Information sheet

Touchless Input and Control for Large Displays

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Introduction

Please read the following information so that you understand what you are being asked to do and why this research is being conducted. Please tell me if anything is not clear or if you have any questions.

The purpose of this study is to evaluate new interaction techniques for a **touchless user interface** on **different display sizes**. Touchless user interfaces track your hand and finger movements in mid-air, so that you can control a computing device without actually touching anything (e.g., a touchscreen or trackpad). For example, your hand movements in mid-air could be used to control the position of a cursor on the screen—as shown below.

We are evaluating new touchless interaction methods for **selecting** and **moving** content shown on the screen and how different sizes of displays can affect this. Selection is a fundamental operation in any user interface: for example, scrolling through the timeline of a video, pressing a pay now button at a kiosk, opening another menu, etc. Our interaction methods provide different ways of activating and controlling selection behaviour and we are interested in evaluating how these different designs affect the **usability** of a touchless user interface when more than one item is presented on the display.

If you agree to take part, you will be given this information sheet to keep and will be asked to sign a consent form. You are free to withdraw at any time without giving a reason. You also have the right to withdraw retrospectively and any data gathered during your session be destroyed. This study should take around 60 minutes. You will be paid £10 upon completion of the study.

Procedure and Task Outline

This study uses a Leap Motion sensor to track your hand movements in mid-air; this device uses infrared sensors that track your hand and fingers—as shown below. At the beginning of the study, I will demonstrate our touchless interactions and give you the chance to practice using these. You will be shown the **Pinch** gesture for selecting and **Raycast** and **Gain** navigation techniques for manipulating user interface controls. When you are comfortable with these interactions and have completed a short sequence of practice tasks, we will move on to the main part of the experiment.

You will be asked to complete a series of tasks using our touchless selection interactions using on-screen widgets such as buttons and scroll bars. Our goal is to evaluate the usability of these interaction techniques, *not* to evaluate your performance. In each task, you will be asked to complete a selection operation by navigating to a particular target. The goal is to try to do this as quickly and accurately as possible. Tasks will only begin when you indicate you are ready, so you can proceed at your own pace and are welcome to take breaks when you want.

After each block of tasks, you will be asked to complete a short survey. This survey will ask you to provide numerical scale ratings, e.g., judgements of perceived physical demand, cognitive demand, etc. You will also be asked to provide preference ratings and will be invited to participate in a small interview where we will discuss your thoughts on these interaction techniques. With your consent, this will be audio recorded.

If you are unsure about what you are being asked to do, please let me know at any point during the experiment.

Data

All data collected during the study is anonymous—task performance data will be stored with your assigned participant number. Survey data consists will not contain any personally identifiable information and will be stored with your assigned participant number. Your participant number cannot be connected to you or any personal information. Findings from this study may be published in a PhD thesis and/or research papers, and may be presented at conferences. Anonymous data may be shared in open-access data repositories.

Ethics approval has been provided by the University of Glasgow College of Science and Engineering Ethics Committee (ref TBC).

Contact

Please get in touch if you have any questions about this experiment.

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