PRIMIExperience: Experience Sampling via Instant Messaging

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Abstract

In this paper we present the PRIMIExperience system, proposing the use of instant messaging as a mean for carrying out cost-effective Experience Sampling studies with a minimised setup effort.

Keywords

Computer-Supported Cooperative Work; Experience Sampling Method; Instant Messaging.

General Terms

Human Factors

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces — Graphical User Interfaces, User-Centred Design; H.5.3 [Information Interfaces and Presentation]: Group and Organisation Interfaces — Computer-Supported Cooperative Work.

Introduction

The Experience Sampling Method (ESM) developed in social psychology [2] is a research methodology that allows the capturing of reactions of study participants to an experience, their inner states or feelings, in the moment they occur. Through repetition ESM is able to deliver rich and in depth data for in-situ studies, and has therefore been adopted in various ways to research
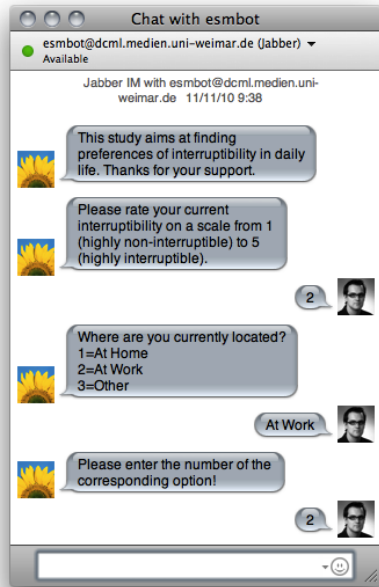
Figure 1. This screenshot shows how a participant of an interruptibility study receives messages in his IM client.

in HCI, specifically in CSCW [4] and Ubiquitous Computing [1].

In order to carry out an Experience Sampling study, the participants need to be equipped with means to record their inner states. Since the early approaches with programmed stopwatches and handwritten notes several tools have been developed to allow for electronic data collection. With ESP, iESP, and the CAES tool (Context-Aware Experience Sampling), all evolving into the My experience (Me) toolkit [1], a number of tools have been implemented. However, all these applications support specific devices only, and so, are limited to study participants with such a device. Alternatively, such devices have to been handed out to the participants, resulting in increased costs and effort for the investigators.

We propose the use of instant messaging (IM) as a cost-effective mean for carrying out ESM studies. In the following we will outline the concept underlying PRIMIExperience from the perspective of the participants and the investigator. We give a detailed overview on how an ESM study is specified in form of an XML Document, which exemplifies the possibilities an investigator has for designing such studies with PRIMIExperience. Finally we give a short outline of the state of the implementation and conclude with a lookout to future work.

Concept

Access to IM is broadly available, whether via popular services like ICQ, GoogleTalk, Skype or integrated in social networking platforms like Facebook. It already has been successfully used in the HCI community for conducting interviews [6] and tools have been

developed to support IM based studies [7]. As clients exist for all popular platforms, including mobile phones, IM allows for conducting ESM studies in the workplace, at home or on the go with a minimised setup effort. PRIMIExperience leverages on IM—in order to receive and answer to short ESM questions that are send to the users' favourite IM client, the participants only need to add the PRIMIExperience bot as a contact to their buddy list, and will immediately be ready (cf. Figure 1).

PRIMIExperience supports several types of questions: multiple choice (one/multiple answers), free text, numerical text, rating scale, and yes/no questions. The participants are able to directly answer an incoming question by typing a textual reply in their chat window. PRIMIExperience validates if the input fits to the question type, and stores it, together with the answer time, in a separate log file for each respective user. The notification about a new incoming question is specific to the IM client and device used by the participants.

In order to setup a new study, the investigator follows four simple steps: Firstly, create a user account at an IM network, that the study participants are later able to add as a contact, and make the credentials available to PRIMIExperience. Secondly, specify the questions and parameters of the ESM study in form of an XML document, as outlined in the next section. Thirdly, run PRIMIExperience on a server as a background service. And lastly, invite the recruited participants to add the created user account to their contact lists.

During the study, the investigator can access the intermediate results of the study on the server, and if required, even adapt the study at run-time. After the study, the investigator simply stops the server, and

informs the participants, that they can remove the contact.

Specifying the Experience Sampling

In the following we provide insights on how the investigator is able to configure the parameters and questions in order to prepare a new study.

The XML file for specifying a new study—loosely based on the Triple-S Standard [5]—is basically divided into two parts: The first part allows for outlining the general parameters of the study. The second part allows for specifying an arbitrary number of questions of the available question types. The *<ESMStudy>* tag surrounds the two parts.

In the general part, the investigator can specify the title (*<Title>*) and a short description (*<Description>*) of the study can be given, that will be presented to the participants once they add the ESM bot as a contact. Further a maximum number of questions that are asked per day or hour can be specified using the tags *<MaxQuestionsPerDay>* or *<MaxQuestionsPerHour>* as well as a daily time interval can be set during which questions should be send *(<Start>* and *<End>*)*.

In the question part, embedded by the *<Questions>* tag, the investigator can specify one or more questions, that will be send to the participants. Each question is defined by a *<Question>* tag and has two mandatory attributes: A unique identifier (*id*) and the question type (*type*), whether it is single, multiple, quantity, scale, character or logical. Further, a nested *<Label>* tag contains the text of the question, as it is presented to the user. And finally, depending on the question type, various tags define the answer possibilities (e.g., *<range from="1" to="200" />* for quantity, *<size>30*

</size> for character, or list of *<value>* tags for single or multiple).

Additionally, for each question finer grained timing options are available. A *<TimeOut>* tag allows specifying the seconds until a message is send, that an answer will not be considered anymore. Further a *<Trigger>* tag allows specifying different options for when a question will be asked. A *Type* attribute (*OneTime*, *Random*, *OnPresenceChangeTo*, *OnStatusChange*, *AtInterval, etc.*) and a corresponding *Value* attribute allow for variations in the timing of questions.

Implementation

PRIMIExperience is currently being implemented in Java and is based on the PRIMI platform [3]. PRIMI encapsulates the underlying communication with the IM server on basis of the XMPP protocol including the sending and reception of messages, presence notifications and management of the buddy list.

When started, PRIMIExperience processes the XML-Document and logs in at the specified IM service. When participants add the PRIMIExperience bot as a contact, the software automatically accepts the participant, and starts a separate Thread for each participant. Then, it sends out a message with the description of the study. Based on the general parameters and the questions, a TimerTask for sending the first question is prepared. After a question is send, a new TimerTask is prepared for the next question. Further, ContextListeners are able to trigger or delay the sending of messages, based on certain events, such as a presence change. Every time a question is posed, it is stored as the current question until either a timeout occurs, a new message is sent, or a valid answer is received. Each received

valid answer is stored together with the question id, time of the question and time of the answer in a log-file. Each incoming message is validated based on the type of the current question. For example for numeric questions, the ValidationService checks if a number in the correct range has been entered. If an invalid answers is received, a short note is send to the participant (e.g. 'Please enter a number in the range from 1 to 10') and the participant is given the chance to resend the answer. This way, PRIMIExperience continuously collects data, until the service is stopped at the end of the study.

Conclusion and Future Work

We presented PRIMIExperience, a system that allows researchers to easily setup and conduct IM based Experience Sampling studies. In order to evaluate the practicability and the validity of this approach for researchers and participants, we will conduct a study with the finished system, and compare the results to such we derived from a classical ESM study.

In the future we will investigate in which way it is possible to extend the system to allow for Context-aware Experience Sampling (CAES). The XMPP Extension Protocols (XEP) defines several extensions that enable the users for instance to express their mood (XEP-0107), current activity (XEP-0108) or location (XEP-0080). Based on a broader availability of such extensions in clients, it would be possible to offer a basic support for CAES via IM. Additionally we plan to extend the system with variables that allow reflecting the context in the question (e.g., the variable *%s* could be a placeholder for the current status). Further we will look into possibilities for formulating contingency questions and to what extend questions or answers

could include media content (photo/video/audio). In order to simplify the generation of new studies, a GUI is planned, that eliminates the effort of generating the XML-Document manually. This way, the finished system will assure ease-of-use for technical inexperienced investigators.

Acknowledgment

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