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# A Comprehensive Survey on Image Inpainting Techniques

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**Abstract:** ***The important part in our life is Image. We can remove the unwanted part of image without disturbing its overall structure using image inpainting. The inpainting of the low resolution images are simpler than that of the high resolution images. In this system different super resolution image inpainting methodologies contain low resolution image and then to form the highly in painted image results of all these methodologies are combined. For this reason for inpainting of single image our system uses the super resolution algorithm which is responsible.***

**Keywords:** Exemplar-based inpainting, single-image super-resolution

## 1. Introduction

For many research field Image has become useful phenomenon. In old days images are only used for capturing memories. But now images have changed their face. Images may be two-dimensional, or three-dimensional. They may be captured by optical devices – such as cameras, mirrors, and lenses. Today, for encryption, processing, authentication, sharing etc. purpose images can be used. But the main aim of image is still being preserve i.e. to store the memories. Due to extra part or distortion in image sometimes useful images get discarded or deleted. To restored image or painting seems as natural as its original version a super resolution (SR) algorithm is used to guess and fill in the lost image information. First using inpainting the object in the required target area is removed. To recover details on missing areas Result gain is given as input to a super-resolution algorithm. Exemplar-based inpainting is used to remove objects that are not required. Since inpainting produces a low resolution image A Super-resolution algorithm is more efficient.

Initially for scratch removal inpainting is used. The next applications include removal of object, text and other automatic modification of images. The process of object removal is to remove objects from images and fill the hole by taking information from the surrounding area pixels. Replacing the corrupted part of the image by using the various effective image inpainting techniques which can able to fix and recover the small defects occurring inside the image is the image inpainting process.

The image which is not recognize by the observer because this technique do changes in the image. Here for automatic inpainting of digital image we introduce an algorithm, and replicate the basic techniques used by existing restoration methods. In computer graphics the image inpainting technology play an important role and has many applications such as old films renovation, object removal in digital photos, coding image and transmission. Using the background information in a visually possible way this method restores lost/selected parts of an image. So the use of image inpainting is to recover the original image as well as to create some image that has a close appearance with the original image.

**Figure 1:** Before and after inpainting

To improve the quality of the image the reason behind region completion varies from remove-undesired object. The object removal starts with mask out the undesired object, making the area where the object previously occupies a hole. Using graphical pixel filling techniques these hole will be filled.

The exemplar based SR, correspondences between HR and LR patches are learned from a group of HR-LR patches known as Dictionary and then to recover its higher resolution version it applied to a low resolution image. As a deploring problem and solve the inverse problem using Bergman iterations SR method consider Super Resolution image reconstruction. The HR image is estimated based on some prior knowledge about the image in the form of regularization. Based on multi scale morphological filters A new regularization method is proposed.

## 2. Literature Survey

This section shows existing inpainting technique and their work. The diffusion based or the exemplar based techniques are two techniques off this system. It leads to the

development of hierarchical approach of super-resolution based inpainting because of It is having some limitation.

**1. Image Inpainting**

This paper shows for filling the some loosed portion of the image that image inpainting is only used. But for high quality images this method is not suitable. It uses patch based inpainting. The area at which the inpainting algorithm is to be apply is selected here manually by the user. Here this area is marked as the sigma notation. Masking on image is denoted by sigma.

**Figure 2:** Traditional image in painting

In this by using Efros and leungs algorithm masking is removed. For filling the losses inside the image this method is responsible but this feeling is not reasonable [1].

**2. Vector-valued image regularization with PDEs: A common framework for different applications**

Here for eliminate the diffusion in image vector valued algorithm is used. As minimization of functions, expression divergence, and laplaciouns the image is passed through three steps named. To in paint the image this uses mathematical formulae, but it is not efficient to represent the flows of large image distortion.

**Figure 3:** Image inpainting using PDE

**3. Variational restoration of non-flat image features: Models and algorithms,"**

Here with an increased priority term which defines the filling sequence of patches in the image the author had states a novel examplar based Image Inpainting method.

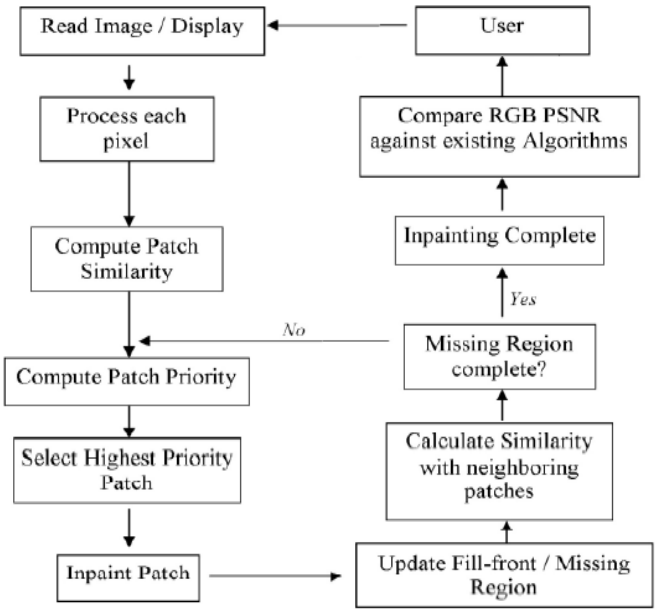


**Figure 4:** Examplar based inpainting

By propagating the image patches Inpainting method is based on patch generation into the interior of the target region from the source region patch by patch. This method uses a diffused PDE to constrain the processing order; so, it has a good property of preserving the linear structure. Here by the local pixel information the size of exemplar is dynamically calculated; by the PDE the block and seem effects are removed. Because for complex geometric structures completion the examplar-based model could not be used, a bi-directional diffused PDE adopts by the novel model to assist the completion procedure [4].

**4. Fragment-based image completion.**

By example fragments this method is used for image completion that interleaves a smooth approximation with detail completion. The unknown region iteratively approximates by our method and fills in the image by adaptive frames. It fills the image by a combination of fragments under combinations of spatial transformations. The principles of figural familiarity and figural simplicity followed by it. Thus, by applying a simple smoothing process an approximation is generated in the low guessing areas. To some underlying structure it is a classification of the pixels that agrees with the parts o1f the image for which we have high confidence.

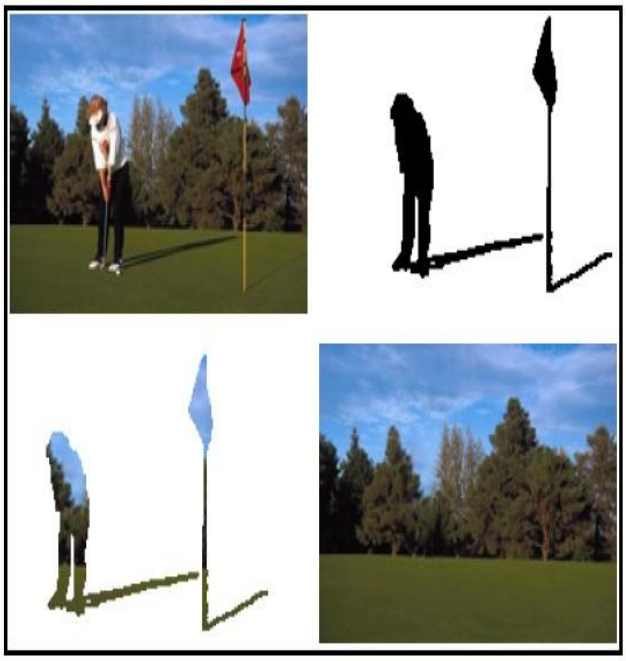

**Figure 5:** Algorithm for fragment based inpainting.

This paper present an iterative process that interleaves smooth reconstruction with the synthesis of image fragments. It iteratively generates smooth reconstructions to guide the completion process [5].

**5. A non-hierarchical procedure for re-synthesis of complex texture**

As a given input image with the same texture for synthesizing an image a procedure which is described. For achieving this, by successively adding pixels selected from the input image there is built up an output image. By searching the input image the pixels are chosen for patches that are closely match pixels which are already present in the output image. A selecting an ordering procedure which large complex features of the input transfers to the output image is described. Even if there are considered only the interactions of nearby pixels for reproducing large features this procedure is capable. In the output texture to allow specification of the placement of particular features the procedure can be altered. There are described the several applications of this [6].

**6. Texture synthesis by non-parametric sampling**

A new image grows by the texture synthesis process outward one pixel at a time from an initial seed. There is assumed a Markov random field model, and there given all its neighbors synthesized by the conditional distribution of a pixel so by querying the sample image far is estimated and all similar neighborhoods are finding. By a single perceptually intuitive parameter there was controlled the degree of randomness. As possible as much local structure are preserving by the method and for a wide variety of synthetic and real-world textures produces good results[8].

## 5. Conclusion

This inpainting method is able to give better output and it has ability of overcoming the limitations of the all existing work done by previous authors by finding exact match of the pixel. It uses the super resolution algorithm to fills the gaps in the image. Here it can result in better and efficient output because we are combining multiple Image inpainting techniques.

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