The Enhanced Image Stitching Using Proposed Preprocessing

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ABSTRACT – Recently, as the market for VR and AR is getting bigger, there is a growing interest in research for creating 360 images and panoramic images. The 360 images are created based on panoramic images, and panoramic images are made by stitching two 2D images. In this paper, we implemented image stitching algorithm using openCV library. By applying the proposed algorithm to the basic image stitching algorithm, it reduces the sense of heterogeneity in the stitching result image.

Keywords: Panorama, Image Stitcing, Feature-based Stitching, SIFT Algorithm, Histogram.

1. INTRODUCTION

Panorama is a Greek word for all scenes. It is a representation of a wide-angle image, unlike a regular 2D image. To represent a wide-angle image, panorama are created using an image stitching technique. To represent a wide-angle image, panorama image is created using an image stitching technique which combining portions of each ordinary 2D images which are overlapping regions\(^1\)[\(^2\)]. The Image stitching technology is divided into Direction-based stitching and Feature-based stitching. Feature-based stitching technology use a feature descriptor that is performed for feature points matching, feature points are extracting feature points from input images. We implemented image stitching algorithm based on feature-based stitching technique. The figure 1 is a diagram of the implemented algorithm\(^3\)[\(^4\)].

![Diagram of implemented algorithm](image)

**Figure 1.** The diagram of the implemented algorithm.

As a result of the implementing the basic image stitching algorithm, the feature points are matched properly. However, since the intensity values of the two images are different from each other, we feel a sense of heterogeneity in the result image. So, we have reduced the sense of heterogeneity through proper preprocessing. In the following section, we describe the proposed preprocessing.

2. PROPOSED PREPROCESSING

we suggest a preprocessing to reduce a sense of heterogeneity in the stitching result image. The key to our proposed preprocessing is to approximate the intensity values of the two input images. The reason for specifying the intensity value adjustment as a key point is that, feeling a sense of heterogeneity in the


result image is due to the difference in intensity values of the two images. So, we took the intensity value adjustment as the key point in proposed preprocessing.

2.1. Proposed Preprocessing Concept

We used a histogram to approximate the intensity value. We obtain the histogram of two images in the RGB channels, respectively. And we approximate the obtained histogram by matching the starting point of the histogram pattern. At this time, the threshold value is used to obtain the pixel value at which the pattern starts.

2.1.1. Experiment And Result

Figure 2 shows result image using the basic algorithm, and Figure 3 shows the result image of processing the proposed preprocessing algorithm. The images used in the experiment are color images and consists of 196608 pixels per channel. And the threshold value is set to 1400 pixels. The starting point of the histogram pattern in each input images, image1 R,G,B=(35,35,35), image2 R,G,B=(72,72,72). As shown in Figure 2, when the images are processed by the basic image stitching algorithm, we found a heterogeneity in the result image. However, in Figure 3 shows that the sense of heterogeneity is reduced in the result image.

**Figure 2.** The result image using the basic algorithm

**Figure 3.** The result image using the proposed algorithm

The proposed algorithm produces a better result image than the basic algorithm. However, there is still a sense of heterogeneity in the result image. We will research to optimize thresholds.

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