Expelling Undesired Targets from an Image Exploiting Surface Synthesis and Dispersion Based Technique

Pratik Bhosale, P.Kumaresan

M.Tech Student, Dept. of SITE, VIT University, Vellore, Tamil Nadu, India

Associate Professor, Dept. of SITE, VIT University, Vellore, Tamil Nadu, India

ABSTRACT: Images or Photographs or Pictures plays very important role to keep the memory of the incident or event to which that image belongs. Many times the images gets corrupted or some unwanted objects are added. The technique which removes the undesired portion from an image is called Object removing and Region filling technique. In this technique there are two types (i) Surface synthesis technique which is used to detect the characteristics of the image surface and to generate large image region.(ii) Dispersion based method to fill the little locales or crevices. The main aim of this technique is to produce the image without disturbing its original quality and restore it.

KEYWORDS: Region filling, Surface synthesis, Dispersion based method, Image restoration.

I. INTRODUCTION

Image handling and processing is one of the critical types in which the info is a picture, for example, a photo. The yield of picture preparing might be either a picture or an arrangement of parameters or attributes identified with the picture. Due to the wide utilization of digital cameras and recovering the old picture technique in-painting has turned out to be a standout amongst the most effective process, which is to be worked on advanced pictures. Sometimes while capturing the picture some unwanted objects gets added in it also if some drops of harmful liquids if falls on hard copied picture then it remains permanent on it also if some information of the picture gets covered by unwanted object then it cant be removed by any mathematical method at that time Object removing and Region filling technique is so useful.

The image which is to be processed is gone through Surface synthesis analysis in which the characteristics of the picture like pixel values,image resolution calculation, identification of region of interest is done and Dispersion based technique which is used to fill the region from where the object is removed for this it will calculate the nearest pixel value and according to that region is filled. If the region to be filled is large then it creates some blur in image. To avoid this Exempler based technique is used in which it uses K-nearest neighbor algorithm. It copies the best pixel patch value. The hierarchical approach is used. After all techniques used then Image restoration comes into picture. The objective of this technique is to reproduce and store the image with same pixel values and quality as the original image. Only the unwanted area will remove and we can see all the necessary details of the image without any noise.

II. RELATED WORK

In [1] paper author explained Bezier bend is use to construct or to join the missing shape lines to reconstruct fundamental structure in harmed zone. This system performs well but requires additional time to perform. In paper [2] DCT(Discrete Cosine Transform)Based and FMM(Fast Matching Method) for Inpainting method is used by author. The advantage of this system is unnecessary objects are removed successfully but the disadvantage of this technique is complexity is more,time required for processing is also more. Also if in the case of missing areas are vast then the calculations does not deliver great comes about. In [3] paper the author proposed a Wavelate Transform based technique. It produces good image resolution and also maintains texture quality but disadvantage of this system is for masking the large regions it takes more time and also complexity is more. In [4] author has explained the Exempler

technique. The patch filling for the large region is worked effectively. But the producing an image with a good quality is not possible with this technique. The author has explained system in [5]with Surface synthesis technique but the disadvantage is that for the curved borders of the object it is not giving the good result.

III. PROPOSED ALGORITHM

A. *System Block Diagram:*

There are basically eight main blocks and they are following with their descriptions.

1.Region of Interest of an Input Image: The undesired area or object from an image is basically a region of interest.

2.Mapping Operation: The Mapping operation is done by using border detection principle. The points are created at the border of the object and they are connected sequentially. But the first point should connect to the last point then only mapping operation will be done.
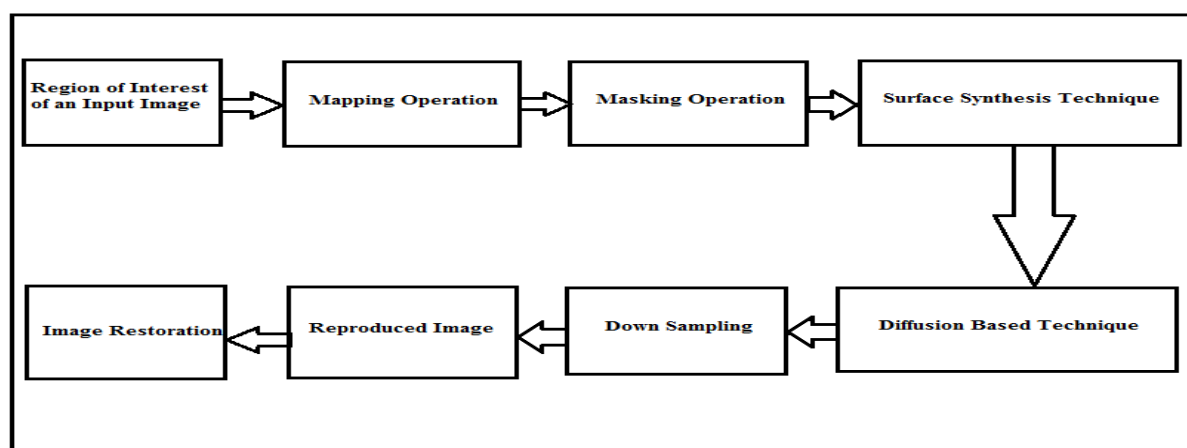

Fig.1. Block Diagram

3.Masking operation: The mapped portion is Masked using 5*5 image masking method.Only the masked portion will be removed from the image.

4.Surface Synthesis Technique: In order to identify the image characteristics this method is used.The mapped pixel values of the region will be saved and only the masked region pixels will be removed from the image.

5.Dispersion Based Technique**:**The region pixel values which are removed will be filled in this technique.In this technique K-nearest neighbour algorithm is used which will uses the nearest pixel values to fill the removed patch or region.

6.Down Sampling: It is done by integrating the input image by x factor to set the ouput image pixels to the average of the corrosponding input pixel.

7.Reproduced Image: After performing all the operations new image is produced and it will be displayed on the GUI.

8**.**Image Restoration**:** The image which is produced will be stored at desired location. The location is selected by the user where he wants to save or restore the output image.

B. *Algorithmic Steps*

The algorithm will works as below.

Input:

Original Image- It is an image which needs to be inpainted.

Mask Image- This image specifying the object to be removed or the regions to be inpainted. The user marks the object to be removed with black color and other region with black color. Using this image mark the object with red color in original image. This object which is marked in red is removed in visual plausible way.

Output:

Inpainted image- Output image include with the removal of object specify in mark image using in-painting algorithm in visual plausible way.

Steps of algorithm are given below:

Step 1 : Initialize mark variable for all pixel. If pixel belongs to inpainting region set mark variable with 0 else set 1

Step 2 : Find boundary of region to be inpaint, if boundary is empty set than exit.

Step 3 : Find priority for all patches on the boundary.

Step 4 : Select the patch which has highest priority, call that patch, P.

Step 5 :Find the patch from search window which is best match to patch P, call that patch,Q.

Step 6 : Copy pixels of patch Q to the patch P, update only those pixels of patch P which has mark value 0 and set mark variable to1, go to step2.

Super-resolution

Super resolution (SR) is a method of creating high resolution image from one or more low resolution

image and generate the desired output.

The algorithm for Super-resolution works as follows.

Step 1 : Dictionary building

Step 2 : Filling order of HR picture

Step 3 : Similarity Computation

Step 4 : Weight Computation

Step 5 : Stitching

1) Dictionary building: Dictionary building is corresponds between low and high resolution image patches. The size of dictionary is specified by the user which may affect the overall speed or quality.

2) Filling order of HR picture: Filling the holes in image is depend on the priority if patches in image. This method improves the quality of inpainted image s compared to raster-scan filling order.

3) Similarity Computation: For the similar patches computation KNN algorithm is used.

4) Weight Computation: The similarity distance is used to compute the weight.

5) Stitching: For the use of stitching algorithm, it is mandatory to have all pixel values in the overlap-ping region are known or already synthesized.
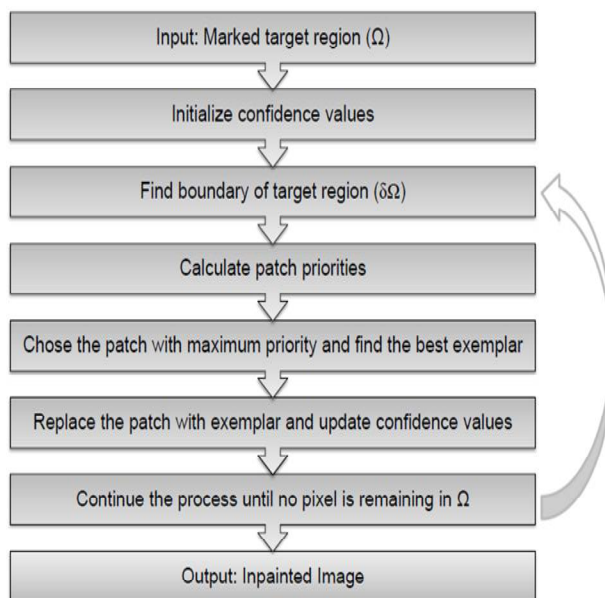
Fig.2.Algorithmic Steps

IV. SIMULATION RESULTS

After setting up all the configuration if we implement the our proposed system then the output will be like these which are shown in figures. The figures shows the step by step implementation and expected output of our proposed system. We can use different pictures or images for implementation and verification purpose.

Fig.3. Mapping of Region of Interest

In the above figure[3] ROI is mapped by red and black boxes. The object which we want to remove is our Region of interest. The netbeans software is used to design our system and the GUI is made with mapping functionality.

Fig.4. Masking of mapped Region of Interest

In the above figure [4] when the starting point is connected to the end point then only the masking operation is done over the area which is outlined by the point boxes. The masked area will be shown by the green color.

Fig. 5. Final inpainted image as a output

In the above figure [5] After masking operation if we click on Start button which is on GUI then it will start inpainting operation. After successful inpainting it will show the success message then it will display the output image with unwanted object removed. We can save our ouput image to our local directory.

V. CONCLUSION AND FUTURE WORK

In this paper we previewed multiple methods, algorithms and ideas for image inpainting. There is a lot of scope for inpainting technique in future to reproduce the output image as a HD image. Also the time required for inpainting and calculating the pixel values can be reduced by using more algorithms. The other applications of this technique is it can be effectively used in traffic surveillance cameras for detecting the number plate and for security and photographic purpose this technique can be used.

VI. ACKNOWLEDGMENTS

REFERENCES

1. Jason C. Hung, Chun-Hong Hwang, Yi-Chun Liao, Nick C. Tangand Ta-Jen Chen,"Exemplar-based Image In-painting", Journal of Software Vol. 2, NO. 8, pp. 101-125, 2008.
2. ShivaniGaikar, NehaKhairnar, Nikita Rane and M. J.Surti, "Image Inpainting using Exemplar based, DCT and FMM Algorithm",International Conference of Advance Research and Innovation, ISBN 978-93-5156-328-0, pp. 45-58, 2014.
3. Katsaggelos,Y., Gong , Softcuts: soft edge smoothness prior for color image super-resolution. IEEE Trans. On Image Processing 969–981,pp. 20-28,2009
4. N.Shahane and S.Badgujar,"Examplar-based Inpainting and Approaches to Improve the Performance",International Journal of ComputerApplications (0975 – 8887),pp. 95-99, 2013.
5. Manali Desai, "Modified Fast and Enhanced Exemplar based In painting Algorithm for Solving Unknown Row Filling Problem",International Journal of Computer Applications 0975 – 8887, volume 56– No.9, pp. 58-96, October 2012.
6. M. Bertalmio, L. Vese, G. Sapiro And S. Ocher, "Simultaneous Structure and Texture Image In-painting" IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL.12,NO. 8, pp. 10-13, AUGUST 2003
7. FaouziBenzarti, Hamid Amiri, TSIRF (ENIT)-TUNISIA (2012). "Repairing and In-painting Damaged Images using Diffusion Tensor" IJCSI International Journal of Computer Science Issues, ISSN 1694-0814 ,Vol 9, Issue 4, No 3, pp. 67-76,J uly 2012 .
8. Olivier Le Meur and Christine Guillemot „Super-Resolution- based In-painting"IEEE TRANSACTIONS ON IMAGE PROCESSING VOL.PP NO 99 ,pp. 325-360, 2013.
9. MouniraEbdelli, and Christine Guillemot"HierarchicalSuper-Resolution-Based In-painting",IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. 22, NO. 10, pp. 42-50 ,OCTOBER 2013.
10. S.Priyalakshmi, C.K.Sangeetha, S.Vijayalakshmi, T.C.Monica „Super Resolution Image Reconstruction Using fast In-painting Algorithm", International Journal of Scientific & Engineering Research, Volume 5, Issue 8,pp. 96-120,August-2014.
11. Manoj K Y , M r . Venkatesh U C,D r . A n tony P J „A Superresolution Based Image In-painting in the Advertence of Exemplar Technique", International Journal of Engineering Research & Technology (IJERT) IJERTIJERT ISSN: 2278-0181 Vol. 3 Issue 4,pp. 67-78, April - 2014.
12. Glasner, D., Bagon, S., Irani, M.: Super-resolution from a single image. In: In 2009 IEEE 12th International Conference on omputer Vision (ICCV). Volume 10,pp. 130-152 ,2009 .

BIOGRAPHY

Pratik Bhosale is a Mtech (Computer and Communication) Student in the Information Technology Department, VIT University, Vellore. His research interests are Image Processing and Wireless telecommunication.