

Property Information Service Construction Plan

Ko Hyejung, Republic of Korea

Key words: Property Information, Augmented Reality, Cadastre, Spatial Information, GPS

SUMMARY

Property information can be obtained through visits and internet by grasping the location of the property. However, applying AR (Augmented Reality) to property information inquiry service makes it possible to use detailed information of property easily and quickly according to real time location. Before you trade property, you should check the property information such as land register, building register, land use plan, individual official land value, registration department. However, in order to obtain such information, it is difficult to grasp only the current location information. Therefore, it is a current situation to grasp the location of the property and obtain information through visiting and the Internet. In this study, AR (augmented reality) is utilized to use property information, thereby contributing to saving time and cost in using property information in the future. When a built-in camera such as a smart phone illuminates a building using AR (Augmented Reality), it first focuses the building and collects latitude and longitude information, tilt and gravity information of the current location through a GPS receiver, then visualize the detailed information into GIS. Property information obtained using AR (Augmented Reality) can improve the efficiency of property information management and property transactions, and further promote the property business more efficiently. Property information inquiry using AR (Augmented Reality) can be expected to have effects on various fields such as economic, social and policy as well as improving the efficiency of property information management and property transaction.

SUMMARY (optional summary in one other language in addition to English, e.g. your own language)

In order to use property information at present, it is necessary to locate the property and then visit and visit the Internet. However, if you use AR (Augmented Reality) to obtain property information according to real-time location, it will have a positive impact on various fields such as economic, social, and policy, and increase the efficiency of property.

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1. INTRODUCTION

Recently, as researches on the development of IT technology and physical space and virtual space have been concentrated, various studies utilizing virtual reality or virtual digital data have been conducted. However, using computer to show property information in virtual reality is artificial and realistic. Therefore, we have come up with a deeper method in property where space sense is important, and a virtual space and a physical space are intersected with each other to create a third space, in an Augmented Reality (AR) environment. Therefore, it is necessary to study AR (augmented reality) based property information inquiry service which expresses the property information collected through existing visit and internet as a realistic and easy to understand presentation method from the user side.

Through this, it will be possible to visualize property information more effectively and systematically in management and real world, and at the same time new property information inquiry service will be possible. Land and building information is so diverse and wide that a database should be built that integrates and records information. The purpose of this study is to build property information service based on AR (Augmented Reality) in order to more effectively and systematically manage and understand integrated property information. First, we classify property information, develop data structure for classified information, and build property information management integrated database on the basis of it. Second, we build a prototype of AR based property information inquiry service system so that property information manager or user can understand more easily and easily by using this integrated database.

Through this research, we are going to find a way to visualize property information based on AR (augmented reality) instead of existing research that expresses spatial information using IT technology.

The property to be considered for the integrated database of property information is limited to the land ledger, the building ledger, the land use plan, the individual official land register, and the registry, and work to integrate the information derived therefrom. Next, the integrated database will be used to construct an AR (augmented reality) based property information management service inquiry service (plan). A concrete example of the management of property information will be shown through one building.

2. MAIN SUBJECT

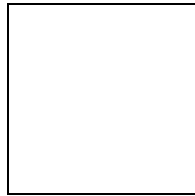
2.1. AR (Augmented Reality) Introduction and Literature Survey

2.1.1. Concept of AR

Spatial Planning and Management Using Augmented Reality (9161)
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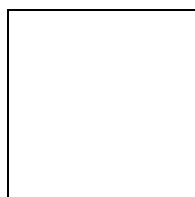
FIG Working Week 2017
Surveying the world of tomorrow - From digitalisation to augmented reality
Helsinki, Finland, May 29–June 2, 2017

Augmented Reality, which has been studied by Ivan Sutherland as a starting point for developing the see-through HMD (head-mounted display), is a field of Virtual Reality (VR) I have. Virtual reality technologies generally allow a user to immerse in a virtual environment, so that a user can not see a real environment, whereas augmented reality technology allows a user to see a real environment, and a mixture of a real environment and a virtual object. In other words, although virtual reality replaces the real world and shows it to the user, augmented reality differs from reality in that it replicates the real world by superimposing virtual objects on the real world and shows it to the user. Milgram explained the concept of AR through the Reality-Virtuality Continuum (Mixed Reality), reality, and virtual reality (Milgram and Kishino, 1994)



<Figure1. Reality-Virtuality Continuum of Milgram>

To represent an object in a virtual reality, a virtual object such as the model is created. In reality, an actual model is expressed. In this way, mixed reality can be considered as an environment that partially contains virtual objects. It is determined whether Augmented Virtuality or Augmented Reality is based on how much the environment created by a virtual object occupies compared to reality. <Figure 2> is an example of an AR, in which the telephone and desk are physical objects, and the lamps and chairs are virtual objects. That is, the user can simultaneously view two different environments in the augmented reality.



<Figure2. Examples of Augmented Reality (AR)>

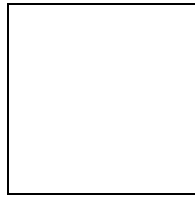
There are two main types of AR technology.

First, the marker-based AR technique is a method of directly recognizing an object captured by a camera or scanning a marker and expressing augmented reality thereon.

Second, location based AR technology is a technology to express target object as augmented reality by using GPS information and sensor information (direction, slope) of camera. Accuracy is higher than marker based and is continuously being developed.

2.1.2. Introduction of AR-related devices and technologies

In order to realize such augmented reality, basic devices and technologies are required, which can be broadly classified into tracking, three-dimensional modeling, display, camera calibration, and matching. <Figure 3> explains how the five elements that make up the AR system work.



<Figure3. Components of an AR (Virtual Reality) system>

First, a display device is a device that expresses a virtual screen synthesized with computer graphics in real time in real time in order to realize AR (virtual reality) as one of computer output devices.

Second, the tracking device uses the GPS (Global Positioning System) to track the current position, and when a video type HMD or a general monitor is used as an output device, a sensor may be installed in a digital camera for inputting a real situation.

Third, three-dimensional modeling is the process of creating a mathematical model that can be reproduced in a virtual three-dimensional space in the field of computer graphics (Wikipedia). The virtual objects and data (attributes). By creating 3D modeling of a virtual object in advance, it is created and displayed as a result.

Fourth, matching is the process by which a virtual object is accurately located in a real environment.

Fifth, camera calibration refers to the process of correcting the position of a virtual object by eliminating the error due to an external cause included in the result, such as observation or approximation calculation. It is possible to make a more realistic AR environment by minimizing the errors occurring in the matching process through the algorithm and the procedure.

2.2. Property information inquiry service design using AR

2.2.1. AR-based property information inquiry service outline

AR-based property information inquiry service system will be constructed for research on how to integrate and manage various property information such as user information, property information, and spatial information in AR environment.

2.2.2. Realization of Property Information Service using AR

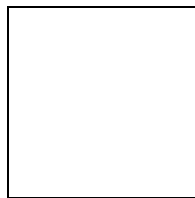
When a built-in camera such as a smart phone illuminates a building using an AR (Augmented Reality), it first focuses the building and collects latitude / longitude information, tilt / gravity information, etc. of the current location through a GPS receiver, Visualize detailed information with GIS. Property information obtained using AR (Augmented Reality) can improve the efficiency of property information management and property transactions, and further promote the property business more efficiently.

2.2.3. Property information integration database construction

In order to search integrated property information, classification of property information and standardization of data should be preceded. The property information integration database should be constructed by standardizing the land register, land use plan, land use plan, individual official land price, registration information, etc., which are considered to be the basic elements of property information, and systematically detailed integration methods. The smart land information application currently provided by the Ministry of Land Transport and Transport provides detailed information on land and buildings. This database can be matched with the GPS coordinate value (longitude, latitude) of building space unit to provide AR (augmented reality) based property information.

Furthermore, cadastral surveying performance can be provided as AR (Augmented Reality). The intellectual achievement provided by LX (Korea National Land Information Corporation) is a one-dimensional method of marking the boundary point or the dividing point as the boundary mark in the applicant land. LX can help customers more easily and quickly understand cadastral surveying performance by providing business intelligence based on AR (augmented reality) as a specialized agency for business development and national spatial information on spatial information. Among the property information, the cadastral survey results should establish a different database from other property information. First, we utilize cadastral maps as basic data using location - based AR technology, and construct border and division markers as marker - based ARs. The customer can easily collect his / her land information and fluctuating location information in three dimensions through the AR.

2.2.4. Property information inquiry service application using AR



<Figure4. Property information inquiry service application using AR >

3. CONCLUSION

When you buy and sell property, you need to check the property information such as land register, building register, land use plan, individual official land price, registration department. However, in order to obtain such information, it is difficult to grasp only the current location information. Therefore, it is a current situation to grasp the location of the property and obtain information through the visit and the Internet. Therefore, this study aims to reduce time and cost in using property information by using property information using AR(Augmented Reality). When a built-in camera such as a smart phone illuminates a building using an AR(Augmented Reality), it first focuses the building and collects latitude / longitude information, tilt / gravity information, etc. of the current location through a GPS receiver, Visualize detailed information with GIS. Property information obtained using AR(Augmented Reality) can improve the efficiency of property information management and property transactions, and further promote the property business more

efficiently. property information inquiry service using AR (Augmented Reality) can expect effects on various fields such as economic information, social and policy as well as improvement of property information management and property transaction efficiency. In addition, we expect to be able to provide cadastral surveys and performance services that link spatial information with intellectuals as visualization of the cadastral survey results provided by LX is also realized through AR(augmented reality) in real space.

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BIOGRAPHICAL NOTES

KO Hyejung

Education background : Feb, 2011, Bachelor degree, Cadastral Science, University of Mokpo

Current position: Assistant manager, H.Q. of Gangwon-do, Korea Cadastral Survey Corporation

Main task: Geoinformatics, Spatial information, Drawing up topographical maps, and so on.

CONTACTS

Property information service construction plan KO Hyejung

Korea Cadastral Survey Corporation

303, Huseok-ro, Chuncheon-si, Gangwon-do, Korea

Chuncheon-si

Republic of Korea

Tel. +82-33-250-5317

Fax + 82-33-250-5350

Email: skekhj@lx.or.kr, skekhj@naver.com

Web site: www.lx.or.kr