Transparent Video Facetop

Introduction

Communication is the central component to collaborative development environments. Many of these environments include or rely on some application level facility to assist users in this interaction. The predominant facilities in this area are email, interactive-chat clients, and video- teleconferencing, each with particular advantages and disadvantages that dictate which roles and requirements they are most suited for. Our research focuses on developing a novel technique for tightly integrating video teleconferencing with desktop artifacts that users wish to collaboratively work with. Called the *Transparent Video Facetop*, our methods have proven effective in enhancing the experience of collaborating pairs working synchronously on tasks that, in person, require finger pointing and manual gesturing. As a side benefit of the integral use of video, Facetop also supports hearing-impaired users in distributed collaborations by allowing effective signing.

The Approach

Facetop allows a computer user with an inexpensive consumer webcam to effectively and precisely control the cursor using simple hand and finger gestures. The user sees their image superimposed on the rest of the computer's graphical user interface as a transparent overlay. All "desktop" content can still be seen, but the user appears to themselves as a faint image, as if looking through a window in which they can see their own reflection. The image can be made to fade out completely or become more opaque at any time.

Facetop's utility extends beyond a single user sitting at a terminal. Public presentations often require the speaker to be mobile on a stage or in front of a classroom and unable to directly control the host computer displaying slides onto a screen. Slide advance devices and optical pointer devices such as laser pointers are awkward and easily lost. With Facetop, the presenter appears as a transparent figure "over" the slide content and interacts directly with it, becoming highly visible to the audience. The direct manipulation by the presenter of slide content is a compelling visual cue to the viewers and extends to slide advancement triggered by gestures which facilitates smooth transitions in the speech. At any time, the presenter can choose for their image to fade, creating a pristine slide content view for the audience.

A "distance collaboration" mode allows for two figures to be displayed on the same desktop, ideal for tasks such as pair-programming and truly interactive videoconferencing. This allows two (or more) individuals to work on the same document, on multiple separate desktops, naturally and interactively. This blends the best of video conferencing communication with Facetop's direct gesture manipulation of digital content. Assistive technologies integrate well with Facetop, helping those with impaired vision, hearing and motion to interact with each other and their computer.
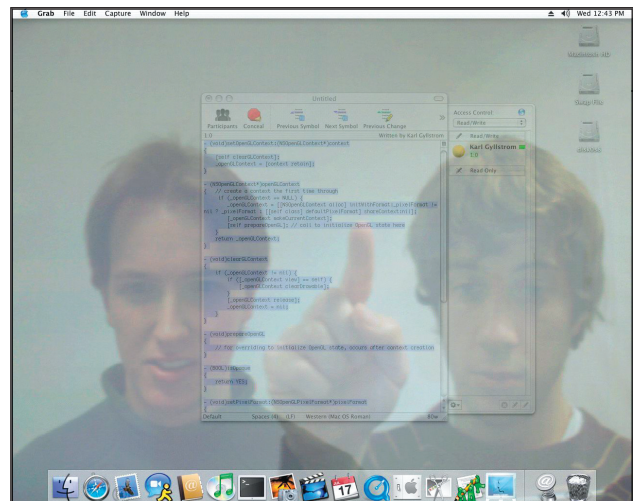
Team Leader

David Stotts, associate professor

Graduate Research Assistants

Jason McC. Smith, Karl Gyllstrom, Dorian Miller, Keith Lee

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Selected Publications

D. Stotts, Gyllstrom, K., Miller, D., and Smith, J. "Facetop: Integrating Artifact and User in Synchronous Paired Collaborations via Semi-Transparent Video," Technical Report TR05-005, Department of Computer Science, University of North Carolina at Chapel Hill.

D. Stotts, Smith, J., and Gyllstrom, K. "FaceSpace: Endo- and Exo-Spatial Hypermedia in the Transparent Video Facetop," *ACM Hypertext* 2004.

D. Stotts, Smith, J., and Gyllstrom, K. "Support for Distributed Paired Collaborations in the Transparent Video Facetop," *XP/Agile Universe*, Aug 15-18, 2004, Calgary, Alberta.

D. Stotts, Smith, J., and Jen, D. "The Vis-a-Vid Transparent Video Facetop," *UIST* 2003.

For More Information

David Stotts
(919) 962-1833
stotts@cs.unc.edu