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PORTUGAL

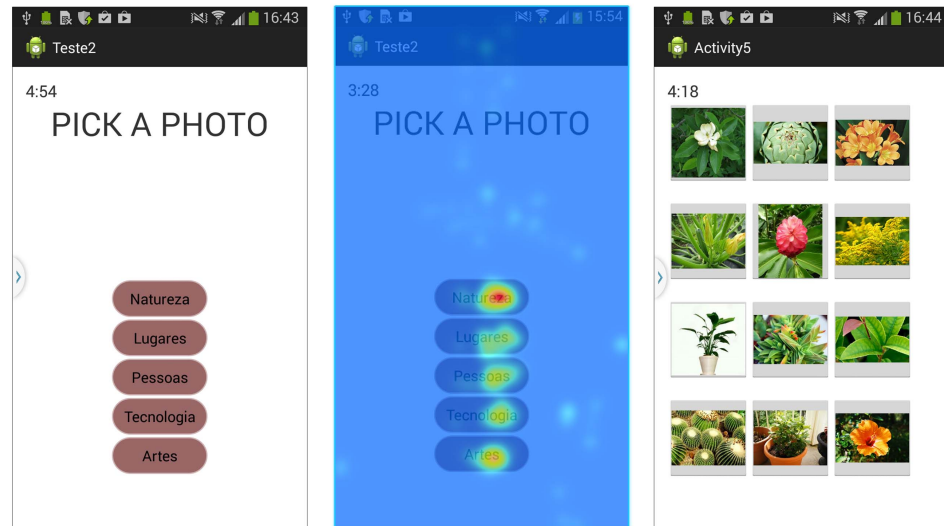


Fig1. Screens (left to right): home page, heat map and screen for image choice.

GESTURE METRICS

OPTIMIZING THE INTERPRETATION OF FUSAMI DATA FOR USABILITY ANALYSIS

Motivation

There is plenty of documentation and instructions on how to use and interpret data recorded through eye-tracking equipment: eye-movement metrics. These help researchers, especially in remote analysis, to analyse the data and extract meaning from users' actions.

The proliferation of mobile devices gave rise to different tools to record users' interaction with the applications. Rather than relying on eye-gaze, these tools rely mostly on the record of users' gestures.

The goal of this project is to combine the use of FUSAMI (a web-based platform, developed within Fraunhofer AICOS, to perform advanced analytics

on real-time mobile applications usage data) with qualitative research to extract meaning from gesture patterns.

Methodology

Frustration was chosen as the first user state to study because i) it is an important state in the field of human-computer interaction studies, and ii) because it is relatively easy to induce and there is already significant related work on inducing and measuring frustrating episodes. The intention of this work was twofold: first, to induce the state of user frustration and then to collect data about users' gestures under frustration and characterise them.

The methodology adopted is based on a mixed-methods approach drawing from experimental procedures, to

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Research questions

This set of experiments intends to answer two questions:

- Can user frustration with a smartphone be induced?
- Are there gesture patterns that can be associated with user frustration?

Test Measures

- Number of gestures
- Frequency of gestures
- Time between each gesture
- Gesture location (gesture heat maps)
- Navigation patterns and transitions

FUSAMI

www.fusami.projects.fraunhofer.pt

collect quantitative and qualitative data. Tests were performed with seventeen participants who rated their emotional state before and after the test, and performed several tasks using an application designed to induce frustration. The retrospective think aloud method was used after the test to help collect qualitative data about the user interaction.

Application design

The most common causes related to user frustration include computer hardware or software failures, poor interface design, users' lack of experience, computer error or bugs, slow or dropped internet connections and unwanted pop-ups. In order to convert the user interaction into a frustrating experience, we deliberately implemented some of these conditions, through the development of an Android application with some intentional bugs and problems.

Results

Although the current study is based on a small sample of participants, the results showed that some of the measures studied might be relevant to help identify user frustration through gesture analysis.

The findings suggest that the number of gestures increases from non-frustrating to frustrating tasks and it also increases when the level of user frustration increases. The decrease of time between gestures in the two most frustrating tasks may suggest that less frustrated users reacted more calmly, while the other users performed more consecutive and faster gestures. The analysis of the navigation patterns suggests that in the easy and bug-free task, users behave in a similar way with

slight differences in their interaction. In the frustrating tasks, the patterns are smaller and fragmented, suggesting that there was not a common behaviour during navigation between users and only a few steps are repeated. The other two measures (see column to the left) show no conclusive result for this investigation.

Conclusions

The results of this investigation show that the most meaningful measure for the study was the number of gestures performed, which shows significant variations according to the nature of the task and the level of frustration reported by the participants.

The most meaningful measure for the study was the number of gestures performed, which shows significant variations according to the nature of the task and the level of frustration reported by the participants. The measure of time between gestures also shows some variations that should be taken into consideration. The decrease in time between gestures can be an indicator of impatience and irritation of the user.

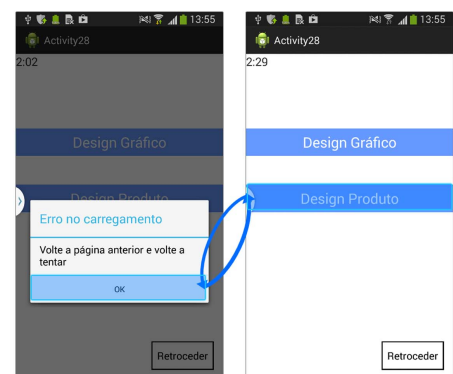


Fig2. Example of a navigation pattern from FUSAMI, showing error message.