

The Island Metaphor

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Abstract

This paper presents an “Island Metaphor” for interactions with systems of heterogeneous computational devices employing mobile agents. In this metaphor, stationary computers represent islands of virtual spaces, and mobile devices represent virtual rafts that allow agents to move through a sea of real space. The Island Metaphor provides several benefits over existing computational metaphors, and may be relevant to applications in education, entertainment, and social technologies.

1 The Island Metaphor

As computational systems become more complex, it is both necessary and desirable for users to interact with them at higher levels of control. This high level interaction requires systems that are capable of greater autonomy. The desktop computing metaphor, however, does not lend itself to computational autonomy. Real desktops do not feature autonomous entities, so people do not have a natural understanding of how to interact with autonomous entities in the context of a real desktop - a real paperclip that stood up and addressed the person seated at the desk would be viewed with a certain amount of suspicion. This makes it hard for users to draw on their previous experience to know how to behave when confronted with autonomous agents in the context of a virtual desktop.

This poster presents the “Island Metaphor,” which could help to integrate autonomous software into people’s lives. In this metaphor, stationary computers are islands of virtual space, and the physical separations between stationary computers are oceans of real space. The inhabitants of these virtual islands are autonomous software agents, which can use mobile devices as virtual rafts to cross that ocean of real space. Humans can play multiple roles, including the forces of nature moving the rafts, or the government in control of ocean travel. Security in this metaphor can be implemented in terms of a Customs office that

must approve any transfer. Movement between an island and raft is predicated on three conditions: the physical proximity of the two devices, the agent’s “desire” to transfer between the devices, and the approval of the relevant Customs office. By drawing a comparison between computational devices and real world island and rafts, this metaphor creates an interaction sphere that is more amenable to including autonomous software agents as an integral part of a software system.

The Island Metaphor is not applicable to, nor appropriate for, every system. However, by providing a model for human-computer interactions that is amenable to the presence of autonomous software, the Island Metaphor could be useful in designing new user interaction paradigms for a range of social, educational and work-related applications.

2 Applications

The Island Metaphor has been employed in two fully implemented prototypes. The Virtual Raft Project [Tomlinson et al. 2005] focuses on moving animated humanoid characters between stationary computers using tablet PCs. In this implementation, the stationary PCs are virtual islands and the tablet PCs are virtual rafts. A second version of the project, EcoRaft [Tomlinson et al. 2006], was shown in the Emerging Technologies program at SIGGRAPH 2005. This version uses the technological platform in an educational system about restoration ecology. Each stationary computer is a virtual rainforest with its own ecosystem, but some of the islands can be deforested. Participants use tablet PCs to move various plant and animal species between the islands in order to restore the deforested areas. Both of these installations use the island metaphor and research in embodied mobile agents [Tomlinson et al. 2006] to present the user with an intuitive paradigm for interacting with the multiple computational devices.

The Island Metaphor offers a useful set of conceptual tools that help users form an intuitive understanding of the interactions of autonomous software operating on networks of heterogeneous devices.

References

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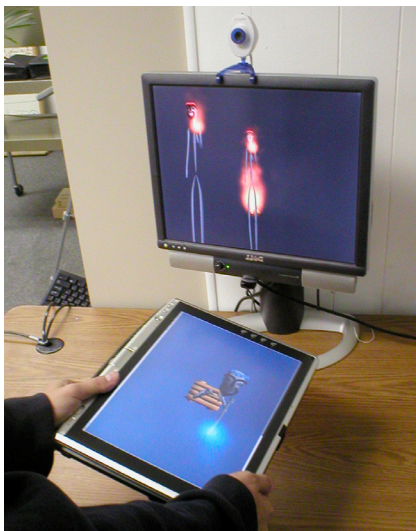


Figure 1 – Animated agents transferring in the Virtual Raft project.