

## A SMART-GATE BASED COMPOSITION METHOD TO PROVIDE SERVICES BY SOLVING CONFLICT USING DYNAMIC USER PRIORITY AND COMPROMISE POLICY<sup>1</sup>

JUNBO WANG<sup>1</sup>, ZIXUE CHENG<sup>2</sup>, LEI JING<sup>2</sup>, KAORU OTA<sup>1</sup> AND MIZUO KANSEN<sup>3</sup>

<sup>1</sup>Graduate School of Computer Science and Engineering

<sup>2</sup>School of Computer Science and Engineering

<sup>3</sup>University-Business Innovation Center

University of Aizu

Aizu-Wakamatsu, Fukushima 965-8580, Japan

{ d8101202; z-cheng; leijing; d8102104; Kansen }@u-aizu.ac.jp

Received February 2010; revised August 2010

**ABSTRACT.** *Context-aware service is a hot topic in the research filed of ubiquitous computing. Composition of smart objects/context provides a flexible way to compose context-aware services, which means related smart objects around a user automatically being integrated together to provide the appropriate services. However, (1) there is no effective mechanism to coordinate the work of multiple smart objects and solve conflict problem in composition of smart objects; (2) priority is an effective method to solve conflict problem, however, the current priority based policies are static and thus not flexible; (3) when a conflict occurs for a numeric action of a smart object, e.g., changing of volume of a TV, it is not reasonable to just follow all/nothing policy, i.e., satisfy one user's requirement and ignore another one's, however, to find a compromised value to satisfy both users as much as possible. To solve the above problems, in this paper, a smart-gate based composition method is proposed. The smart gate has uniform interface to communicate with multiple smart objects and modules to coordinate the work of multiple smart objects and resolve conflict of services. Moreover, two novel policies are proposed in the smart gate for solving the conflict problem. One is a dynamic user priority based policy. The other is a compromise policy to minimize the required tolerance of users. Finally, we evaluate the proposed method through an experiment. The experiment result shows that the composition method works well and effective for resolving conflict problem.*

**Keywords:** Context-aware services, Service conflict, Composition/coordination of smart objects, Smart gate, Conflict resolution, Dynamic user priority policy, Compromise policy

**1. Introduction.** The phrase “ubiquitous computing” has been widely used in the research fields after it appeared [1]. One of the hot topics in ubiquitous computing is context-aware service/intelligent system [2-5], which provides users personalized services, by considering users' location, time, available devices, favorites, etc. For example, a mobile phone may provide information of restaurants automatically, which are close to the user's current location and matched to the user's favorites around the time for lunch, say 12:00 AM. Another ubiquitous context-aware system proposed in [4], can get person actions such as standing up/down, walking and running by embedding acceleration sensors in a mobile phone, and provides services adaptive to the user's context.

The rapid progress of smart objects augmented by the abilities of sensing, computing, and wireless communicating makes the development of context-aware possible and

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<sup>1</sup>A preliminary version of this work was presented in the 1st International Workshop on Aware Computing (IWAC09), Aizu, Japan, 2009