important issue in today's society: people can only be present at one place at the same time. This issue leads to various social problems like traffic jams and environmental issues. If this project manages to alleviate the challenges faced when working distributed by supporting the sharing of awareness information, this presents the possibility for people to be present on multiple (virtual) locations at the same time. This could lead to less traffic jams, a lower emission of substances which are hazardous to the environment and, in a business context, offer the opportunity to work in several projects at once while still appearing to your colleagues to be a full member of all project teams.

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