

A Study on Real Time Digital Map Data Construction through User Participation

Yong-won Cho, Mu-wook Pyeon, Il-woong Jang, and Tak Hur

Abstract— Recently, Spatial information technology closer to real 3D space, a variety of web-based content to provide information services. Many multi-dimensional image data in order to build real-time digital map was uploaded to the online video you should use them. This map service through user participation that is called crowd mapping. Spatial information in the field of guidance and it can provide many benefits. In this study, based on 3D reconstruction built at the any location of pictures by user participation taken photos entering them how to make the high quality digital mapping of the propose. Based on these future, the map data in real time to build that will be can propose.

Keywords—Real time digital map, Crowd mapping, 3D reconstruction, Spatial information, DLT method, User participation

I. INTRODUCTION

IN the field of spatial information process of building a real time digital map of the various types of information that must be collected. These service is spatial information in the field of indoor and outdoor space together without distinction to handle demand[2]. Recently, spatial information technology service deployment from real time 3D space, multi-dimensional space based information service and web-based content through a variety of service allow user participation to change[4].

Provide to real time digital map service and user participation service events. The concept of real time spatial information(Hyper-Live Spatial Data) to based technology development. Also monitored by CCTV and collected to user image data as a possible, spatial information to provide in real time digital map demand for increasing service[1].

South Korea government makes the 3D map by 'V-world'. 'V-world' seems like 'Google Earth'. And Naver and Daum map service in the aerial view, real photo view or normal view[1].

The service currently provide to establish, build the cost of expensive, built based on the image data and CCTV video to spatial information service. When building can be seen in terms of cost reduction. So this study is propose to CCTV built based

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map data, through real time user participation a variety of locations with any photos. We want to build a high quality real time digital map.

II. IMAGE DATA ACQUISITION METHODS

A. CCTV

The purpose to monitoring of local government CCTV installation supplement is constantly increasing. CCTV has been used mainly for security purpose, in real time to provide via video as a service is required[1]. In the field of spatial information existing equipment instead of expensive LiDAR data designated place in order to reduce construction cost as fixed in real time utilizing the CCTV has been studied[5]. CCTV picture below is the video data using the Ankara House at Youido, Seoul, South Korea.





Fig. 1 CCTV obtained through the left images



Fig. 2 CCTV obtained through the right images

B. Camera video

To mentioned above can be obtained through the CCTV image data, but only with CCTV images of any area cannot be obtained. So the image data in other ways to compensate people carrying smart phones and digital camera. Video data should take advantage of through user participation. Smart phones and digital camera very portable and technology to the development of high quality images can be obtained easily[6], General with the consent of the user to upload images can be obtained

through an internet search[7]. When these images are acquired to manage large amounts of images to solve this problem, which is currently active in the BigData and Cloud Computing to take advantage of the one that you think is an alternative[3].

C. BigData

BigData and efficient processing of such data, analysis, and in order to take advantage of was the emergence, BigData is usually data volume, variety, velocity as a combination of three factors is characterized by changes[12]. BigData and analysis techniques for processing such data, the text mining, opinion mining, social network analysis, cluster analysis has dual images similar to nested characteristics of the object together with the cluster analysis technique was used for outgoing[13].

D. Crowd mapping

Crowd mapping is designed and built by the team behind Ushahidi, a platform that was originally built to crowd source crisis information. As the platform has evolved, so have its uses. Crowd mapping now allows users to set up their own deployments of Ushahidi without having to install it on a web server. Since its release in 2010, prominent deployment of Crowd mapping have documented the global 'occupy' protests and the 2011 London anti-cuts protest[9].

On 31 December 2010, the Ushahidi team announced Crowd mapping: Checkins, a geosocial add on to Crowd mapping that allows users to create a white label alternative to sites like Foursquare and Gowalla[9][10]. Rather than filling out submission forms online, checkins allow Crowd mapping users to expedite data entry to their deployment, focussing first on location and adding more detailed information later[11]. Ushahidi describes the effort as 'checkins with a purpose'.

III. HOW TO MAKE 3D RECONSTRUCTION

The user participation in order to build, system based CCTV data must be built. CCTV is often see a lot on the street, and local governments for the purpose of security installations are increasing. Therefore, the existing LiDAR equipment as a way to replace the fixed CCTV.



Fig. 3 Field experiments at Ankara House

CCTV given that it is generated from the 3D reconstruction

IV. TO USER PARTICIPATION, A VARIETY OF ANY LOCATIONS TO IMAGE DATA

CCTV image data obtained through a few simple technique through the process with DLT 3D reconstruction is possible. However, CCTV disadvantages are not all the places are taken, occlusion area and shaded area can't obtain the desired image data. In particular, if the tallest building in the same data through CCTV is not easy to obtain. Thus, a way to give these shortcomings is the user participation.

People can easily take a picture, if peoples internet uploaded data could not build them as part of the CCTV to complement will added. User participation to build map, finally high quality real time digital map.

So, Basis for process and result of the experiment, SIFT algorithm for image matching technique utilizes the stylized, DLT technique was constructed using of 3D reconstruction. SIFT algorithm is feature points in each image (interest points) which is the process of extracting ① Scale-space Extrema Detection, ② Keypoint Localization and extraction of the feature points matching process ③ Orientation Assignment, ④ Keypoint Descriptor-step process of matching will perform[4]. Based on this, taken at any locations for photos, browse to locations of the photos and then, in addition to the CCTV 3D reconstruction map. So we want build to high quality digital mapping.



Fig. 6 Added to user participation camera images(point cloud)

This study through experiment possibility of building 3D digital map was confirmed. As such, based on these result, user participation in various place, in the form of recording data to update in real time map can be thought. If possible, using data from good quality of high-resolution 3D digital map will be able to provide service.



Fig. 7 User participation photos on location

V. CONCLUSION

This study CCTV and image data obtained through BigData and Cloud Computing by spatial information real time digital map, that process quickly and efficiently is possible, the service proposed. Upload your image data and after uploaded image that 3D data reoffer the advantage of being able to provide services, if will be user participation. User participation real time digital map due to the continuous image update will be service. In the future, matching the existed work that by image matching data with latest image data to build 3D map data, take advantage of the BigData and Cloud Computing that the experimental result propose. So recently, that process is called 'Crowd Mapping'.

This study result through experiment, DLT technique utilized any location for taken photo. Most of any location photo came out position correctly. Thus, user participation will be able to provide the new 3D map service. This method use to simple and more convenient than LIDAR existing equipment, that way to build the 3D data can be used.

Based on the experiment result of this study, if you upload your image to take advantage of the video, that receive the 3D data again. If can be provide service for user participation. And real time digital map due to the continues video update will be look service. In the Future, using CCTV data and user participation to build a high quality 3D digital map can be serviced. This service may be provide via 'V-world' linkage.

And processing the data through real time updated to the map, to consumer of high quality real time digital map service can be provide.

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