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Using mobile devices to overcome idle times in modelling workshops

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Abstract

Working collaboratively is very common when dealing with complex tasks. In case of process modelling, collaboration usually takes place in structured workshops. Within these workshops several people with different knowledge come together and jointly create a model of e.g. a specific process. A common approach within these workshops is to create a model by linearly discussing a process and documenting it within a model. Due to this procedure and the diversity of people involved not everyone can contribute to the modelling process at the same time potentially resulting in long idle times for participants. To overcome these idle times we developed a system that allows for people to use different devices to work on the same model synchronously. With our solution idle participants can use their mobile device to edit a part of the model where her expertise is needed, thus being able to contribute her expertise throughout the whole session.

1 Introduction

There are several design tasks that require people from multiple disciplines and with different backgrounds to collaborate while drafting artefacts such as models. One example for such design tasks is the collaborative analysis and re-design of business and work processes using process models. Aiming at improving organizational processes, identifying requirements for software development and adoption or simply documenting processes in order to foster a common understanding among stakeholders involved, an approach known as collaborative modelling has received widespread attention from practitioners and scholars alike (Prilla et al. 2013; Renger et al. 2008; Rittgen 2010). In collaborative modelling domain experts along with people involved in or affected by processes (stakeholders) participate in workshops in which processes are discussed and graphical models of them are drafted. As most of the workshop participants will probably not be experts in process modelling, they are supported by modelling experts.

Due to the diversity of stakeholders involved, a common problem emerging during such workshops is that not every participant is interested in or can contribute to every aspect of a process. As usually only one person may contribute verbally to the process discussed at the

same time, this may result in long waiting times for the participants (Prilla & Nolte 2010). Given the widespread availability of mobile devices we came up with the idea to develop a system that allows for people to view and work on different parts of a model at the same time. The system enables participants of a workshop to work on parts of a model they are interested in while the main focus of discussion within that workshop might be at an entirely different aspect of the same model. As studies have shown that even people, who are not trained in modelling, are capable of eliciting simple processes (Hoppenbrouwers et al. 2010; Prilla & Nolte 2012), this system might increase the effectiveness and efficiency of workshops while maintaining the positive aspects of modelling workshops such as the possibility of exchanging perspectives and negotiating them when necessary.

Within this paper we will introduce a system that allows people to collaboratively work on the same model of a process using mobile devices (section 2). We will then present a scenario describing how we expect this system to be used in collaborative modelling (section 3) and describe possible benefits and improvements of it (section 4).

2 Implementation

In order to enable collaborative modelling by working simultaneously with multiple devices we set up a webserver, which distributes the model to every single client. The respective client features possibilities to create new elements or edit and remove existing ones. Every change influencing the model will be synchronised across all clients who are connected to the same model at the same time. We used a message-driven system and a long-polling mechanism for synchronisation, thus reducing delay to a minimum.

As described in the introduction the system also allows for the usage of mobile devices. Referring to (Kolb et al. 2013), it is mandatory to consider the characteristics of mobile devices, like small screen sizes and touch interaction, in order to create a usable interface. Taking that into account, we created an interface and interaction-concept that is tailored specifically for mobile devices. To overcome the problem with small screen sizes we reduced the basic graphical user interface to a minimum of two transparent buttons. The first one activates a menu for model-specific actions (e.g. closing the model or displaying a list of participants) and the second one opens a toolbar with all available elements. In addition to these two buttons, which can be accessed at any time, we created a context-aware toolbar. It is only displayed if an element is selected and offers element-specific actions like adding a comment or deleting the element (Figure 1, right).

Our interaction-concept for mobile devices also includes gestures to execute some of the main functions needed for editing a model like creating, moving, resizing, labelling and deleting elements as well as means for navigation. For example, creating elements is done by opening the toolbar and dragging the element out of it to the desired position. While dragging, a preview of the element is shown in order to improve the user's awareness of her own action. In addition to that we also tried to improve the awareness for the other participants' actions. For that we included a synchronisation of the viewport and selected elements of every user. Figure 1 shows the viewport of a mobile user on the right and the

visualisation of that viewport for another user on the left. The green dotted rectangle shows the viewport of a respective other user. A second visualisation for improving awareness of others' actions is the highlighting of elements, which are selected by other users (Figure 1: the selected element on the right is highlighted in green on the left). To overcome concurrency problems during editing, the selected elements are blocked for other users. The current development work focuses on the ability to select a part of model by using the built-in camera of a mobile device.

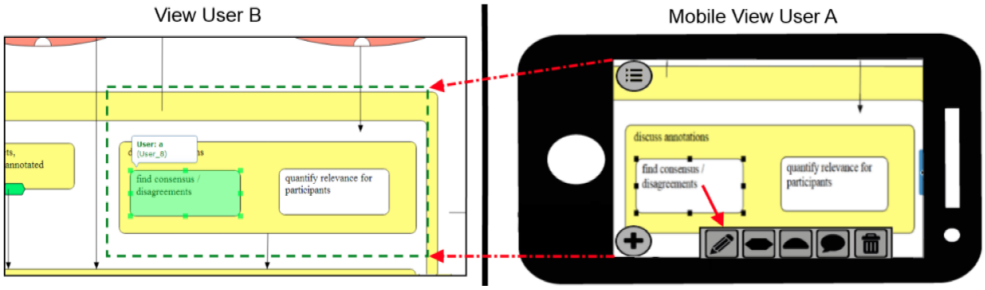

Figure 1: User B is aware of where user A is focusing at (left); mobile user interface (right)

3 Scenario

A typical pattern of collaboratively considering and re-designing a process model is a walkthrough where a model is dealt with step-by-step (cf. the socio-technical walkthrough, Herrmann et al. 2004). Within the scope of a walkthrough process modelling is conducted in a series of workshops, where a facilitator guides the participants during the workshop and a modeller creates or modifies the model simultaneously on a projection surface (typically a beamer or an interactive large screen). All participants contribute to the changes verbally by e.g. explaining their role in a process or pointing out problems and improvements, depending on the goals of the modelling activities. Similar to other collaborative group work activities – such as brainstorming – participants within a walkthrough situation can "tend to under-contribute (with comparison to a situation where they would work alone)". This effect is known as "production blocking" (Diehl & Stroebe 1987): People are not able to contribute their expertise either because of people who "over-contribute" or because their competence is not relevant with respect to the part of the model the facilitator is currently focusing on. Unfortunately, this might be frustrating for participants, especially when they get the feeling of their expertise not being required due to a focus which does not address it. Therefore, we developed a system which allows those participants to contribute their knowledge working on those parts of a model that are currently not in the focus of the main discussion. They can now add their ideas by either commenting or modifying parts via a handheld device. Thus, we differentiate between a main discussion stream and side-activities. Those side-activities can prepare main-stream discussions which might occur later. By employing their own handheld devices such as smart phones or tablets, participants can act independently from the

facilitator without disturbing the ongoing discussion. The only prerequisite is that a server's address is available to connect a mobile web-browser with the application which allows a touch-based modification of the current model. Selecting the model's part to be modified can take place via gestures on the mobile device or with the built-in camera by focusing the part of interest on the large screen. Acting independently from the facilitator is not a necessity – the facilitator can also coordinate the participants' work on different parts of the model in advance – e.g. at the beginning of the workshop. Once a participant has focused on a part of her interest on the handheld, it is easy e.g. to rename, resize or create new elements or assign new ideas via comments to elements. Furthermore, it is also possible to simultaneously rearrange elements, if someone e.g. disagrees with a specific way of the facilitator's modelling, which of course entails further intentional discussion within the walkthrough. Chat-functions will also be implemented to support "side-talks" if multiple participants are not involved in the main discussion. They can discuss collaboratively enacted manipulations of the model. One user might even take over the role of the facilitator if the focus of the main discussion moves to the collaboratively prepared modifications of a part of the model. This includes showing how and why a certain part of the model was modified.

4 Outlook

The scenario described in the previous section will provide a basis for evaluation aiming at gaining a deeper insight into how mobile devices may affect collaborative modelling in workshops. While testing the system within a collaborative modelling setting, the results gained from this evaluation are expected to be useful in a lot of other settings, in which people from different backgrounds collaboratively work on artefacts within a workshop setting.

With the help of our system we expect the participants, who might have the feeling of not being involved into the walkthrough at every stage, to be treated as a part of the walkthrough at any moment of the session, even if their respective expertise is actually not required during a specific part of it.

Regarding the technical implementation we are also going to enhance our prototype with the ability to create elements by drawing the corresponding geometric shape of it to enable a sketch based modelling. In addition to the existing awareness functions, we consider to add animations for elements, which were just created by others.

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