

1 SEMANTIC INTERACTIVITY IN PRESENCE SYSTEMS

Ramesh Jain

PRAJA inc. and
University of California, San Diego
jain@ece.ucsd.edu

Presence Technology (PT) is targeted to the needs of people who want to be part of a remote, live environment. Presence systems blend component technologies like computer vision, signal understanding, heterogeneous sensor fusion, live-media delivery, telepresence, databases, and multimedia information systems into a novel set of functionality that enables the user to perceive, move around, enquire about, and interact with the remote, live environment through her reception and control devices. PT creates the opportunity to perform different tasks: watch an event, tour and explore a location, meet and communicate with others, monitor the environment for a potential situation, perform a query on the perceived objects and events, and recreate past observations. Technically, the framework offers computer-mediated access to multi-sensory information in an environment, integrates the sensory information into a situation model of the environment, and delivers, at the user's request, the relevant part of the assimilated information through a multimodal interface.

This framework departs from all previous architectures for multimedia content delivery or retrieval systems in two important ways. First, it does not just acquire and passively route a sensor content to a user (although it can be made to do so) like video streamers or web cameras. It integrates all sensor inputs into a composite model of the live environment. This model, called the environment model (EM), acts like a short-term database, and maintains the spatiotemporal state of the complete environment, as observed from all sensors taken together. By virtue of this integration, the EM holds a situationally complete view of the observed space. The second point of departure is that in a Presence system, the user not only perceives sensory inputs, but also actively interacts with it. This interaction, whether effected by an explicit query

for more contextual information about an observed object, a request to track an object in the environment, or a notification request when any observed object enters a user-designated region, transcends any query operations found in current state of the art multimedia information retrieval systems. Indeed, we contend that content-based interactivity on live, dynamic objects is the next generation of capabilities beyond the content-based query operations on stored, mono-stream media objects offered by today's systems. Hence we believe that the ability to perform an action on the remote environment by a client-side action is a significant aspect of the Presence Technology.

PT is an extension of the Multiple Perspective Interactive Video project at the Visual Computing Laboratory, University of California, San Diego. In this paper we will present results from PRAJA Presence system implemented to bring an early version of PT for different application. We will present a demo of this system to explain different technical components of the system.