

# An Adaptive Session Manager and Fault-Tolerance Agent running on RCSM for Festival User Sites

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**Abstract.** The focus of festival applications based on situation-aware ubiquitous computing has increased lately. An example of situation-aware applications is a smart festival management system. Since ubiquitous applications need situation-aware middleware services and computing environment keeps changing as the applications change, it is challenging to detect errors and recover them in order to provide seamless services and avoid a single point of failure for smart festival management system. This paper proposes an adaptive session manager and fault-tolerance agent (ASMFTA\_SFMS) in situation-aware middleware framework.

**Keywords:** festival applications, adaptive session manager, situation-aware applications, smart festival system

## 1. Introduction

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 [1].

Context awareness 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, 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, 4].

This paper proposes an adaptive session manager and fault-tolerance agent (ASMFTA\_SFMS) model based on situation-aware ubiquitous computing for smart festival management system.

## **2. Related Works: Fault Tolerance**

The field of fault-tolerant computing has evolved over the past twenty-five years. Generally, fault-tolerance system can be classified as software techniques, hardware techniques and composite techniques [5, 6]. The tolerance of software faults is in most cases more difficult than dealing with hardware faults since most software-fault mechanisms are not well understood and do not lend themselves readily to “nice” techniques such as error coding [7, 8]. Two different techniques for achieving fault-tolerance in software have been discussed in the recent literature: the recovery block and N-version programming [8]. In the latter a number ( $N \geq 2$ ) of independently coded programs for a given function are run simultaneously (or nearly so) on loosely coupled computers, the results are compared, and in case of disagreement a preferred result is identified by majority vote (for  $N > 2$ ) or a predetermined strategy [9]. The recovery block technique can be applied to a more general spectrum of computer configurations, including a single computer (which may also include hardware fault-tolerance) [9]. It is difficult to detect errors and recover them for seamless services and avoid a single point of failure by using conventional method. But it can be to detect errors and recover them for seamless services and avoid a single point of failure by using proposed method for smart festival management system. However, it did not include fault-tolerance support in the architecture for smart festival management system.

## **3. Adaptive Session Manager and Fault-Tolerance Agent for Smart Festival Management System (AFTA\_SFMS)**

### **3.1 QR Code and Automatic Visitor Processing System for Smart Festival Management System**

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 1 as follows for smart festival management system.

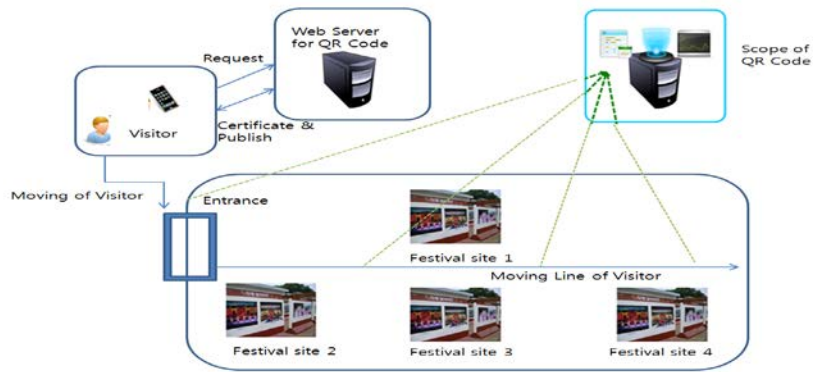


Fig.1. The Example of QR Code and Automatic Visitor Processing System [1]

### 3.2 The Algorithm of ASMFTA\_SFMS based on RCSM for Smart Festival Management System

Figure 2 shows the relationship between WSA (web server of QR code) and WECA (client of festival sites) in ASMFTA\_SFMS architectures for smart festival management system.

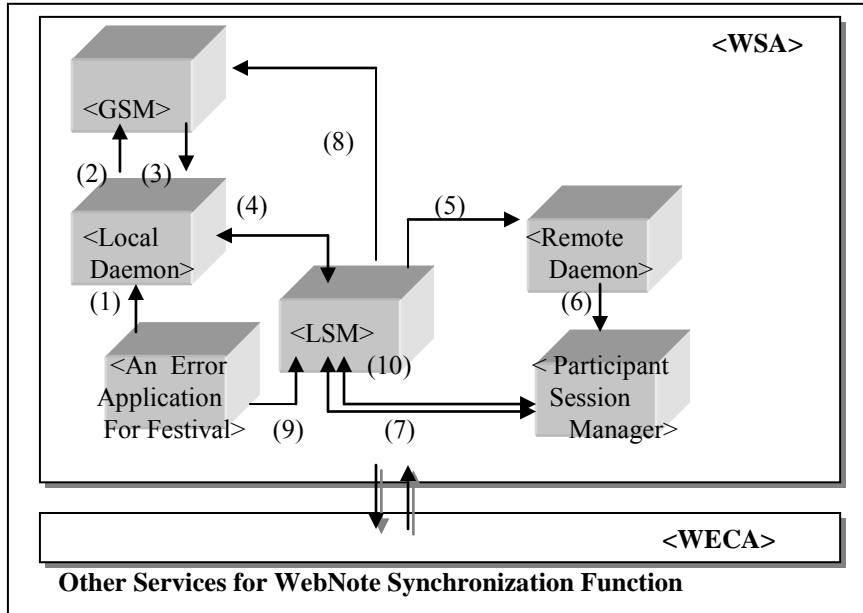


Fig.3. SMA and FTA Architecture on S situation-Aware Environment for Smart Festival Management System

First it is decided whether it is hardware error or software error. In case of software error, it can be recoverable for smart festival system. If an error is to be recoverable, you can create sequences below for smart festival management system. WECA requests to GSM session information for smart festival management system. GSM give response session information for smart festival management system. WECA requests to Daemon for recovery for smart festival management system. Daemon announce to Remote-Daemon for recovery for smart festival management system. Remote-Daemon announce to Participant Session Manager for recovery for smart festival management system. Remote-Daemon receives an acknowledgement for recovery packet for smart festival management system. Daemon receives an acknowledgement for recovery packet for smart festival management system. Daemon creates Local Session Manager for smart festival management system. Local Session Manager create Media server for smart festival management system. Media server create Media server Instance for smart festival management system. Media Server Instance makes an acknowledgement to Local Session Manager for smart festival management system. LSM creates application for smart festival management system. Daemon informs GSM of an information for recovery. The strong point of this system is to detect and recovered automatically in case that the session's process come to an end from software errors for smart festival management system.

#### **4. Simulating ASMF<sub>TA</sub>\_SFMS for Smart Festival Management System**

The ASMF<sub>TA</sub>\_SFMS simulation model has been implemented by using DEVS for smart festival management system. To evaluate the performance of the proposed system, an error detection method was used to compare the performance of the proposed model against the conventional model by using DEVS(Discrete Event System Specification) formalism for smart festival management system.

The DEVS formalism is a theoretical, well grounded means of expressing hierarchical, modular discrete event models. In DEVS, a system has a time base, inputs, states, outputs based on the current states and inputs. The structure of atomic model is as follows [11,12,13].

Before system analysis, the variable that is used in this system is as follows. The letter Poll-int stands for “polling interval”. The letter App-cnt stands for “The number of application program with relation to WECA session”. The letter App\_cnt2 stands for “The number of application program without relation to WECA session”. The letter Sm-t-a stands for “ The accumulated time to register information in WSA”. We can observe the result value through transducer.

Conventional method for smart festival management system:  $2 * \text{Poll\_int} * \text{App\_cnt}$

Proposed method for smart festival management system:  $1 * \text{Poll\_int}$

Therefore, proposed method is more efficient than conventional method in error detected method in case of  $\text{App\_cnt} > 1$  for smart festival management system. We have compared the performance of the proposed method with conventional method for smart festival management system.

The merit of ASMFTA\_SFMS detects an error by using hook techniques for smart festival management system. During process of session, Media Service Instance comes to an end abnormally at times. In this case, the session's process can come to an end, but it is necessary to protect the user from error by reactivating the Media service instance. We are first in need of a method to detect error for session's recovery. ASMFTA\_SFMS is a multi-agent system which is implemented with object oriented concept for smart festival management system. This system detects an error by using hook techniques and classifies an error by using polling periodically processes with relation to sessions. The strong point of this system is to detect and recover error automatically in case that the session's process comes to an end through a software error for smart festival management system.

## 5. Conclusions

This paper proposes an adaptive session manager and fault tolerance agent (ASMFTA\_SFMS) algorithm in situation-aware middleware framework for smart festival management system. ASMFTA\_SFMS is a system that is suitable for detecting, classifying, and recovering software error based on distributed multimedia festival site environment by using software techniques for smart festival management system. This method detects an error by using hooking techniques for smart festival management system. The purpose of this research is to return to a healthy state or at least an acceptable state for session for smart festival management system. It is to recover application software running on situation-aware ubiquitous computing automatically for smart festival management system. The purpose of ASMFTA\_SFMS system is to maintain and recover for session automatically for smart festival management system.

In the future work, fault-tolerance system 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 for smart festival management system.

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