
Kinect-based Background Segmentation and Transparency.

Keywords: People-on-Content; Kinect; Video segmentation; Image transparency

Abstract

The goal of this thesis is to derive a transparent background information from an image with depth information in order to superimpose it onto the content of an interactive whiteboard.

Environment

Large interactive screens allow performing the interaction directly on the screen, which makes them suitable to be used as digital whiteboards. If two of these systems are interconnected over a network, a distant collaboration will be possible. The CollaBoard, which was developed at the ICVR, is able to transfer the content of the digital whiteboard as well as the video of the person in front of it. This allows displaying deictic gestures in a meaningful context with the content on the whiteboard.



Problem description

In order to separately transfer a person's video in front of a dynamic background (whiteboard), it needs to be segmented. This will be achieved by using the depth information coming from the Kinect camera. By this, the person can be segmented from the background, while the background has to be converted to transparent. By doing so, the video can be overlaid on the remote station's content of the digital whiteboard. This should allow that the whiteboard's content stays editable at positions where the remote person is not being displayed.

Task

The goal is to segment a person from a video and to convert the background to transparent, using the Kinect's visible and depth information. Next, this modified video should be overlaid on the remote station's content of the digital whiteboard.

Requirements

Basic knowledge is required in image processing (OpenGL) and in network programming (SIP-client) using C/C++. Further, interest is required in developing software in close connection with underlying hardware, as well as the ability to run a small software development project.

Results

The results of the work will be discussed in an intermediate as well as in a final presentation. Further, a written report of the achieved results is mandatory.

Work packages

- Analysis of the Microsoft Kinect (driver, framework)
- Implementation of a Z-cam based video segmentation
- Generation of a transparent background
- Implementation of the result into an open video-chat (SIP) software
- Overlay of the video onto the whiteboard's content so that it stays editable where no person is shown
- Documentation and presentation

Information & Administration

Bastian migge, CLA G19.1 - migge@iwf.mavt.ethz.ch

Andreas Kunz, CLA G9 - kunz@iwf.mavt.ethz.ch