The Beware Home: A Contextually Aware Haunted House

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ABSTRACT

In the Broadband Institute Residential Laboratory, we are exploring interaction techniques for a contextually aware home [1]. Here we describe several recent projects that were adapted to create a haunted house for demonstration to the International Symposium for Wearable Computers conference during the month of October. These projects included three augmented realities, a location system, and five methods of interacting with the home environment.

Keywords

Aware Home, interaction techniques, augmented reality.

THE VISITOR'S EXPERIENCE

Fig. 1. Viewing the Digital Family Portrait

WEST WIND and Guided by Voices

As visitors entered the house, they were given personal audio assistants. These boxes utilized the WEST WIND wireless location system [3] with a modified Rio mp3 player [2] to play audio files with information and instructions to each user as they approached a particular area of the house. We used this to create a self-guided tour through the Beware Home that progressed through the following demonstrations in order.

The Digital Family Portrait

The first stop along the tour is the Halloween version of the Digital Family Portrait [4]. In its normal state, the portrait is intended to reflect the well being of the inhabitant of a house. In this version, the visitors watched Grandma grow old while they listened to the story of what happened through their wearable audio device.

Fig. 2. Grandma turning up the volume on the television

The Gesture Pendant

After turning from the portrait to the rest of the living room, the guests watched grandma's ghost control her appliances with the Gesture Pendant [5]. (Fig. 2) For this demonstration, grandma switched between television channels and controlled the lights with simple hand gestures.

Fig. 3. Watching ghosts in the kitchen

Ghost Viewer in the Kitchen

The kitchen was one of the most active places in the home. At first glance, watering cans moved and cabinets opened and closed, seemingly on their own. However, when the visitor looked through a pair of opera glasses in the kitchen, she saw that there was a ghost cooking and manipulating the cabinets. (Fig. 3)
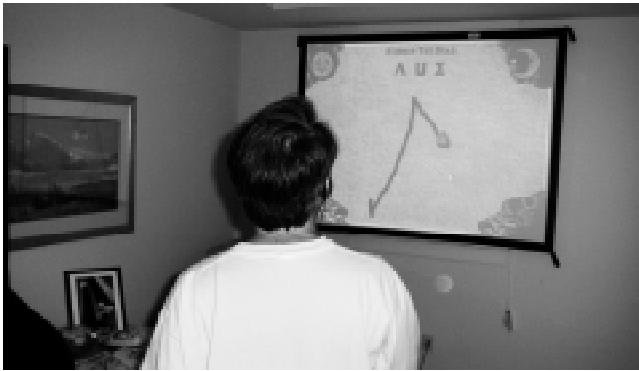
Fig. 4. Etching on the walls with a laser pointer

Drawing on Walls with the Ghost Writer

In the den, visitors used a laser pen to draw symbols on the wall. (Fig. 4) Through the use of a computer vision system and a video projection unit, the user appeared to leave a trail of scorch marks on the wall. If the user drew the correct symbol, she was rewarded with more of the story line. However, incorrect symbols were punished with a "scary" animation.

Fig. 5. Trying to get the baby's attention

The Demonic Baby

In the first bedroom, a doll's head followed the sound of a baby's squeak toy. (Fig. 5) A phased array microphone [6] directed a pan and tilt camera head to follow the sound sources.

Fig. 6. Revealing a partial scene in the bedroom wall

Seeing with Ghost Lights

As visitors entered the master bedroom, they were handed normal-looking flashlights. As they panned their lights over the walls of the room, an ongoing ghostly drama was revealed. (Fig. 6) The effect is accomplished through a computer system that tracks the infrared light projected by multiple flashlights on the wall. Projectors displayed video clipped to the circular region indicated by the flashlights.

Ghostly Reflections

As users passed in front of the master bathroom mirror, they saw themselves reflected as though they were falling away from the mirror. This is accomplished by compositing video images of the user, a static image of the background, and 3-D graphics.

OUTCOME

The Beware Home provided a tolerant audience that allowed us to quickly explore several new means of interaction with the home. As a result of showing these projects to over five hundred people, we have decided to more seriously investigate some of these methods.

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