The Virtual Raft Project: A Network of Mobile and Stationary Computer Systems Inhabited by Communities of Interactive Animated Agents

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1   ISLANDS AND RAFTS

This project presents a novel interaction paradigm in which computer screens serve as islands of virtual space ("iLands"). Mobile "virtual rafts" let people move animated agents between iLands (see Figure 1). The project features innovations in heterogeneous computer graphics, tangible human-computer interaction, interactive animated characters, and mobile computing technology. It has applications in education, entertainment, and new media art.

2   ART AND SCIENCE

The Virtual Raft Project offers a unique physical and graphical interaction that can be used for learning and interactive storytelling, and as a "sand box" in which participants can experiment with interactions of animated agents. There are three main goals for this project:

- To develop an interactive platform that enables physical human interaction with virtual characters.

- To explore the implications of this kind of heterogeneous platform for animation of autonomous characters, as they break away from the constraints of a fixed desktop screen.

- To enable active learning by creating an engaging setting for exploring a range of content domains, starting here with color theory, but extending to more complex domains such as ecology and other system sciences.

3   INNOVATIONS

There are three main innovations for this project. First, this project offers an example of animated characters that are able to move seamlessly among heterogeneous graphical systems. If a character appears on only one screen, it does not seem to "exist" as an entity apart from that screen. If, on the other hand, a character can move between devices, then it appears to exist in a way that is not dependent on any given machine. Networked multiplayer games do this to a certain extent as well, but there the characters remain "in the box." The characters in the Virtual Raft Project appear to exist in real space, interacting physically with people, and are able to move between both stationary and mobile graphical screens. Through this dynamic cross-screen animation, the characters appear to be more believable than characters that only exist on fixed computer screens.

Second, through the virtual rafts, the work presents a novel tangible interaction between humans and virtual characters. Accelerometers in the tablet PCs allow characters on the rafts to respond in real time to the physical motion of the device; this visual feedback appears to enhance the realism of the characters and create an enjoyable experience for human interactors.

Finally, the work demonstrates an "island metaphor" for computational interactions, which helps to frame the relationship between real space and virtual space, and between the real creatures and virtual creatures that inhabit those spaces. As the autonomy of computer programs increases, the desktop metaphor is constraining the kinds of interactions that people might have with computers. A metaphor that lends itself to autonomous computational entities is needed. The island metaphor may provide an interesting way to think about human-computer interactions that is somewhat different from the traditional desktop metaphor. Considering computers in this way could open up new possibilities that might not be evident from other points of view.

4   FUTURE WORK

This example of a novel interaction paradigm enables autonomous animated characters to break free from the traditional desktop screen. Because it allows characters to jump between stationary and mobile computing platforms, the system increases the realism of the characters and helps to frame the way people should interact with autonomous agents. The "island metaphor" for computational devices points toward a new kind of interaction designed to accommodate and enhance the capabilities of autonomous systems. This interaction could be used as a platform for new kinds of educational exhibits, new genres of location-based entertainment, and new forms of interactive media art. In particular, the development team is currently collaborating with several science centers to develop a version of the project based on multi-species ecological interactions.
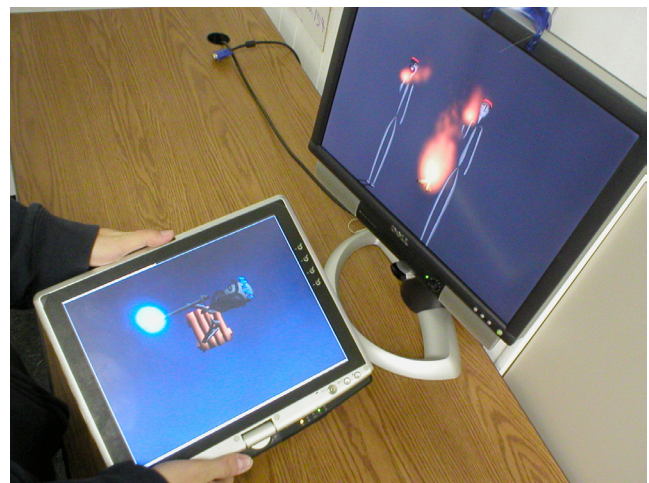

Figure 1: A participant carries a virtual raft up to an iLand.