An Adaptive Data Control Model based on Situation-Awareness Environments for Smart Festival Management System

Soongohn Kim¹, Byungcheol², and Eungnam Ko³ (Corresponding Author)

¹ Department of Computer Science, Joongbu University, 101 Daehakro, Chubu-Meon, GumsanGun, Chungnam, 312-702, Korea
sgkim@joongbu.ac.kr

² Institute of Information Research, Hanbaek System Co., 2105 Venture Tower, Cheonan TechnoValley, Jiksan-Eub, Cheonan, Chungnam, 330-816, Korea
bclee@hbsys.net

³ Division of Information & Communication, Baekseok University, 115, Anseo-Dong, Dongnam-Gu, Cheonan, Chungnam, 330-704, Korea
ssken@hanmail.net

Abstract. This paper proposes a new adaptive data control model based on situation-awareness environments for smart festival management by analyzing the window and attributes of the object data. This paper presents the design of the adaptive model for sharing control, which is running on RCSM (Reconfigurable Context Sensitive Middleware) for smart festival management. RCSM provides standardized communication protocols to interoperate an application with others under dynamically changing situations for the smart festival management. (Key words: adaptive data control model, situation-awareness environments, smart festival management)

1. Introduction

Currently, the regional local festivals, which are a part of community development projects that utilize the regional cultural resources of the local self-governing entities, contribute in the nurturing of local cultures. And, because of the advantages of festivals -- directly and indirectly -- in terms of their increasing the incomes of the local residents, raising the potential for regional development and being suitable for the acceptance by the dynamic forms of the modern tourism, lately these festivals have been utilized quite a lot. The smart festival management system is a management system that, for the various festivals that are operated by the local self-governing entities and agencies, enables a direct operation of all the process phases from the advance preparation phase to operation phase and the post management and the administrative tasks, etc. of the planning operational headquarters and agencies
Context awareness (or context sensitivity) is an application software system’s ability to sense and analyze context from various sources; it lets application software take different actions adaptively in different contexts [2]. In a ubiquitous computing environment, computing anytime, anywhere, any devices, the concept of situation-aware middleware has played very important roles in matching user needs with available computing resources in transparent manner in dynamic environments [3-5]. Although the situation-aware middleware provides powerful analysis of dynamically changing situations in the ubiquitous computing environment by synthesizing multiple contexts and users’ actions, it is difficult to avoid a problem of the seam in the ubiquitous computing environment during data collection for smart festival management. This paper proposes a new adaptive data control model based on situation-awareness environments for smart festival management by analyzing the window and attributes of the object data.

Section 2 describes Reconfigurable Context-Sensitive Middleware (RCSM). Section 3 denotes an adaptive collaboration platform based on RCSM for festival data control. Section 4 present conclusions.

2. Reconfigurable Context-Sensitive Middleware (RCSM)

In the Context Toolkit, a predefined context is acquired and processed in context widgets and then reported to the application through application-initiated queries and callback functions. In this Reconfigurable Context-Sensitive Middleware (RCSM), Stephen S. Yau et al. [2] proposed a new approach in designing their middleware to directly trigger the appropriate actions in an application rather than have the application itself decide which method (or action) to activate based on context. RCSM provides an Object-based framework for supporting context-sensitive applications. It shows how all of RCSM’s components are layered inside a device. All of RCSM’s components are layered inside a device. However, it did not include an adaptive data control and platform for multimedia collaboration in the architecture.

3. An Adaptive Collaboration Platform based on RCSM for Festival Data Control

3.1 An Adaptive DOORAE Platform based on RCSM

DOORAE is made up of a distributed architecture for a collaborative multimedia distance education system and forms several levels according to service functions. DOORAE is a foundation technology for computer collaborative work that allows development of required application by combining many agents composed of units of functional module, provided by DOORAE, when user wishes to develop new application field. As it can be seen on Figure 1, DOORAE’s basic structure consists of DOORAE application program, DOORAE agents, operating system and
communication subsystem. DOORAE agents are composed of SEMA and APMA. SEMA is a session management agent that appropriately control and manages session and opening / closing of sessions, even in the case of several sessions being generated at the same instant. APMA is an application management agent that handles request of application. SEMA consist of GSM, LSM, AMA, CRPA, ACCA, and COPA. APMA consist of MECA, INA, UIA, and APSA. AMA is an agent that has functions of application management. CRPA is an agent that has functions of managing formation control of DOORAE communication protocol. ACCA is an agent that has functions of managing floor control and concurrency control. COPA is an agent that has functions of providing participants same view.

3.2 Festival Operation Phase and Data Control for Automatic Visitor Processing System

For a festival, based on the characteristics of the festival and in accordance with separation into a preparation phase, operation phase, post management and reporting phase, the requirements for each of the phases are defined and a management system is developed for -- in a logical order -- planning, design and development. For the requirements of the festival operation phase, what is needed are the assessment data needed for operation such as punctuality check, smoothness check, surveys, etc. and the management side requirements such as schedule reporting, visitor feedback, event management, risk management, visitor traffic flow trace, etc. During the festival operation, systems for the design and construction of festival site facilities and festival risk management are important requirements as well.

For smooth feedback during the festival operation phase, the interoperability between the management that applied QRCode (Quick Response Code) and automatic visitor processing system is essential. The concept drawing for automatic visitor
processing system is shown in Figure 2 as follows.

![An Example of QR Code and Automatic Visitor Processing System](image)

**Fig.2. An Example of QR Code and Automatic Visitor Processing System**

### 4. Conclusions

This paper proposed a new model adaptive data control model based on situation-aware environments for smart festival management by analyzing the window and attributes of the object data. As a result, it offers a seamless view without interfering with concurrency control is also suggested. In the future work, fault-tolerance system for smart festival management will be generalized to be used in any environment, and we will progress the study of domino effect for distributed multimedia environment as an example of situation-aware applications. And we remain these QoS of resource conflict resolution strategies for smart festival management as future work.

**Acknowledgments.** This paper was supported by Local Industry Technology and Development Fund (project No.: A001100187), in 2011-2012.

### References