

The use of remote control

Discovering behavioral patterns

Conducting research in the area of distributed and embedded systems requires different research methods and tools. The goal is to create user experiences through environments that are perceptive and intelligent. Traditional usability engineering methods and tools fail to assess these experiences. Established organizations such as the Usability Professionals' Organization have recognized the need for new approaches to usability testing [2, 3]. In 2000 first serious plans were launched to build an advanced laboratory [1] to conduct feasibility and usability studies in ambient intelligence. Two years later the Philips HomeLab was opened.



Figure 1. The HomeLab living room.

The HomeLab is built as a two-storey house with a living, a kitchen, two bedrooms, a bathroom and a study. At a first glance, the home does not show anything special, but a closer look reveals the black domes at the ceilings that are hiding cameras and microphones.

There is an observation room adjacent to the Home with direct view into the Home. Signals captured by the cameras can be monitored on any of the four observation stations. Each observation station is equipped with two monitors and one desktop computer to control the cameras and to mark observed events. The marked events are time-stamped and appended to the video data.

When setting up an experiment in HomeLab, the researcher designs a coding scheme for the observation session, listing all prototypical behaviors that are expected to occur during the session. A sophisticated data mining analysis is conducted to find patterns in the data set [4]. For this analysis we use the software package Theme™. To illustrate the use of Theme, we

report on an experimental study on the usability of a universal remote control.

THE OBSERVATIONAL STUDY

Nowadays, people have several electronic devices such as a DVD player, video recorder, television set, etc., with several remote controls to operate them. When they get fed up with all the different remote controls they usually decide to buy a universal remote control. However, the configuration and installation of such a device seems complex and could be improved in terms of usability. We tried to detect behavioral patterns in the use of such a remote.

MATERIAL AND METHODS

Twenty-nine subjects were recruited for this experiment. The equipment needed was a universal remote control, a television set, a DVD player, a tuner and a CD player. Discovering behavioral patterns in the use of universal remote control.

Observational data was collected by means of the HomeLab Observation system (observed behaviors are scored using a pre-defined coding scheme in a similar way as The Observer® Video-Pro). The participants were left alone and given a randomized list of tasks they had to complete. These tasks ranged from simple control and command tasks up to more complex programming for the recorder products. Meanwhile the experimental



Figure 2. The observer leader post.

leader observed and coded their behavior. The acquired data was analyzed further with Theme 4.0 to find behavioral patterns. After the experiment, participants were asked to use our coding scheme to score the recordings of their own experimental sessions. With this additional comments and interpretations were collected for interpreting further the discovered patterns.

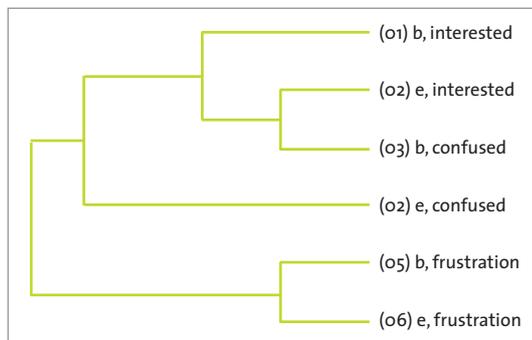


Figure 3. See text for details.

RESULTS

The patterns obtained were significant. Theme can compare the patterns found in your data with randomly gathered data. In the pattern presented in Figure 3, the observed behaviors coded as being interested, being confused and being frustrated are related.

This pattern confirms our expectations with regard to the order of events during the experiment. Participants start out to be interested in solving the problem of operating the remote control. They all had the feeling that they would sit down and easily turn on the television or something else with the remote control. When this failed they grabbed the manual to prevent confusion. If the manual did not help either, confusion appeared and eventually also frustration.

CONCLUSION

The results partially reported here indicate that Theme, combined with the interpretation of the researcher, is a valuable tool for analyzing large samples of observational data.

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