ABSTRACT - Recently, panoramic contents are being developed that provide a wider viewing angle in a 2D content format, which is taken by multiple cameras on the basis of the horizontal line. It is required to develop a technology of providing a scene where a plurality of media are fused and developed into a ultra-precise fusion media generation and consumption technology based on various sensor information. The zig-saw like Ultra-Wide Viewing (UWV) contents is composed by reconstructing media obtained from a plurality of cameras into one content. The UWV content that provides a wider viewing angle horizontally / vertically is newly required. Thus, we suggest a method for generating Spatial Adjacency Matrix based on similarity between 2D contents in order to create a UWV content. Also, this paper uses HSV color space and discrete cosine transform (DCT) for obtaining a similarity between 2D Contents.

Keywords: Ultra-wide Viewing, panorama, Spatial Adjacency Matrix, HSV color space, Discrete cosine transform

1. INTRODUCTION

Since the advent of 3D and UHD content in recent years, the demand for high-quality panoramic images has been increased[1]. In addition to providing realism of 3D contents and realistic feeling of UHD contents, UWV service reconstructs images acquired through multiple cameras into one content and provides a wide viewing angle in horizontal and vertical directions compared with existing panoramic contents. Thus, a UWV service maximizes the user's sense of presence. There is also a clear need for solutions to settle the immersive media [2]. However, there are problems for live service such as the quality degradation due to parallax generation of UWV contents, non real-time image processing due to large capacity, and securing of transmission channel to be overcome [2]. In Section 2 of this paper, we describe a method of generating a space adjacency matrix to improve the speed of image stitching and show experimental results. The conclusion in Section 3 describes the problems to be solved for a live UWV service.

2. SPATIAL ADJACENCY MATRIX GENERATOR

The Spatial Adjacency Matrix Generator generates a spatial map of describing positional relationship among captured multiple contents and then determining the similarity between images. In each image, the region of interest is designated and divided, and the ROI are compared with each other. In this paper, we use HSV color space and DCT to determine similarity between images. After determining the positional relationship among each contents, the actual positional information is described in terms of the coordinate system in a pixel basis. The Spatial Adjacency Matrix proposed in this paper allows determining the positional relationship between images and reduces the amount of computation during stitching.

2.1. SYSTEM STRUCTURE

Figure 1 shows the system structure of the Spatial Adjacency Matrix Generator. The Spatial Adjacency Matrix receives multiple content as input. The first frame of the input content is histogrammed with
respect to the HSV color space. The histograms of the images are matched to determine the similarity among images. We use DCT to determine the similarity between the images that match through the HSV color space. This improves the accuracy of similarity between images. The coordinates of the image are generated by using the matched result.

![Figure 1. Spatial Adjacency Matrix Generator](image)

### 2.2. EXPERIMENTS

Spatial Adjacency Matrix Generator was experimented using three test images in Figure 2. The results of the experiment are shown in Figure 3.

![Figure 2. Test set](image)

![Figure 3. Result of experiment](image)

### 3. CONCLUSION

In this paper, we propose a spatial adjacency matrix generation method for generating UWV contents. Through the continuous research, we will complement the method of storage and transmitting metadata and media data generated by the spatial adjacency matrix generator.

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### REFERENCES