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IMAGE MOSAICING TECHNIQUES: A COMPREHENSIVE REVIEW

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Abstract

Image Mosaicking is a method of constructing into a larger image several images of the same scene. The union of two input images would be the product of the image mosaic. To obtain mosaic images, image-mosaicking algorithms are used. Processed image mosaicking is effectively split into 5 stages. Including; extraction of feature point, registration of images, computation of holography, warping and blending if image. For Feature Extraction, various corner detection algorithms are used. An effective and informative output mosaic image is created by this corner. In producing 3D images, medical imaging, computer vision, satellite data, and military automatic target recognition, image mosaicking is commonly used.

Keywords: *Algorithms, Image Processing, Image Mosaicking, Mosaicking Model, Security.*

I. INTRODUCTION

In the fields of image processing, computer graphics, computer vision and multimedia, image mosaicking techniques are becoming increasingly common [1]. In everyday life, it is commonly used by stitching pictures into panoramas or a huge image that can vividly show all the scenes. It can, for example, be used on the internet for virtual travel, creating virtual worlds in games, and processing personal images [2]. First, in Image Mosaicking, rectangular sections are broken into (usually equal size) sections, each of which is replaced by another photograph that matches the target photo [3].

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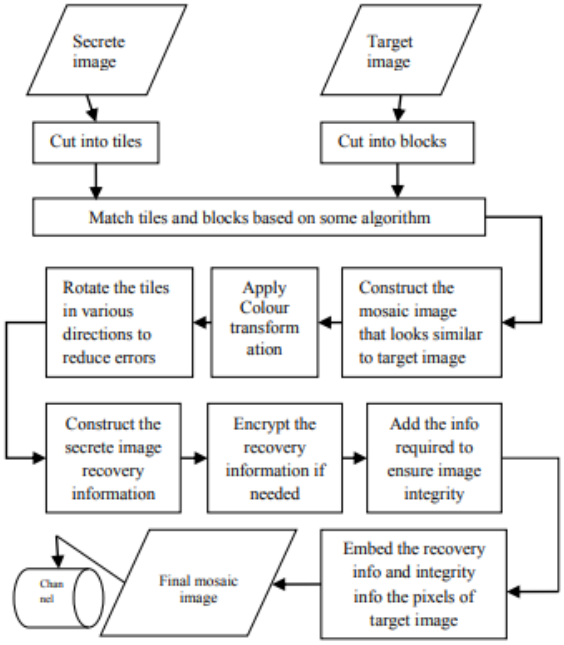

Fig. 1 Flow chart of Crystallization Mosaic [4].

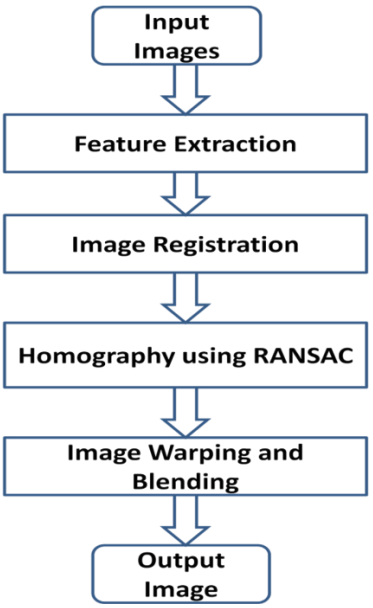

Fig. 2 Illustrates the image mosaicking model[3].

$$E(x) = \frac{1}{N}\sum_{i=1}^{N} x_i$$

$$D(x) = \frac{1}{N}\sum_{i=1}^{N} (x_i - E(x))^2$$

$$cov\,(x, y) = \frac{1}{N}\sum_{i=1}^{N} (x_i - E(x))\;(y_i - E(y))$$

$$r_{xy} = \frac{cov\,(x,y)}{\sqrt{D(x)}\sqrt{D(y)}}$$

$$\sqrt{D(x)} \neq 0, \sqrt{D(y)} \neq 0$$

$$NPCR = \frac{1}{M \times N} \sum_{i=1}^{M} \sum_{j=1}^{N} D(i,j) \times 100\ \%$$

$$UACI = \left[\sum_{i=1}^{M} \sum_{j=1}^{N} \frac{|C1(i,j) - C2(i,j)|}{255} \right] \times \frac{100\%}{M \times N}$$

$$r_{x,y} = \frac{C(x,y)}{\sqrt{D(x)}.\sqrt{D(y)}}$$

Where $C(x,y), D(x)$ and $D(y)$ may be evaluated by utilizing the following equations[5].

$$C(x,y) = \frac{\sum_{i=1}^{K}(x_i - E(x))(y_i - E(y))}{K}$$

$$D(x) = \frac{1}{K}\sum_{i=1}^{K}(x_i - E(x))^2$$

$$D(y) = \frac{1}{K}\sum_{i=1}^{K}(y_i - E(y))^2$$

II. LITERATURE REVIEW

Pooja et al. conducted a survey on mosaicking techniques in image processing. Mosaic images in image processing are images produced by cementing small tiles together. The tiles' tessellate 'a source image in order to replicate a new mosaic-like style with the original visual details rendered. Mosaic image formation from a series of partial views is a powerful means of obtaining a larger view of a scene in a single view than is usable, and has been used in a wide range of applications. In this paper, a general structure is proposed for retinal and document images. This paper also addresses a study of various image mosaicking applications, primarily in the field of retinal image mosaicking and document image mosaicking [6].

III.DISCUSSION AND CONCLUSION

Various methods of mosaicking techniques are discussed. Achieving data security and ensuring data integrity by using Cryptography, Steganography and Image Mosaics are discussed. It is also noted that some of the mosaic creation techniques will take considerable time for execution and needs huge database of tile images [7]. An arbitrary target image can also be selected in some methods. For smooth visual effect of image and to reduce various errors colour

transformation schemes need to be applied. This leads to added computational work. Building a mosaic image directly from the noise image (encrypted secrete image), creation of second level mosaic image, clubbing the basic methods of mosaic techniques for better results, employing more efficient algorithms for data security and integrity can be considered for future scope of improvements.

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