

traces::*

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1 Introduction

“Present is the presence of the absence” (Jean-Paul Sartre, *Being and Nothingness*)

Technology multiplies *presences*. It provides us with ways of being more present to the world, for instance through email, cell phones, chat, or electronic avatars. It also makes the world more present to us by enhancing the forms and efficiency with which we can get information. Yet parts of human experience cannot be transmitted by presences: for instance, the present instant is an object which is *always already gone*, as it is impossible to grasp the “now”. It is thus an absolute and continuous *absence*. In the traces:: installation, we use advanced visual hull-inspired computer vision techniques to gain precise knowledge of user location and contact. We use this knowledge to confront users not to where they are now, but to their absence from where they were before. The present becomes less of a point in time than the actual disappearance of all the previous instants. In this way, traces:: uses novel technologies to give users novel types of responses to their movements and actions in space.



Figure 1: Following a person’s passage, feet marks appear.

2 Technique employed

We are interested in finding the intersection of users’ bodies with surfaces, may they be floors (foot steps) or walls (hand marks). We later use this input to materialize absence through meaningful ambient response. Our technique builds on previous work for real-time visual hull reconstruction [Hazenfratz et al. 2003]. However, by just finding the visual hull on a precise world plane, higher resolution and more exact contours are found. Our technique is also close to [Wilson 2004], however their system is limited to contact with a transparent surface of limited size (behind which the cameras are placed), and contact detection is inaccurate since only two cameras and raw infrared images are used for merging. In contrast, our approach accommodates larger real world locations and arbitrary planes like walls and floors, and allows more accurate contact detection by using a greater number of cameras positioned at key

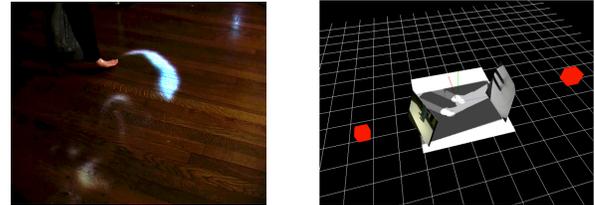


Figure 2: Left: Person’s hand touches are remembered. Right: Finding zone of contact by intersecting the “shadows” of silhouettes from multiple cameras

locations, like in the case of visual hull reconstruction. A high quality silhouette of the zone in contact is achieved by using background subtraction and shadow reduction techniques, as well as image processing methods that compensate for the variations on the surface due to light projection. In order to achieve real-time performance, all computations are made on the GPU through the Apple Core Image framework.

3 Interaction

Our approach uses the knowledge of the intersection of bodies with floors and walls in order to represent absence of those bodies. The system gives us “contact” events, each of which has a duration, a location and a shape (e.g. a foot, hand, or finger). A new event however does not target its own appearance, but the appearance of the previous ones. A previous event (user dragging his/her hand, a foot step) is shown as blurred light projected back onto the location where that event occurred. This light represents at the same time the event and the absence at that location of the body which generated it. By acting, users explore the traces of their past actions and their absence from those actions. Longer contact generates a brighter glow, which will slowly fade away and vanish. This represents another type of absence: from memory. Memory can be recovered through contemplation. When no event is seen for a certain amount of time (for instance when the user is static), the actions of all users progressively appear, glowing all together. Users reflect their absence not only from their own passage, but from a shared history.

References

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