Towards a Platform for Usability Remote Tests via Internet

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Abstract

Remote Usability tests over the Internet have become possible due to the advent of new technologies, wireless networks and the Internet. The remote usability labs raise the research issues beyond technical problems to resolve. These issues consist in determining the interest of the remote usability testing in comparison with traditional usability labs. This paper aims at clarifying these questions and gives also an insight of the RANA project whose goal is to provide a platform equipped with tools for conducting empirical studies and remote usability testing.

Keywords

Usability, Usability Labs, Remote Usability Testing, RANA (Remote Architecture for Net-based Analysis).

INTRODUCTION

Before launching software in the market, one should test and validate it in order to ensure that the software fulfils the criteria defined in the requirements stage. The costs and the benefices of usability tests are largely demonstrated by the HCI community (Karat 1990, Pressman 1992). Therefore, different types of usability labs have been proposed and implemented in order to offer an organizational, material and software infrastructure to support and conduct these tests. These laboratories are used to observe, gather, and analyze different data generated during test sessions.

However, only large companies or big research centers can afford fixed usability labs because of their relatively high costs. Small companies have neither enough financial resources to equip themselves with usability labs nor the expertise to conduct usability tests. Furthermore, for small companies, investing in the equipment of such a system is not an economically viable solution. A usability lab requires well-equipped rooms and qualified personal in order to complete successfully usability tests.

The advent of new technologies, Internet, and wireless networks let appear the possibility of conducting remote tests via Internet. The idea consists in enabling any small or big company, employing usability professionals or not, to integrate remote usability tests in their software development cycle; remote usability tests appear to be a less expensive solution. The architecture and the process for conducting remote usability tests still have to be clearly defined.

In the first section of this paper, we will go over the advantages and the challenges of remote usability tests. The next section will present the integration platform related to remote usability tests in the scope of RANA project. We will conclude with a glimpse at the future steps for this work.

REMOTE USABILITY TESTS

Remote usability tests can be defined as the usability tests where the testers, performing observation and analysis, are separated in space and/or time from the participants (Hartson et al. 1996).

Advantages of Remote Usability Tests

Remote usability testing has several advantages over traditional labs testing. It allows testing with more numerous participants with diverse backgrounds. The tests are performed with reduced budget, and they take less time. In addition, the participants are almost not influenced by the test environment. During an empirical study carried out by Tullis, usability tests of websites have been performed within a traditional usability lab on 8 participants and on 29 remote participants via Internet with the aim of comparing and determining the efficiency of these two techniques (Tullis et al. 2002). The study has shown that both techniques enable the testers to collect the most significant problems. However, remote tests enable to get the most reliable subjective affirmations of websites because of the important number of involved participants, but also considering the fact that users are not influenced by the test environment. As a result, they can provide feedbacks closer to their perception.

Another advantage is that neither the participants nor the testers need to make costly or timely travel. Indeed, the testers test and interact with the participants remotely. The testers themselves can also be geographically remote to each other and collaborate all together during the same test session. Consequently, it is possible to take advantage of the expertise of professionals and specialists, who are located all over the world. In addition, participants' sample can be broad, diverse and international, which is a determining advantage, especially if it is for developing specific applications that target a foreign population (Dray and Siegel 2004).

Thirdly, since there is almost no environmental influence while conducting remote usability tests, participants feel at ease, and as a result, their comments are more reliable. Participants can remain anonymous, which makes their comments even richer. In addition, tests made in the participant's real work environment in his office or at his home reveal relevant problems related to specific work environments that could not be detected otherwise (Tullis et al. 2002).

Lastly, some tests do not require real time connection between testers and the participant. There is no constraint of time as the test can be done at anytime. Data is collected automatically by a software agent responsible for sending it, when the test is finished, to the testers via Internet (Hilbert and Redmiles 1998).

Challenges

In spite of all their advantages, remote usability tests present some challenges to address.

It is difficult to control remotely the participant's environment. Indeed, participants can be distracted by either their family or their colleagues during the tests or suddenly stop the test session (Bartek and Cheatham 2003). Nevertheless, this disruptive environment is part of the final user's environment. Thus, this loss of control can be considered as an advantage because the collected data truly reflect to the participant's work environment.

In addition, the limited scope of visual feedback leads to information loss because of non verbal communication and participants' attitude. Although the participant has a camera, only his/her face can be captured; the rest of the body in particular the hands and the room where the participant is located are hard to visualize.

Remote data transmission raises the security and confidentiality issues. Furthermore, participants' workstations can be located behind firewalls which are sometimes impossible to cross (Bartek and Cheatham 2003). The firewalls have to be raised in order to enable the access and the information sharing between the participant and the testers.

In addition to the security issues, there are also issues of performance (Bartek and Cheatham 2003). In the case when the participants remotely share an application with the testers, thanks to some tools such as IBM Lotus Sametime, the interaction can be slow because of network instability and a poor internet connection.

Remote usability tests propose an alternative for certain types of tests. For example, they are particularly adapted to tests of Web applications, desktop applications and websites for test sessions not longer than three hours.

RANA

RANA (Remote Architecture for Net-Based Analysis) is an ongoing research and development project administered by the Human-Centered Software Engineering group of Concordia University (RANA). RANA is an integrative process-sensitive software infrastructure for conducting remote usability tests and user-centered empirical studies.

RANA is still under development, however, at medium term, this platform will provide web access to different tools for capturing, visualizing and analyzing the results of empirical studies and usability tests. This infrastructure supports usability tools and offers an architecture adapted for conducting remote usability tests. This platform will also help to perform groupware, focus groups, to conduct interviews and to create questionnaires. RANA has the objective to provide a user testing environment assisted by computer or Computer-Assisted User Testing Environment (CAUTE). The CAUTE provides the same functionality to usability and human factors professionals as a CASE tool provides to software engineers. Indeed, this environment will help elaborating of usability tests and user-centered empirical studies. CAUTE allows repetitive, well defined activities to be automated, thus reducing the cognitive load of the developers and the usability professionals involved. They are then free to concentrate on the specific aspects of the testing process.

RANA is planned to be equipped with a set of software and material mechanisms from a simple camera and a microphone to powerful and efficient control and remote observation software. More precisely, these mechanisms will enable to reduce significantly repetitive tasks related to the tests and the administrative load related of the manual application of test methods. At long term, RANA will have to provide a unified access to a large variety of usability engineering tools including tools developed within Human-Centered Software Engineering lab : MOUDIL (Online Usability Patterns Digital Library), an online library of usability patterns and QUIM (Quality in Use Integrated Measurement), a large database of usability metrics. Other tools of capture, data classification and data analysis (statistics, data mining, neural networks) are also planned to be added to RANA platform.

Platform for Remote Usability Tests

The first stage of the RANA project consisted in defining the architecture supporting remote usability tests. This architecture combines both types of labs: mobile and fixed. However, tests are made remotely via Internet. The data analysis power of fixed labs and the flexibility of mobile labs are advantages exploited and assembled within this platform. The architecture that we defined is mainly made up of four components (Figure 1): (1) the user's local environment, (2) the observers' remote environment, (3) the mobile usability lab, and (4) the fixed usability lab.

The user's local environment includes his workstation and a minimal audio-visual equipment including a web cam, a microphone, headphones and/or loudspeakers. This audio-visual equipment is necessary for collecting multimedia data related on user's behavior and his or her interaction with the computer. It ensures also an interactive communication between the people involved in the tests: the testers, the observers and the participant. It is recommended that the participant has a high band connection in order to facilitate data exchange and transfer.

The mobile usability lab is made up of a laptop that has a wireless Internet connection and a network card. This mobile lab comprises also a PDA, a camcorder (with wireless connection) and an audio-visual equipment including a web cam, a microphone, headphones and/or loudspeakers. The observers can be located in mobile or fixed labs, or they can be dispersed geographically. In addition, no constraint is made concerning their connection means; it can be a low or high band connection. The fixed lab includes two modules: the observation module and the test module. The main function of the observation module is to enable the observers to record and visualize participants' behavior during the test through a big monitoring screen. The test module is equipped with a workstation and three monitors of control and observation. A switcher combines the different sources of audio-visual signals, and projects them on the monitors. The main function of this test module is to provide an adapted infrastructure for the test supervision and the interaction with the participant.

In the center of this architecture, the RANA server plays two roles:

- As a Web server: it manages usability tests, facilitates the communication between different actors involved in usability tests via Internet.
- As a data server: it stores both audio-visual and textual generated data during usability tests. The testers can access raw data as well as analysed data.

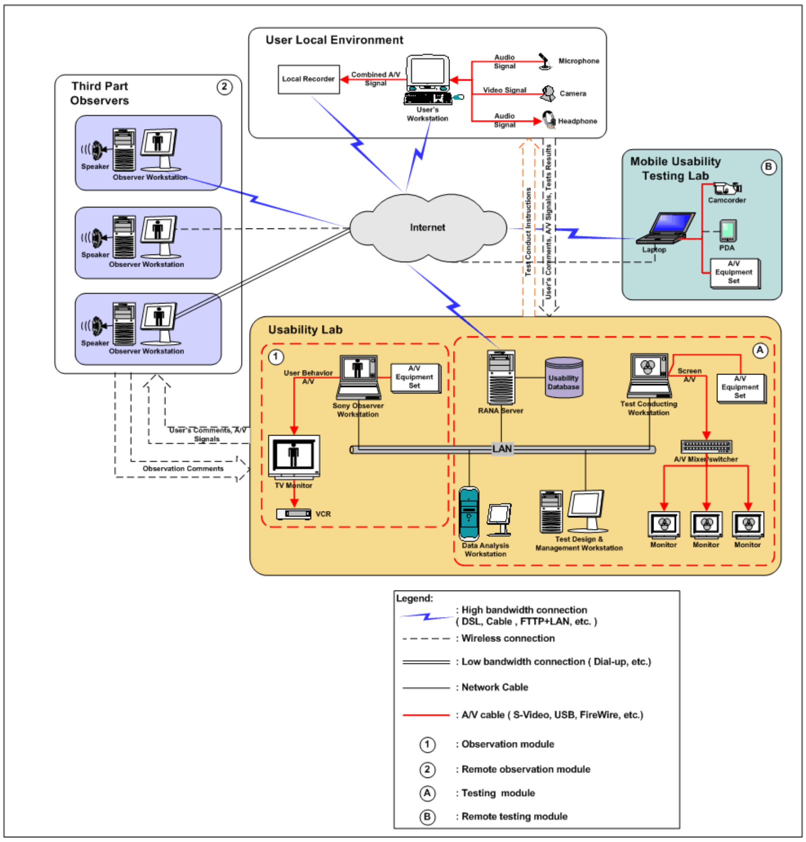

Figure 1: Architecture for Remote Usability

This server extends functionalities of Web and multimedia servers. It exploits also a representation of all observation data based on norms MPEG 4, 7 and 21 (Bormans et al. 2003, Nack and Lindsay 1999) in order to avoid multitude data conversion.

The proposed environment will be used to perform synchronous and asynchronous tests. During synchronous tests, the testers and the participant as well as the observers are connected at the same time, and the tests are visualized in real time by all people involved in the tests. In that case, the participant and the testers interact via videoconference by using tools such as Microsoft NetMeeting. The testers use functionalities of remote control, the whiteboard and the file sharing of videoconference system for distributing scenarios and observing the participant's screen. During asynchronous tests, the participant performs the tests whenever he/she wants. The testers and the observers can retrieve collected data and the results afterwards, thanks to an agent in charge of this task (Hilbert and Redmiles 1998). The observers provide their comments and feedbacks by email or via the RANA website.

CONCLUSION

In this paper, we have presented the advantages and challenges related to remote usability tests. We have also proposed a new architecture, complementary to current fixed and mobile labs, capable of supporting remote tests. The two techniques of usability testing; on site and remotely, are complementary having several advantages and disadvantages according to the kind of tests to perform. One of the undeniable advantages of remote usability testing is the fact that it is a cost-effective solution; it enables testing a large panel of participants in their own environment by remote testers and observers. This article draws up a first perspective towards a platform equipped with tools for conducting empirical studies and remote usability tests. RANA is a project that aims to build a complete environment for remote usability tests. Further work is required to define well the infrastructure for tool support. It is also necessary to define how tools communicate with each other and exchange their data.

REFERENCES

Bartek, V. and Cheatham, D. (2003) Experience remote usability testing, Part 1 : Examine study results on the benefits and downside of remote usability testing, URL http://www-106.ibm.com/developerworks/library/wa-rmusts1/, Accessed 7 Aug 2004

Bormans, J., Gelissen, J. and Perkis, A. (2003) MPEG-21: The 21st century multimedia framework, *IEEE Signal Processing Magazine,* 20**,** 53-62.

Dray, S. and Siegel, D. (2004) Remote possibilities? International usability testing at a distance, *ACM interactions,* 11**,** 10-17.

Hartson, H. R., Castillo, J. C., Kelso, J., Kamler, J. and Neale, W. C. (1996) Remote Evaluation: The Network as an Extension of the Usability Laboratory, *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '96)***,** 228–235.

Hilbert, D. M. and Redmiles, D. F. (1998) Agents for collecting application usage data over the Internet, *Proceedings of the Second International Conference on Autonomous Agents,* Minneapolis, Minnesota, 149-156.

Karat, M. C. (1990) Cost-benefit analysis of usability engineering techniques, *Proceedings of the Human Factors Society, Orlando, FL***,** 839-843.

Nack, F. and Lindsay, A. T. (1999) Everything You Wanted to Know about MPEG-7: Part 1, *IEEE Multimedia,* 6**,** 65-77.

Pressman, R. S. (1992) *Software Engineering: A Practitioner's Approach*, McGraw-Hill, NY.

RANA, Remote Architecture for Net-Based Analysis, URL http://rana.cs.concordia.ca, Accessed 7 Aug 2004

Tullis, T., Flieschman, S., McNulty, M., Cianchette, C. and Bergel, M. (2002) An empirical comparison of lab and remote usability testing of web sites, *Proceedings of the Usability Professionals' Association Conference,* Orlando, FL.

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