REMOVING UNWANTED OBJECTS FROM AN IMAGE USING IMAGE INPAINTING

Mrunal Mate[1], Bhanudas Thakare[2], Amruta Wade[3], Pratik Wagh[4]

[1] *B.E Scholar, Computer Department, SRES College Of Engineering, Maharashtra, India*
[2] *B.E Scholar, Computer Department, SRES College Of Engineering, Maharashtra, India*
[3] *B.E Scholar, Computer Department, SRES College Of Engineering, Maharashtra, India*
[4] *B.E Scholar, Computer Department, SRES College Of Engineering, Maharashtra, India*

ABSTRACT

Image inpainting refers to an approach used for filling in the missing or corrupted regions of an image. In simple words, Image inpainting or completion is a procedure to restore a damaged image. Inpainting approaches plays a vital role in numerous applications like object elimination, scratch removal, Image restoration etc.Recently various approaches have been proposed. In the past, this problem has been courteously approached by two classes of algorithms: (i) texture synthesis algorithms for creating large image regions from sample textures, and (ii) inpainting techniques for filling in small image gaps. In this paper a new algorithm is proposed for removing large objects from images. Recently various strategies have been proposed different exemplar based image inpainting algorithms to recover the structure of damaged images. We introduce an unusual and efficient exemplar based Image Inpainting Algorithm with investigating natural image patches. This paper will discuss inpainting techniques with respect to restoration of image. The goal of any digital image inpainting algorithm is to rebuild the missing or impaired regions in a visually plausible way.

Keyword: - *Object Removal, Image Inpainting, Simultaneous Texture and Structure Propagation, exemplar-based inpainting.*

1. Introduction

This paper reveals an unusual algorithm for removing unwanted, may be large or small objects from digital photographs and replacing them with visually feasible backgrounds. The filling-in of missing region in image is known as Image Inpainting.

Inpainting is the creative activity of modifying an image or video in a form that is not easily observable by an ordinary observer. Image Inpainting has become thoroughly made researchers more curious to do an research in Image processing. The modification of images in a way that is no detectable for an observer who does not know the original image is a practice as artistic creation. The motive was simple, to bring medieval pictures, and then to make this pictures look good by repairing it completely. We can scan these photographs or take snaps and then system will do the rest things. This practice is called 'retouching' or 'inpainting'. We can obtain scratch free(from damaged photographs), high resolution (from faded photographs), image coding and transmission (e.g. Recovery of missing blocks), text removal(names, dates and time etc.) and likewise. Also image inpainting has been widely researched in the applications of digital effect (i.e. object removal, image editing, image resizing).

The schemes that are proposed for image inpainting can be classified into two categories:

• Texture oriented
• Structure oriented

In the previous work, several investigators have used texture synthesis as a way to fill large image regions with pure textures-repetitive two dimensional textural patterns. Example of texture synthesis is the exemplar based technique. This approach effectively produces new texture by sampling and considering colour values from the source. Though the methods of texture synthesis are effective, they have problems in filling holes in photographs of real world images having of composite textures. On the other hand, the structure oriented strategy generates information of the missing region by considering linear structure (called isophotes in the inpainting literature) into the target region with contrast to diffusion. They are motivated by the partial differential equations. Their drawback is that the

diffusion process creates some blurriness, which becomes hard when filling larger regions. The technique introduced in this paper uses the strengths of both approaches into a single efficient algorithm. The main attention is on linear structures in structure oriented technique. But, linear structures in the target region only focus the fill order of is an exemplar based texture synthesis algorithm. The result is an algorithm that has the efficiency and qualitative performances of exemplar based texture synthesis, but which also make use of the image constraints forced by surrounding linear structures. There are many objects and uses of this method. In photography and filmography is used for film renewal, to reverse the drop (e.g., crashes in photographs or scrapes and dust spots in film). It is also used for red-eye reduction, the printed date from photographs and removing objects to original effect. This system can be used to include the lost blocks in the coding and transmission of images, for example, in a flowing video. It can also be used to remove symbols in videos. Also alphanumeric restoration of older paintings for preservation purposes, reestablishing aged or damaged photographs and films, text deletion and object removal in images for different effects, alphanumeric zooming and edge-based image coding.

Fig: Object Removal

2. LITERATURE SURVEY

A. Super Resolution Based Inpainting

This paper provides a unique structure for exemplar-based inpainting. It involves in performing initial the inpainting on a part of the input image. A hierarchical super-resolution formula is then used to obtain details on the missing areas. The advantage of this approach is that it is easier to inpaint low-resolution photos than high-resolution. The effect is each in the form of computational quality and visual quality. The low-resolution input image is unpainted many times with totally different configurations, to be less sensitive to the parameter setting of the inpainting technique. Results are efficiently combined and details are recovered by a single-image super-resolution formula.

B. Region filling and Object Removal by Exemplar–Based Inpainting

A new formula is proposed for removing large objects from digital images. The main task is to fill the holes in a picture. In the past, this drawback has been solved by 2 categories of algorithms

1) Texture synthesis algorithms
   for producing large image regions from sample textures and
2) Inpainting techniques
   for filling in small image gaps.

This paper represents a unique and efficient formula that results the advantages of those 2 approaches. A number of algorithms specifically solve this issue for the task of image restoration, where scratches, and overlaid text are removed .These image inpainting techniques fill holes in pictures by controlling linear structures (called isophotes within the inpainting literature) into the target region through diffusion.

C. Super-Resolution from a Single Image

Methods for super-resolution will be broadly classified into 2 families of methods:

1) The classical multi-image super resolution
2) Example-Based super-resolution.

This paper introduces a Unified framework for combining these 2 families of ways. It is important to learn how this combined approach will be applied to get super resolution from one small image. This study considers various previous and current approaches/strategies in image inpainting. The major roll covered by the study include different approaches for inpainting.

D. Diffusion based Inpainting

Diffusion based Inpainting was the first digital Inpainting approach. In this approach missing region is filled by diffusing the image information from the known region into the missing region at the pixel level. Basically these algorithms are based on theory of vibrational method and Partial Differential equation (PDE).

E. Texture Synthesis Based Inpainting

Texture synthesis based algorithms are one of the earliest approach of image Inpainting. And these algorithms are used to fill the missing areas using similar neighbourhoods of the damaged pixels present in an image. The texture synthesis algorithms synthesize the new image pixels. And then try to maintain the local structure of the image. All the earlier Inpainting techniques used these methods to fill the missing region by sampling and copying pixels from the neighbouring ar**ea.**

F. Exemplar based Inpainting

The exemplar based approach is an important class of inpainting algorithms. And they have shown to be very effective. Normally it consists of two basic steps

1. Priority assignment
2. Selection of the best matching patch.

The exemplar based method samples the best similar patches from the known region, whose similarity is measured by considering certain parameters , and pastes into the target patches in the missing region present in an image. Exemplar- based Inpainting synthesizes the unknown region i. e. target region, by the most similar patch in the source region. According to the filling order, the method fills various structures in the missing regions using related information of neighbouring regions. This method is an efficient approach for reconstructing large target regions.

3. Advantages

Super Resolution algorithm comes into picture when the region to be filled is large. Though many algorithms have been researched on image inpainting, this is the best to be used for filling of holes are large. The two types of methods that is, exemplar based inpainting and diffusion based inpainting are combined such that to get results in desired manner. Obviously it is a two-step algorithm. Unlike other, inpainting is applied to the rough part of the image rather than working on the filling of missing areas in original resolution image. According to this algorithm inpainting is not performed directly on full resolution picture but on the image which is smaller than the original, therefore it significantly reduces the computational time needed. Performing inpainting on rough part gives advantages that there is no more existence of noise and also it is very easy. The algorithm does not demand for computational resources always. Thus the algorithm shall not only inpaint an image but also it'll increase its resolution. Another very important advantage is that the proposed system with its interaction with the system will not need any expertise to interact with it. On national importance it'll be proved to be a best solution to preserve very old paintings in museums.

4. Disadvantages

The proposed system can process only one image at one time. That is, system is single image aided system in which multiple pictures cannot be given as input.

5. Applications

As name of paper suggests we're not only increasing resolution of an image but also removing unwanted objects from any specific picture. The objects that are not required or may be not looking so well in image can be removed in an efficient way using proposed system. The super-imposed text, that may be subtitles, any information, dates etc. maybe also abolished. We may also get rid of an entire object in an image. Old, torn, ruined personal photographs can be reestablished and reconstructed to form new repaired image which is now super-resolution applied image. The quality obtained of modified image appears very pleasant to our eyes. Another main application includes filling

of missing parts of an image. Matching comes thereafter so that newly constructed image has no more holes. Special effects can also be applied on an image by removing unwanted things.

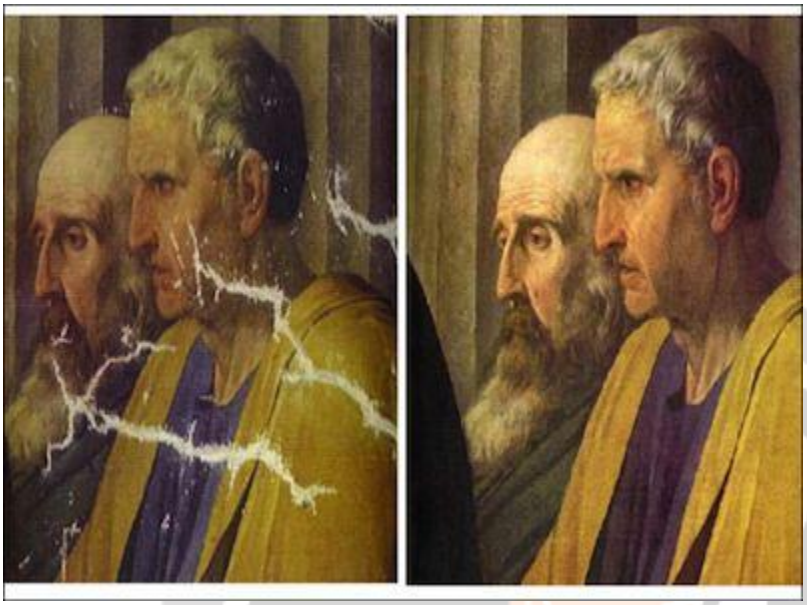

Fig: Scratch Elimination

Fig: Raising resolution

6. CONCLUSIONS

Last decades or two, many inpainting concepts were implemented but this Super Resolution based inpainting is new anatomy proposed to solve problems of image inpainting. Non-parametric patch sampling along with super resolution technique will be the better and give better results than other image inpainting methods.

ACKNOWLEDGEMENT

We would like to thank our project guide Prof. S. P. Patil for his valuable support and encouragement for our research work.

REFERENCES

[1]. Criminisi, A., P´erez, P., Toyama, K.:Region filling and object removal by examplar-based image inpainting. IEEE Trans. On Image Processing 13 (2004) 1200–1212

[2]. Olivier Le Meur and Christine Guillemot: Super-Resolution-based Inpainting. IEEE TRANSACTIONS ON IMAGE PROCESSING VOL.PP NO 99 YEAR 2013

[3]. Dariu M. Gavrila: A Bayesian, Exemplar-Based Approach to Hierarchical Shape Matching. IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE, VOL. 29, NO. 8, AUGUST 2007 1.

[4]. Jaspreet Kaur Chhabra and Mr. Vijay Birchha: Detailed Survey on Exemplar Based Image Inpainting Techniques. (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (5) , 2014, 6350-6354