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GUEST EDITORIAL

Special Issue: Intelligent agents in design

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This Special Issue had its genesis in an international Workshop on Agents in Design held in June 2002, at MIT by the Guest Editors. Computational agents have been developed within the artificial intelligence community over an extended period. The concept of an agent can be traced to Carl Hewitt's 1977 work on "actors." Hewitt defined actors as self-contained, interactive, and concurrently executing objects. Since then, considerable research has gone into developing the concept of an agent and into formalizing agents, developing multiagent systems, and exploring their use. The use of agents in design is more recent, and the first PhDs in the area appeared in the early 1990s. Although a precise and unique definition of an agent has yet to be agreed upon, one distinguishing characteristic of an agent is that it exhibits autonomous behavior. Research on agents in design focuses on two primary areas: how to make agents useful in design, and how to apply them to design tasks. This Special Issue has papers from both areas.

The five articles in this issue are a result of a general call for papers on agents in design, which were selected after reviewing the submitted work. Three of them are rewritten and revised versions of papers that originally appeared in the 2002 Workshop on Agents in Design. Shakeri and Brown's paper, "Constructing Design Methodologies Using Multiagent Systems," addresses the problem that there are no systematic approaches to building design methodologies for integrating different disciplines in multidisciplinary design so that they collaborate to contribute to the common goals of the design and also share resources, using a multiagent system that mimics a design team. In their article, "Interagent Ties in Team-Based Computational Configuration Design," Olsen and Cagan address the problem of how an organization can significantly improve its collective computational capacity, flexibility, and efficiency, and thereby improve its problem solving by effectively structuring the resources (human, informational, computational) available. They develop a multiagent approach that seeks to simulate human teaming. Saunders and Gero's paper, "Curious Agents and Situated Design Evaluations," develops new kinds of situated agents that are motivated by their goals and general curiosity, can learn from experience, and can report their individual evaluations. Liew and Gero's article, "Constructive Memory for Situated Design Agents," presents some of the machinery that allows continuous learning from interactions between agents and their environments in cognitively based situated agents. The final paper by Wijngaards, Boonstra, and Brazier on "Role of Trust in Distributed Design" tackles an important and not yet fully appreciated issue in agent interactions, that of trust. They demonstrate its role and effects in a design activity.

These five papers provide a cross section of current research in agents in design from applications to foundational developments. Agents can be viewed as simply as an enabling technology borrowed from artificial intelligence, or they can be viewed as a paradigm for thinking about design.

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