Modeling and Simulation of Context-Awareness

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Abstract

Context-awareness is a key enabling technology for the design of future Internet and user-centric distributed applications. Contexts are situational information, which could be physical/logical, system/user-specific, explicit/implicit, and complete/incomplete, of processing and object entities embedded in a computation and communication environment. The use of contextual information offers great opportunities for enhancing the performance of systems with new applications beyond imagination. From the user’s viewpoint, augmented with contextual information, distributed applications can be made to adapt to the environment that it operates within. From the system’s viewpoint, embodied with computation in the environment, the supporting infrastructure can be made dynamic as the environment changes. We have seen much ongoing research and applications of context-awareness in the “context” of pervasive and mobile computing, and some other general distributed computing.

The research issues on context-awareness include context modeling, specification, acquisition, interpretation, and management. The supporting technologies touch upon many aspects of computer science ranging from sensor technology, network infrastructure, algorithm and language design, and HCI and AI. This presentation gives a brief overview of context-awareness, argues its importance, and then focuses on exploiting the roles of simulation in supporting the development of context-aware applications and systems. Examples include testing and debugging of context-aware software, synthesizing sensor data, and simulating context-aware infrastructures.