Touchless Interface Research

Tim Vise & Nathan Bakhuijzen

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The Touchless Interface Research minor was supposed to be a project consisting of three weeks of research, and three weeks of development. However, soon after the start of the research we discovered that a different approach might be more suitable for our project. In this paper we explain why the original approach was not suitable enough, what our new proposal is, and why our proposal suits this project better.

Original Approach

The original approach defined in the slides of the minor describe a research periode of three weeks, followed by three weeks of development. The main idea was to research and build a platform focussed on the medical sector, think of allowing touchless interaction with a machine to keep is sterile.

After some research we quickly discovered there aren't much research papers readily available that cover this subject. Based on this, we decided to start working on a general purpose implementation first. This platform would allow you to interact with a computer. Sadly, there aren't much research reports available either that are relevant for our implementation. In addition, the project doesn't solve a particular problem yet. Therefore, it is very difficult to pin down a certain subject to focus research on. Because of this, we decided to conduct our own research by experimenting on our own implementation.

New Approach

As mentioned, our new approach is to develop a general purpose application that allows users to control the computer using a touchless interface. In our project, the Leap Motion device will act as our hand motion and gesture sensor being interface to the computer.

Before we start building this application, we will look into a little bit general research about the following topics:

- Controlling a computer with touchless interaction
- How viable and efficient is interaction with hand gestures versus a mouse and keyboard.
- Recognizing hand gestures based on coordinate data
- Combining sensors to improve data accuracy

We expect that the results will give us more than enough information about the subject to point us in the right direction for a initial proper implementation. Note that most of the research on the mentioned topics has already been conducted at the time of writing.

The last few days of this minor, we will be be conducting some experiments. We will define the research questions to do the experiments for in advance. Our main goal of these experiments is to figure out whether certain hand movements and gestures are usable, and whether it's viable to do general tasks on a computer with it as compared to a keyboard and mouse. The actual experiments will be better defined in the other documents we will produce.

By developing a general purpose application we want to allow the researcher in minor KB-81 to conduct experiments about the viability of touchless control of a computer or other technical devices, and/or to develop the platform further.

Arguments

- Initial goal is too broad
- Little research to find on gestures and medical related implementations
- We already had a project in mind, why search for a fitting problem?

- We believe that to reach our goal it is more effective to research and experiment by trying instead of by doing extensive research beforehand