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The Smart Town based on Mobile using Interactive Design

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Abstract

Objectives: In this study the relationship between an interactive design and space based on mobile is reviewed and a smart town for the activation of old town is discussed. **Findings:** The area of town will be able to become smart town using the augmented reality of various media in order to activate the old town in this study. The service of digital story telling which is positioned at famous street of specialization is provided and the interactive design for the mutual response of digital contents through the various technology of augmented reality in a major area is planned. In order for mobile service, the smart town is produced as a form of Android application. A user can experience the contents at the spot and can share the breakdown of experience immediately due to an interactive design based on augmented reality. **Improvements/Applications:** The comment on old town focused on a vivid storytelling as well as three-dimensional method provides visitors with not only the improvement of visiting meaning and its enjoyment but also the maximization of satisfaction for viewing.

Keywords: Augmented Reality, HDM, Interactive Design, Mobile, Smart Town, VR

1. Introduction

The activation of network through an interactive design makes the awareness of space augmented. The convergence of the cutting edge technology and an interactive design makes it possible to provide not only various digital service for public but also to be able to enlarge the form of culture space for giving pleasure and excitement instead of the static function of city space that is connected simple production and consumption¹.

In this study the relationship between an interactive design and space based on mobile is reviewed and a smart town for the activation of old town is discussed.

1.1 Interactive Design

As the interface that makes it important to use a tool focuses on communication and handling method as well as the participation of user in the process of communication, the upper concept that calls it an interaction is being developed².

An interaction is a kind of aspect that is occurring in the process of communication between human and environment, human and human and human and system³. An interactive design is generally defined as the ability to design an experience of human learned during a series of procedure. The ultimate object of an interactive design for the creation of experience induces users and visitors to happen naturally the experience of the intentional sense.

So the role of navigation for providing the accurate direction of information we want to find is very important and is to be supported by its simplicity with consistency⁴.

1.2 Activation of the Old Town

The downtown is the representative place not only for the integration of population and various functions but also for the historical assets including culture and tradition over a long period. Due to the decay of a downtown and an expansion of suburban area, the loss of function for a downtown area as well as the decline of its practical usage is being incurring. These are making its function of

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convenience and attractions deteriorate such as the place of networking, a center position of our lives.

The old town is considered public assets that are still positioned in very important location. The active reflection of an information-oriented society and globalization as well as their trend makes it possible to restore the declined function of downtown. Also the downtown that is being declined by various factors must be revived through the adaption of new functions that can be replaced the declining function of downtown.

1.3 Technology Trends in Interactive Media

The concept of virtual reality was introduced in mid 1970 and Jaron Lanier firstly used this term 1988 in the US. Afterwards as the concept and its scope had been expanded, all researchers were prone to define the meaning in their way. From all these consideration, human is able to feel the sense of the real in the virtual space that is created by computer. It is possible to have indirect experience through the environment that computer made virtual space as well as its interactive things with computer.

Computers and its related devices have made it possible to experience four senses such as sight, hearing, taste and touch. Even though the world of VR is fabricated as an unrealistic, it has made impossible experience possible through accumulate experience to human brain and has maximize experiencing. The current VR system such as HDM, DATA Glove, CAVE and Vision Station is explained in Table 1.

An augmented reality is a technology that is the melding of real world with computer-generated imagery. It is also called as Mixed Reality (MR) because they are capable of showing one imagery adding the virtual world of information into the real world at a real time. The Boeing Company was introduced first in 1992 to explain the process of integration for cable harness. Since then, R&D of this technology has been processing in the USA and Japan. The industries of game and mobile solution as well as education field are developing various kinds of product thanks to wide spread of smart phone since mid 2000. They are entering full-fledged phase of commercialization.

Table 1. VR system type

Sort	Application method		
HMD	In order to see a three dimensional imagery it is a		
	helmet type device installed a small video monitor		
	in front of eye to receive RGB input signal for		
	displaying. Only one user can experience a virtual		
	reality.		
DATA	This is a kind of touch device that is able to		
GLOVE	input data according to the finger movement of		
	demonstrator with the glove type texture putting		
	hand in.		
CAVE	The display system of VR which is composed of		
	three dimensional space in 3-6 wall screen can		
	process a simulation surrounded by VR imagery.		
Vision	A hemisphere-type projector with an extra VRML		
Station	viewer makes totally immersed in 3D without any		
	additional device like HMD.		

Design of Smart Town with Interactive Design

2.1 Configuration of Smart Town

In order to provide mobile service a smart town which is not only made by the form of the android application but also adapted by an interactive design based on augmented reality is designed. The composition of their basic service is shown in Figure 1.

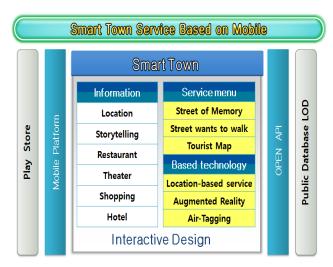


Figure 1. Configuration of smart town service.

The major services are composed of street memory, street wants walk and tourist map. These are supposed to provide the various information that are converted by the content of storytelling, including text and audio as well as image.

The street that is remembered is provided its memory by a story telling service based on a smart phone's AR technology. A street wanting to walk is provided by the service of commercial building, concert, shopping information and direction based on AR technology. Also a street wanting to find is provided by a social network service for lefting memory as a Airtag type.

2.2 Augmented Reality-based Interactive Design

The good communication facility is able to define as a nice harmony between public space and private one, an abundant interactive component among human for improving interaction and diverse events as well as programs inducing all walks of people to participate in. Furthermore, the facility that maintains public order as a social structure and community of neighbor is the space that entire local resident can share and interplay to form a tender-hearted human relationship. An interactive component that not only activates an interaction of people but also combines and gathers more people including an architectural elements and programs plays an important role in order to support this space.

The important factor is how to deliver actively the identity of space described the theme in a certain method in order to design the smart town adapted in an interactive design.

In this study a smart phone that is able to connected between the experience spots and interactive media in order for that the interactive design based on AR apply to the space is necessary. In order to compose an interactive media, it is necessary to build not only the digital story telling that is a one of basic factors of events for experience components but also an experiencing by visiting, but also the augmented reality for mutual response.

The composition of important interactive factors based on AR used in this study and their detailed factors

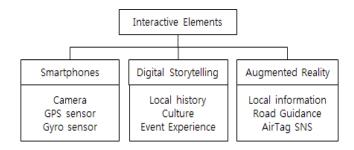


Figure 2. AR-based interactive components.

The interactive factors based on AR which are consider major service as a street of memory, a street wants to walk and tourist map are to become interactive media after converging each factor like showing in Figure 3.

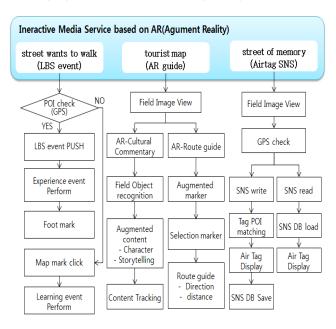


Figure 3. Flowchart of AR-based interactive services.

The interactive design for the purpose of user and site as well as the harmony between the cyber spaces applying the various AR technologies is composed in this study. There are twelve designated sites for experiencing an interactive component in the downtown of Choonjangro, including Asian cultural center, 5.18 uprising plaza, Song moo kwan, YMCA, Sambok bookstore, Artist street, GJ post office, Alley of fried lattice, Yousaengchon garden, Funny department store, Cheongwon momil noodle and

GJ theater. Each site has been given POI (Point of Interest) based on after measuring GPS coordination shown in Table 2. The coordination of established POI in Google earth is shown in Figure 4.

Table 2. GPS coordinates for poi

event	name of point	GPS coordinates		
point		Latitude	Longitude	
POI_1	Asian cultural	35° 8'48.39"N	126°55'8.82"E	
	center			
POI_2	5.18 uprising plaza	35° 8'50.54"N	126°55'10.03"E	
POI_3	Sangmookwan	35° 8'52.73"N	126°55'13.03"E	
POI_4	YMCA	35° 8'52.35"N	126°55'5.68"E	
POI_5	Sambok bookstore	35° 8'53.65"N	126°55'4.45"E	
POI_6	Artist street	35° 8'59.33"N	126°55'5.81"E	
POI_7	Woo coffeeshop	35° 8'51.27"N	126°55'1.95"E	
POI_8	Laitue fritada	35° 8'51.09"N	126°54'59.79"E	
POI_9	Yousaengchon	35° 8'51.80"N	126°54'58.26"E	
	garden			
POI_10	Fanni deparment	35° 8'59.13"N	126°54'51.97"E	
	store			
POI_11	Chungwon	35° 8'56.81"N	126°54'51.62"E	
	momil noodle			
POI_12	Gwangju theater	126°54'51.62"E	126°54'45.36"E	



Figure 4. Google Earth-based status poi.

3. Conclusions

The area of town will be able to become smart town using the augmented reality of various media in order to activate the old town in this study. The service of digital story telling which is positioned at famous street of specialization is provided, and the interactive design for the mutual response of digital contents through the various technology of augmented reality in a major area is planned.

In order for mobile service, the smart town is produced as a form of Android application. A user can experience the contents at the spot and can share the breakdown of experience immediately due to an interactive design based on augmented reality.

The expectancy effects of producing the smart town based on mobile are like following.

Firstly, the comment on old town focused on a vivid storytelling as well as three-dimensional method provides visitors with not only the improvement of visiting meaning and its enjoyment but also the maximization of satisfaction for viewing.

Secondly, the contents applied storytelling methods are to be developed according to the appropriate level of each visitor in order to give them enjoyment.

Thirdly, the story capable of utilizing smart phone APP is to be developed and the effective form of story is necessary to build for the addition of next contents,

Fourthly, the old town area is to make famous brand through the development of various theme and courses

4. Acknowledgment

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