



Design and Implementation of Novel Super Resolution Algorithm using Inpainting

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Abstract— *A new work for the exemplar based inpainting. It procedures on first step is inpainting for input image. Super-resolution algorithm is used to gain missing areas of the input image. Benefit of this approach is it is easy to low resolution images than high resolution images. The advantage is in two terms, they are computational complexity and visual quality. Different configurations can be done on low resolution input picture is inpainted for many times. All details are gained by using super resolution algorithm.*

Keywords— *Inpainting, Super-resolution, missing areas, Low Resolution, High Resolution*

I. INTRODUCTION

Image inpainting represents to filling-in missing regions of an image. Lot of methods introduce in the previous years. In the previous year's same computational is general required. Two problems are raised; they are first is low resolution of the input image and second is inpainting using an exemplar-based method.

Super resolution help to create an image into one or many more input low resolution images. Then above problems are raised of an image and reference to single or multiple images SR, respectively. In above problems, assume the high frequency details which are missing in the input image. SR results the many high resolution images and also results the many low resolution images. While solving the above problem introduce some information. That information added as energy of image. Image inpainting is use the to fill up the missing area or broken region in an image by using the beside region. Inpainting algorithms are numbers applications. It is used for restoration of old films and unwanted object removal in the images. It is also applicable to super resolution algorithm. The major aim of inpainting is to change the missing region of an image in such way inpainted region is not observed by ordinary observers. Existing methods are two types. The first type is diffusion based which is some hole in the image. That hole is large means diffusion based is used. The second type is exemplar-based methods is easy and choose the best matching hole from the know image neighbourhood. The above mentioned methods are expressive from texture synthesis. The first attempt to use exemplar-based methods to removal of unwanted object removal has been seen at [1].

Today, inpainting technique is a hotspot in the computer graphics. And also it is helpful in the films, television, object removals etc. Inpainting method is helpful for degraded paintings. Inpainting is carried out by professional artist and every time adding process because it was the final result. The aim of this method is to rebuild damaged parts or missing parts of an image. At last this method rebuilds image in such a way that the inpainted region cannot be detected by observer. Inpainting technology has been used in many applications such as restore of old films, object removals in the photos, red eye correction, super resolution, compression, image coding and transmission. Inpainting rebuilds the damaged region or missing parts of an image by using the information of neighbouring region of an region. Other names for inpainting is modification and manipulation of an image. In image inpainting we like to create original image but it is completely accomplish without the

prior information about the image. We do not have the digital images, so images are which are available to us and finally we are filling a missing area of an image.

II. RELATED WORK

A. *Texture Synthesis Based Inpainting*

Texture synthesis based algorithms are old technology of image inpainting. And algorithms are uses to complete the filling region of an image by comparing the previous pixel of damaged pixel. These algorithms synthesize the new pixel from an starting seed. The old techniques of inpainting uses these methods to fill up the missing region by comparing the pixels of the neighboring area. The major aim of texture synthesis based inpainting is to produce result of texture patterns, which is compare to a given sample pattern, in such a way that the reproduce the final result of an image.

B. *Exemplar Based Inpainting*

The exemplar based inpainting is a major class of inpainting algorithms. They have proved to be very unfeasible. It performs two basic steps: the first step is priority assignment and the second step is selection of the best matching pixel. In the patch priority, the filling process defines a major of priority for each patch. High priority indicates the presence of structure. In the selection of the best matching pixel, takes the samples of the best matching patches from the know region.

C. *Diffusion Based Inpainting*

Diffusion based inpainting is the first technology of inpainting. In this method holes are filling up by the image information from the known region. These methods are based on Partial Differential Equation (PDE). The diffusion based inpainting method releases filling the holes in the image.

D. *PDE Based Inpainting*

This method is the iterative algorithm. The basic idea of this method is to continue geometric and photometric information that seen in the area itself [2]. This method will produce best results if missed regions are little one. If missing region is large means it takes so much time and also it not produces good result. After this inspired by Total variation (TV) inpainting methods [3]. This method is helpful to removal of noise in the image. The disadvantage of this method is either connects neither broken edges nor large texture area. These methods mainly focused on inpainting region. Another disadvantage of this method is large texture are not best reproduced.

E. *Non-uniform Interpolation SR Technique*

The basic idea of this method is the reconstruction of functions from given by non-uniformly distributed areas. The advantage of this method is takes relatively low computational load and makes life-time applications available [4]. In this method have holes and the noises are the same for all low resolution images.

F. *Sparse Representation Method*

This method is basic idea of single image super resolution. In this method is image if missing area is best represented as a sparse linear combination of pixels. It is impossible to study a dictionary or basic vectors [5]. Researcher's advice that easy made dictionaries are already to generate high-quality rebuilds, they used combined with sparse representation [6].

G. *Super Resolution through Neighbor Embedding*

This method is helpful for solve the single-image super-resolution problems [7]. If low resolution is given as input means objective is to recover its high-resolution of image. In a previous neighbor embedding method based on semi-nonnegative matrix factorization (SNMF) only nonnegative weights are added. This method is based on assume that small holes in the low and high resolutions of images. Each hole is represented by a vector.

H. Frequency Domain method

This method makes low resolution image to rebuilds an high resolution image [8].

The frequency domain method is based on three principles:

1. the shifting property of the Fourier Transform
2. the Continuous Fourier Transform (CFT) of an original high resolution image and Discrete Fourier transform (DFT) of observed low resolution image
3. the original high resolution image is band limited

III. SUPER-RESOLUTION ALGORITHM

Start the low resolution of inpainted image, then super resolution algorithm is to be applied. Super resolution algorithm is used to rebuild the image which affect from naturally. The problems [9][10] is to identify a patch of resolution. Super resolution algorithm involves three steps. They are:

1. Dictionary building: It consists of correspondences between low and high resolution image holes. The high resolutions have to be valid, entirely compare of known pixels. The valid patches are extended from the known parts of an image.
2. Filling order of the HR (High Resolution) picture: The filling process starts with the hole having the highest priority and which is compare of known and unknown parts of an image.
3. The LR (low resolution) patch corresponding to the HR patch having the highest priority: The best neighbor in the inpainted images of lower resolution is to be selected. This selected process can be done at dictionary and particular valid of previous pixel.
4. Weights are added by using an nn-local means method to work linear combination of previous pixels.
5. A high resolution candidate is last deduced by using a linear combination of high resolution holes.
Stitching: The high resolution holes is then added into the missing region

IV. CONCLUSION AND FUTURE SCOPE

- We discussed old techniques of image inpainting. And Super resolution algorithm is used in the damaged image. The image is to be done for low resolution and apply super resolution algorithm to recover details of the native resolution.
- Various methods have been developed using in equal assumptions of the existing system. It is difficult to identify an missing area of an image and super resolution algorithm is applied particular purpose for given task.

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