"IMPLEMENTATION OF HAIM BASED ON CURRENT VIEWPOINT OF USER"

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ABSTRACT: *Image Mosaicing is a method of constructing multiple images of the same scene into a larger image. The output of the image mosaic will be the union of two input images. Image-mosaicing algorithms are used to get mosaic image. Image Mosaicing processed is basically divided in to 5 phases. Which includes; Feature point extraction, Image registration, Homography computation, Warping and Blending if Image. Various corner detection algorithms are being used for Feature extraction. This corner produces an efficient and informative output mosaic image. Image mosaicing is widely used in creating 3D images, medical imaging, computer vision, data from satellites, and military automatic target recognition. In this paper we are implementing the image mosaic it is based on the RANSAC and Harris corner algorithm. These algorithm woks in five stages. First select points for mosaicing. In second and third stage previous work points are selected automatically, in forth stage resolution of mosaic image is increase due to RANSAC and liner Pass Filter and finally get resultant image.*

***Keywords*:** Image Mosaicing, Feature point extraction, Image registration, Homography computation, Feature extraction.

1. INTRODUCTION

Image Mosaicing technology is becoming more and more popular in the fields of image processing, computer graphics, computer vision and multimedia. It is widely used in daily life by stitching pictures into panoramas or a large picture which can display the whole scenes vividly. For example, it can be used in virtual travel on the internet, building virtual environments in games and processing personal pictures. In Image Mosaicing is firstly divided into (usually equal sized) rectangular sections, each of which is replaced with another photograph that matches the target photo. When viewed at low magnifications, the individual pixels appear as the primary image, while close examination reveals that the image is in fact made up of many hundreds or thousands of smaller images. In image mosaicing two input images are taken and this images are fused to form a single large image. This merged single image is the output mosaiced image. The first step in Image Mosaicing is feature extraction. In feature extraction, features are detected in both input images. Image registration refers to the geometric alignment of a set of images. The different sets of data may consist of two or more digital images taken of a single scene from different sensors at different time or from different viewpoints. In image registration the geometric correspondence between the images is established so that they may be transformed, compared and analyzed in a common reference frame. This is of practical importance in many fields, including remote sensing, computer vision, medical imaging. Registration methods can be loosely divided into the following classes: algorithms that use image pixel values directly, e.g., correlation methods [6]; algorithms that use the frequency domain, e.g., Fast Fourier transform based (FFT-based) methods [7];algorithms that use low level features such as edges and corners, e.g., Feature based methods [4];and algorithms that use high-level features such as identified parts of image objects, relations between image features, for e.g. Graph-theoretic methods[8].The next step, following registration, is image warping which includes correcting distorted images and it can also be used for creative purposes. The images are placed appropriately on the bigger canvas using registration transformations to get the output mosaiced image. The quality of the mosaiced image and the time efficiency of the algorithm used are given most importance in image mosaicing. Image Blending is the technique which modifies the image gray levels in the vicinity of a boundary to obtain a smooth transition between images by removing these seams and creating a blended image. Blend modes are used to blend two layers into each other.

2. LITURATURE REVIEW

Shree K. Nayar et. al. presents two efficient approaches for capturing high resolution spherical mosaics. In the first approach, a wide-angle imaging system is used to capture a sequence of 360 degree strips on the sphere by a single rotation of the capture device. For this, we suggest the use of a catadioptric imaging system since such a system typically produces higher resolution in the periphery of the hemispherical field of view than a fish-eye lens. The unknown rotations between the strips are estimated and used

to blend the multiple strips into a single spherical mosaic. Our second approach seeks to further enhance the resolution of the computed mosaic. This is done by designing new catadioptric sensors that capture a single 360 degree slice of the scene3. Mirror shapes are derived that enable the projection of a thin slice onto a large image area. This results in the capture of high resolution slices despite the use of a low resolution (640x480 pixel) image detector. Such a slice camera is rotated on a turntable and the captured slices are concatenated to obtain a high resolution spherical mosaic. Though a large number of images (slices) are needed to obtain a high resolution mosaic, the processing of each image is minimal and is easily done in real time [1].

Lucas- Kanade presents two image alignment algorithm. The goal of Lucas- Kanade is to align a template image to an input image, where is a column vector containing the pixel coordinates. If the Lucas-Kanade algorithm is being used to compute optical flow or to track an image patch from time to time, the template is an extracted sub-region (a window, maybe) of the image. Algorithms for aligning images and stitching them into seamless photo-mosaics are among the oldest and most widely used in computer vision. Frame-rate image alignment is used in every camcorder that has an "Image Stabilization" feature. Image stitching algorithms create the high- resolution photo-mosaics used to produce today's digital maps and satellite photos. They also come bundled with most digital cameras currently being sold, and can be used to create beautiful ultra wide-angle panoramas[11].

D.Le Gall investigated Variants image aligment algorithm are useful in nearly all video compression like MPEG and other[2].

J.R. Bergen, P. Anandan proposed parametric motion estimation algorithms suitable for variety of applications such as video summarization, video stabilization and video. Sophisticated image registration algorithms are also developed for medical images and sensor data analysis.[3]

Ebtsam Adel, et al. have offered a comprehensive study on features-based image stitching such as SIFT algorithm which is rotation, scale invariant as well as more effective in presence of noise. It has highly distinctive features. However, it needs high computational time; the SURF algorithm proves superior in terms of execution time and illumination invariance property; The ORB algorithm is rotation and scale invariant with improved execution time but its performance is poor in presence of noise. In future we want to compare between the algorithms we have studied and other feature based image stitching algorithms, Also Stitching videos together to create dynamic panoramas, and stitching videos and images in the presence of large amounts of parallax [4].

Vinod. G. R et al. proposes FPGA implementation technique to generate a panoramic view by combining images. Image mosaicing is useful for a variety of tasks in vision and computer graphics. It presents a complete system for stitching a sequence of images with some amount of overlapping between every two successive images. There are three contributions in this paper. First is an image registration method which handles rotation and translation between the two images using FFT phase correlation. Second is an efficient method of stitching of registered images using the registration parameters obtained in previous step using pixel mapping method. Third is image blending where the seam present in the stitched image is removed by weighted average blending method [4].

Steven Maxwell Seitz investigated the problem of rendering changes in viewpoint and scene appearance by operating on a set of basis images of a real scene. A primary focus was the view synthesis problem, i.e. producing images of a real scene from new viewpoints. An additional topic was editing transformations in which persistent changes to scene appearance could be effected by editing individual basis images [3].

3. PROPOSED WORK

1. RANSAC Algorithm:

Calculating Homography is the third step of Image mosaicing. In homography undesired corners which do not belong to the overlapping area are removed. RANSAC algorithm is used to perform homography. RANSAC is an abbreviation for "RANdom Sample Consensus." It is an iterative method to estimate parameters of a mathematical model from a set of observed data which contains outliers. It is a non-deterministic algorithm in the sense that it produces a reasonable result only with a certain probability, with this probability increasing as more iterations are allowed. The algorithm was first published by Fischler and Bolles. RANSAC algorithm is used for fitting of models in presence of many available data outliners in a robust manner. Given a fitting problem with parameters considering the following assumptions.

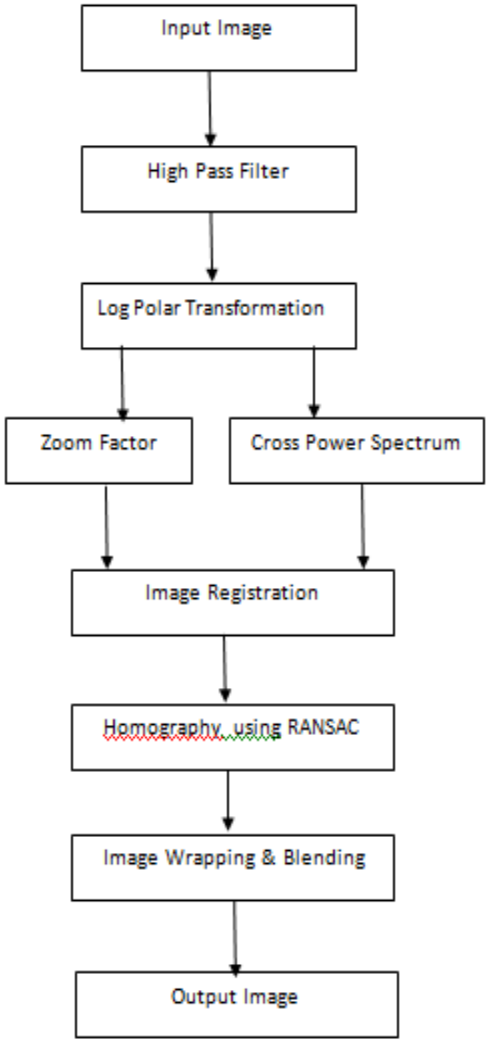
1. Parameters can be estimated from N data items.
2. Available data items are totally M.
3. The probability of a randomly selected data item being part of a good model is Pg
4.The probability that the algorithm will exit without finding a good fit if one exists is Pfail.

2. Harris Corner Algorithms

The Harris corner detector uses both x and y gradients in order to determine whether a pixel is a corner or

not. To be a corner, then there has to be significant change in both directions. However, the Harris corner algorithm calculates the likelihood that a pixel is a corner from summing all the surrounding gradients around a pixel and performing some calculations to determine its likelihood of being a corner.In order to extract the corners, the Harris corner detector needs a 5 x 5 window in order to compute a score for the pixel at location (2,2). The window size requirement comes from the fact that we need to calculate the surrounding gradients, and to calculate those gradients we need the pixels around those.

Proposed Flow Chart



PROPOSED Algorithm based on HAIM

Step 1. Select N Data items at random

Step2 . Estimate parameter X by step 3 to 5

Step3. Convole image with horizontal and vertical differential operator to obtain Gx and Gy. By

$$G = \begin{bmatrix} \sum_{x,y \in w} Ix^2 & \sum_{x,y \in w} Ix^2 \\ \sum_{x,y \in w} IxIy & \sum_{x,y \in w} IxIy \end{bmatrix}$$

Where G is an gradient of image

Step4. Generate the three summation necessary from Ix and Iy from Harris Window.

Step5. Compute determinant

$C=\text{Determinate}(G) - k.\text{trace}^2(G)$

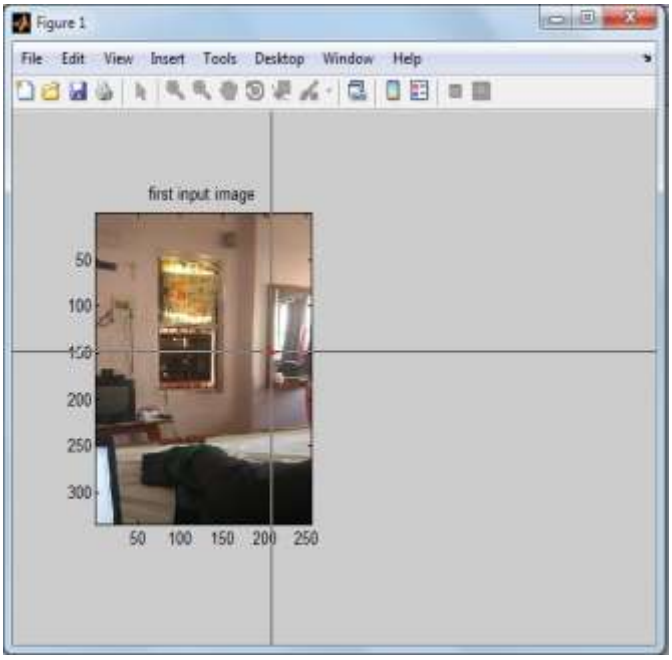
Where C is an corner pixel value and compare with threshold to determine if it is corner or not.

Step6. Find how many data item of (M) fit the model with parameter vector X within user given tolerance. That is K

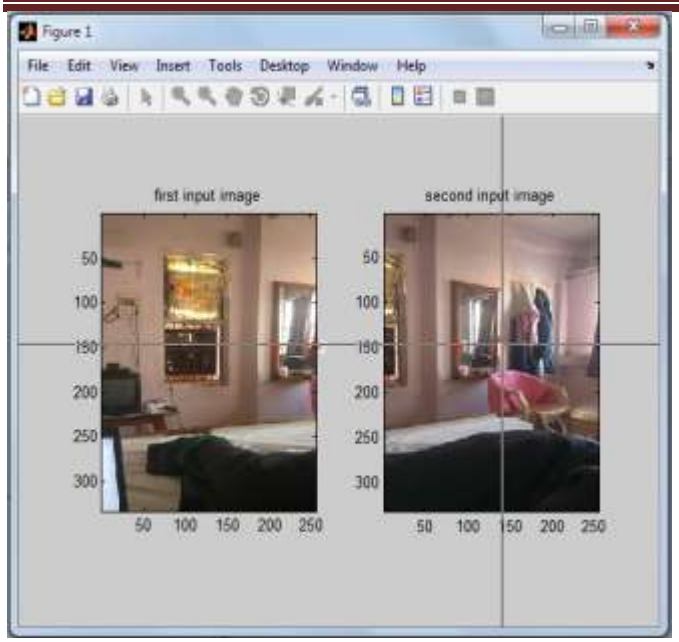
Step7. If K is big enough accept fit and exit with success.

Step8. Repeat Step1 to Step7 L times

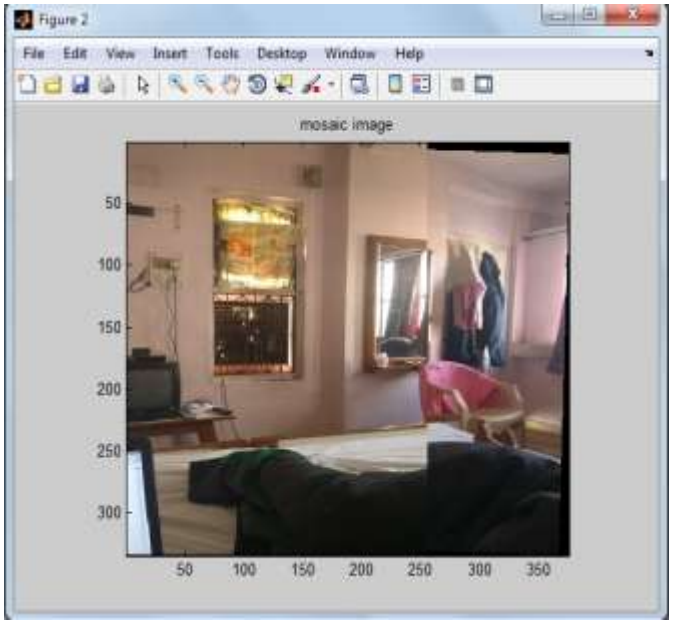
4. EXPERIMENTAL RESULT



First image for the mosaic. User need to select 2 points from where the pixels should match.



Second image loaded to select the two points from it



Final resultant image after mosaic

5. CONCLUSION

An approach for image mosaic based on RANSAC and Harris algorithm is obtained through this project. Image Mosaicing processed is basically divided in to 5 phases. Which includes; Feature point extraction, Image registration, Homography computation, Warping and Blending if Image. Various corner detection algorithms are being used for Feature extraction. Using these algorithms we have enhanced robustness. As a result, the setting of preprocessing avoid the useless extraction and registration which leads to additional speed-ups and improvement of the precision.

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