

Towards Automating Analysis of Eye Tracking User Studies

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Usability is a quality attribute that assesses how easy user interfaces are to use. The word “usability” also refers to the methods for improving ease-of-use during the design process. The traditional usability testing demands testing in specialized usability laboratories and in many cases it requires test moderator or commenting work by the participant. During usability testing we are collecting wide range of data and then we analyse these data and evaluate various usability metrics in order to identify usability problems [1]. This analysis is mostly performed manually and therefore in many cases it can be very time consuming.

Nowadays usability testing of mobile applications with use of eye-tracking is realized as traditional usability testing. Therefore it requires specialized laboratory and test moderator. Also it is not possible to easily perform mobile usability testing on multiple participants simultaneously, therefore in most cases these tests are qualitative and not quantitative because we are able to collect only small amount of data. Biggest challenge during eye-tracking studies of mobile interfaces is that screens of mobile devices are very small. As study [2] suggests, at a distance of 50 cm which is typical distance from the eyes at which mobile device is held while using it, only one fixation is necessary for the brain to get an accurate image of approximately a quarter of the display. Therefore it is very difficult to use eye-tracker to collect detailed information about user behaviour during mobile application usability testing.

Although there are many factors which make usability testing of mobile applications more difficult there is different eye-tracking equipment being commercialized or investigated to make testing of mobile applications possible. Main techniques or setups applied to mobile usability testing are:

- head-mounted eye-trackers
- stand-alone eye-trackers
- the below table setup

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—emulator setup

Our main goal is to make bulk testing of mobile applications possible. We are proposing method to achieve our goal by means of simulating mobile applications on PC and collecting data from PC. At current state testing of mobile applications is performed only with one tester at the time. We plan to use UX infrastructure available at our faculty, to make testing with 20 participants simultaneously possible.

Although interaction with PC is quite different than interaction with mobile device, we believe that we will be able to collect more precise data from eye-tracking thanks to bigger displaying screen. It is clear that there are some specific usability problems that can be identified only during testing on real mobile device, but we believe that we will be able to identify multiple usability problems also during emulation on PC, moreover thanks to better quality of eye-tracking data identify some problems that could not be identified during testing on mobile device. We plan to study correlations between quality of collected eye-tracking data and used size of projection. We are going to perform a usability study, where participants will test a mobile application in two main setups:

—testing on mobile device

—testing on PC using an emulator

During testing on PC multiple sizes of the projection screen will be used. After this study we will evaluate if there is aforementioned correlation between size of projection and quality of eye-tracking data and also if it is possible to identify usability problems also during the emulation of mobile application on PC.

Later thanks to better quality of collected data, we plan to perform automatic analysis of these data and automatically evaluate specified usability metrics.

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References

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