

Issues and Challenges in Creating Context-Aware Embedded Ubiquitous Applications

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Abstract. In ubiquitous computing environment, many embedded computers, sensors, devices, and networks are connected for creating context-aware embedded ubiquitous applications. We have been building smart rooms and smart furniture to develop such context-aware ubiquitous applications. The smart furniture is equipped with embedded networked computers, I/O devices and sensors, and it can provide various services in open public and/or private space. By simply placing the smart furniture in a space, we can instantaneously convert the legacy non-smart space into a smart space where location-based context-aware services, service roaming, personalized services and access to the Internet are provided.

In this talk, we will discuss the issues and challenges in creating context-aware embedded ubiquitous applications with smart furniture. We first introduce four types of smart furniture; a pole type, a lamp type, a mirror type, and a message board type. Then, the smart furniture middleware and various issues in the context-aware ubiquitous applications such as a Personalized Message Board System, a Secure Library System, an Environmental Monitor System, and a Mobile TV-phone System are described. Finally, we summarize the issues and challenges in providing context-awareness, adaptability, time and space coordination, and privacy negotiation in embedded ubiquitous applications.