The Streaming Service Model using Complex Recognition for Smart Festival Management

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Abstract. Festival management has the required elements of making support to the visitors about the festival programs and giving the fun of the festival by building the best possible service environment reflected the characteristics of visitors. In this paper, we propose the steaming service model using complex recognition for the festival management by using a variety of IT technique such as QR Code, NFC, GPS, Streaming Service, and Location Service. By using this system, it can be provide convenience to visitors through audio/video streaming service and information of the status of the event hall and increase interoperability of the manager through demand forecasting.

Keywords: Festival Management, Streaming Service, QR code, NFC tag, GPS, Location Base Service, Smart Phone

1 Introduction

Recently, the festival has been growing interest with the spread of cultural life. In particular, local cultural festivals are being created through various agencies of local governments. These festivals systems activate the local culture and local income directly or indirectly. However, in reality, there are many festivals that are generated based on the exhibition administration. And those festivals do not make the creation of an active market and post management. As a result, the system environment that can create value to local residents based on the systematic deployment and management system of the festival is required [1]. And also, through growing the Information technology and audio/video transmission and spreading a various mobile device that is included high-feature sensors, users are demanding a variety of services. For these requirements, in this paper, we propose the smart festival management system providing complex recognition-based streaming service that can support systematic management and aggressive promotion for the efficient festival service. With this system, visitors will be able to use the information easier and festival manager can be use the visitor information as the post management and statistics. Therefore, it can be ensure efficient management and viability of the festival.

The remaining parts of the paper are organized as follows, In Section 2, we discuss the related technology for the smart festival management. In Section 3, we propose the system model that is complex recognition-based streaming service for the festival. Section 4 presents an implementation model in this system and Section 5 concludes this paper.

2 Related Works

2.1 Festival Management Elements

The elements for making a festival management system consist of festival planning, operation, evaluation and analysis. First, in the festival planning, it is need to determine the impact factors for successful management of the festival and need to consider the elements of the regional characteristics and economic factor. Second, in the festival operation, it is need to an effort to prevent problems during the events; aggressive marketing reflected the characteristics of the festival and promotional activities to reflect the needs of visitors. Third, the festival evaluation and analysis are required the process of a thorough internal analysis for the effect of the events and visitors characteristics to make the festival equipped with a sustainable and viable [2][3]. In this paper, we propose the service model that is include various information technologies to increase operational efficiency of the festival. The proposed system includes the ability to deal with various situations through the entire process of the festival using streaming server and smart phone for the visitor activities. For this service, we use technical services such as the location-based service, NFC technique, QR code, streaming service, GPS and so on.

2.2 NFC and QR Service

Near Field Communication (NFC) technique is able to read from and write information to RFID/NFC tags and was used for the implementation of the two presented interaction techniques. And also NFC techniques are already available in the mobile phones such as smart phones and it is predicted that several hundred million NFC equipped mobile phones will be used in 2013 [4]. The NFC protocol is based on a wireless interface and also it is known as peer-to-peer communication protocol that establishes wireless network connections between network appliances and consumer electronics devices [5]. In this paper, we use NFC to service the information of the item that is unable to provide the GPS data for the festival service.

The QR code is a kind of matrix symbol that was developed by the Japanese company Denson-Wave in 1994. The code has quiet zone, position detection patterns, separators for position detection patterns, timing patterns, alignment patterns, format information, version information, data, and error correction code words [6][7]. In this paper, we use QR code to support the information of the contents that is unable to provide the GPS data such as inner area for the festival service.

3 Complex recognition-based Streaming Service for the Smart Festival Management System

3.1 The Proposed Service System Architecture

The complex recognition-based streaming service system includes the ability to deal with various situations through the entire process of the festival using streaming server and smart phone for the activities of the visitors. They are shown in Figure 1.

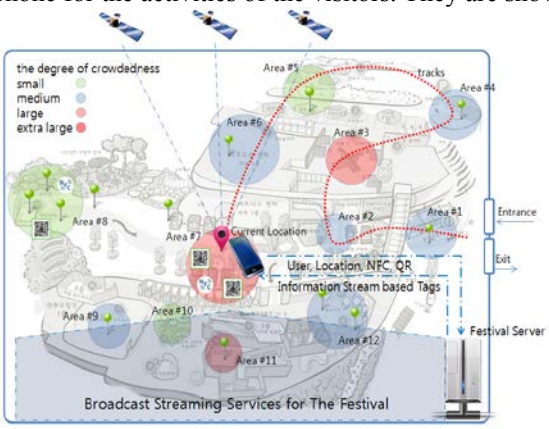


Fig.1. Festival Streaming Service Architecture and Elements of the Service

3.2 The elements for the System Operation

The elements of the complex recognition-based streaming service system and operation through the entire process of the festival are described as follows.

Management of Registration and Entrance for the visitor: Visitor registration process is done through the box office and information desk. When the visitors fill out the application form, the visitor can received the QR code which is created by the festival management system through smart phone. The QR code is used to enter and exit to the festival. And the QR codes give the visitor the admission of the special event area in the festival. The manager of the festival can utilize the data of the festival participants and the tendency of the users as statistics.

Festival Application Service based on Smart Phone: The application based on smart phone has the service that can provide real-time audio and video data streams of the schedules and festival services information based on a map, user location, QR

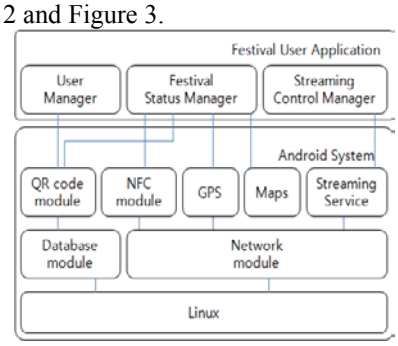
code, and NFC. And also the application give the status of congestion in the event areas based on proximity sensing. So the visitor can enjoy the festival service comfortably.

Complex Recognition-based Streaming Service: The Streaming Service provides outdoor and indoor services. The outdoor streaming service operates with GPS and proximity sensor. The service detects the event to enter and exit the specific space and give the information of the event in real time. And also tells a crowded situation of the area based on the map. And indoor streaming service operates with NFC and QR code in the area that can't be use the GPS data. The visitor can contact special item or services with smart phone. When the phones detect the tags, it requests the streaming service about the item.

4 Implementation of the Complex recognition-based Streaming Service for the Smart Festival Management

4.1 The Software Architecture for the Streaming Service

We propose an implementation model of the complex recognition-based streaming service for the smart festival management system based on the open source. this system consist of Dawin Streaming Server for Audio and Video Streaming Service, Android system for smart application program, Zxing library for QR code module, NFC, GPS and Map Service. The service system software architecture is shown in Figure 2 and Figure 3.



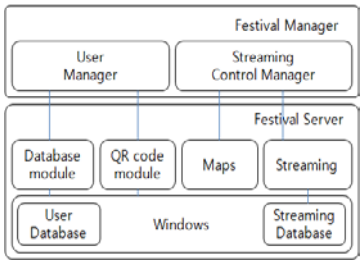


Fig.2. Festival Client Software Architecture **Fig.3.** Server Software Architecture

Figure 2 show the architecture of the festival client software. It includes modules such as QR, NFC, GPS, Map and Streaming and it manage situations of the festival and visitors. And Figure 3 show the architecture of the festival server software. It includes management functions for the visitors and streaming data. After registration of the visitors, the visitors can receive the streaming services of the festival contents. Each elements and approach methods is described in the next section.

4.2 The Implement for the management of the visitors

The In this section, we present the flow of the registration and management of the visitors. The visitors receive the user identification code using QR and then can use this QR code for entering and exiting the event section and the gate of the festival. And the manager of the festival can manage and use the actions of the visitors. The flow of the entering and exiting with QR tag is shown in Figure 4. And Figure 5 show the interface for the user login and identification.

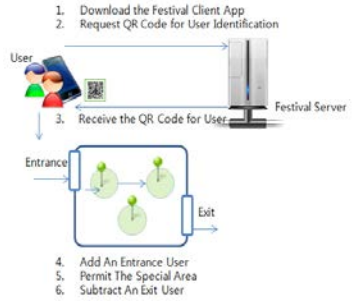


Fig.4. User Control Flow of Registration , Entrance and Exiting

Fig.5. Interface of login and Identification

4.3 The Implement for the management of status of the festival

The Visitors can use the service for the status of the festival when they entered into the festival area based on user location. It can trace user location and check the status of congestion in the event area with a map. This interface is shown in Figure 6.

Fig.6. Festival Status Interface based on a map

Fig.7. The approach of the streaming

Fig.8. The streaming service for indoor area

4.4 The Implement for the Streaming Service

The streaming service can be used in the indoor and outdoor area through a variety of approaches. This service approach is shown in Figure 7.

The event of streaming service will occur in the various situations such as entering and exiting the specific area, contacting contents. The client system transfer user information, current location and content name to the streaming server when an event occurs, And then the streaming server save the user and location information, and process the audio or video service to the visitor in real time. And indoor streaming service shown as Figure 8 operates with NFC and QR code in the area that can't be use the GPS data. It can be used when the visitor want to know a detail information of the contents or to receive the additional service about the contents.

5 Conclusions

With the growing of the cultural life, there are a variety of local cultural festivals that is made by agencies of local governments. It will require systematic management and operation through expansion of scale of the festival. In this paper, we proposed the complex recognition-base streaming service model for the efficient operation in the festival. The proposed system covered various situations through the entire process of the festival using streaming server and smart phone with a various approach to the visitor. Using the proposed system, it will be able to manage the festival systematically and to provide aggressive promotion to the visitor. And visitors will be able to access the contents easier and enjoy the festival. And also the management of the festival could lead to the better festival by utilizing event-related and visitor-related data.

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