Design of an Algorithm for Video Mosaicing using Cross-Correlation
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Abstract—In this paper, we describe direct method for creating mosaics from videos. There are two main types of techniques used for creating Mosaic, direct methods and feature-based methods. Mosaicing is considered as an active research area in computer vision and computer graphics. In the implementation of the mosaicing algorithm, In Direct method used the Cross-Correlation method for Video mosaicing. Cross-Correlation method generally used for similarity measurement. The results of an experiment conducted that the cross correlation method easily compute and using this method algorithm works only for planer videos.

Key words: Cross-Correlation, Video Mosaicing

I. INTRODUCTION
Video frames can also be input such that the frames having sufficient overlapping regions in between need to be selected to achieve better performance. This process is called video mosaicing. It has been a large literature on image mosaicing. Video frames can be mosaiced to form a larger aggregate. In cases, merging computations generally depend on the common parts in consecutive images, which are called overlapping regions. Mosaic Construction is an active area of research in computer vision and it has various applications such as satellite photographs, video surveillance and 3D world scene medical imaging [1]. Direct methods are found to be useful for mosaicing large overlapping regions, can handle only small translations and small rotations. Direct method, the source image is matched with the target image with reference to individual intensity pixel values [2].

II. ALGORITHM
This Section represents the method which is an implementation of Video Mosaicing using Direct method in Cross-Correlation.

Cross correlation is correlation based method and is a direct method of image mosaicing. In this method, the source image is matched with the target image with reference to individual intensity pixel values. The correspondence match is made individually between intensity pixel values of the source and the target image. An alternative to taking intensity differences is to perform correlation, to maximize the product (or cross-correlation) of the two aligned images. Correlation is widely used as an effective similarity measure in matching tasks [16].

Considering the medical field, correlation of images is still a major method to detect the existence of a part of an image within another. Thus a faster method to perform cross correlation would always be useful and would save a lot of time. An application aimed at being advantageous with the above mentioned technique would be the correlation of two images to see the hidden pattern in one image with respect to the other. This method establishes correspondence between images by calculating cross correlation. There are two images called sensed image and reference image used cross correlation to calculate the maximum similarity between them. Video frames is similar as image

\[ c(x, y) = \sum_{i=0}^{\infty} \sum_{j=0}^{\infty} f(i,j)s(i + x, j + y) \]  (1.1)

Where \( f(i,j) \) and \( s(i,j) \) are pixel values of Video1’s frame and Video2’s frame.

At translation of \((x,y)\), template should match the image. At that point, cross correlation represented as \( c(x,y) \).
Or, equivalently, as

\[ c(x, y) = \sum_{i=0}^{100} \sum_{j=11}^{15} s(i,j) f(i-x, j-y) \]

\[ c(x, y) = \sum_{i=0}^{\infty} \sum_{j=0}^{\infty} s(i,j) f(i-x, j-y) \]  \hspace{1cm} (1.2)

Where \( f(i,j) \) and \( s(i,j) \) are pixel values of Video1’s frame and Video2’s frame.

Suppose we take two overlapping videos. First video frames is indicate F and second video frames indicate S. 100 x 80 Pixels two Videos frame F and S. Frame S in take first five columns is fixed. And frame F in take first five column, then other five columns take different different five Columns. Cross correlation between frame S of first five columns with frame S of different five columns.

**Fig. 2:** Cross Correlation based Frame Mosaicing

**Fig. 3:** Flow chart of Video Mosaicing Algorithm

First we take two Videos with sufficient overlapping region. Two Videos frame are read in Matlab. Calculate the Cross-Correlation between Video 1’s first frame and Video 2’s first frame. Take five Column of Video 2’s frame and different different five column of Video1’s frame. When get the Cross-Correlation is maximum near to one. Then get the maximum matching between two frames. And then stitch two video’s frame. Take another frame of both videos. This process is repeated when get sufficient overlapping frame between two videos. We get the multiple mosaic frames this multiple mosaic convert to video. We get the single larger area covered video.

**A. Cross Correlation Using Video Mosaicing**

**III. IMPLEMENTATION RESULTS**

Main Purpose of this algorithm Camera is not capture high range of view Video, so it needs to generate mosaic video.

In this chapter, the simulation result obtained in the proposed technique is discussed in details. First I capture Overlapping same scene Videos by my mobile Nokia 500(5 Megapixel camera). Cross Correlation Method using Video Mosaicing implemented in matlab 2015.In this method direct matching without detection so we easily compute using matching area in both videos frames.

**A. Set 1 Videos Frames Mosaic Result**

**Fig. 4:**
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Fig. 5: 11th number of Original frame from video 1 (352 x 640 pixels)

Fig. 6: Cross-Correlation using Mosaic frame of video 1 and video 2

11th number of mosaic frame of video 1 and video 2 using Cross-Correlation (352 x 708 pixels).

B. Set 2 Videos Frames Mosaic Result

Fig. 7: 8th number of Original frame from video 3 (352 x 640 pixels)

Fig. 8:

Fig. 9: Cross-Correlation using Mosaic frame of video 3 and video 4

8th number of mosaic frame of video 3 and video 4 using Cross-Correlation (352 x 698 pixels).

C. Set 3 Videos Frames Mosaic Result

Fig. 10: 1st number of Original frame from video 5 (352 x 640 pixels)

Fig. 11: 1st number of Original frame from video 6 (352 x 640 pixels)

Fig. 12: Cross-Correlation using Mosaic frame of video 5 and video 6
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1th number of mosaic frame of video 6 and video 4 using Cross-Correlation (352 x 686 pixels).

IV. CONCLUSION

The Video Mosaicing program implemented by cross-correlation method. This method is direct method in this method directly matching without detection in image registration step. Then the final step is blending. So conclude that the direct method is easily computed. Cross-correlation method work only for the planer videos by the literature survey conclude that less time in maximum frames consider and less frames large area covered.

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