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Enhancement of Image and Video using In-Painting Technique

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Abstract

A comprehensive image in-painting method was proposed to enhance the two critical task in the prior hybrid method, which are setting up the best application order for in-painting textural and structural missing regions and extracting the sub-image containing best candidates of source patches to be used to fill in a missing region. By integrating our 'execution-order analysis based solution 'to task one and our image 'context –driven source image extraction solution 'to task two. We were able to consistently improve in-painting quality compared with that of the previous non-hybrid in-painting method while even spending much shorter processing time compared with the conventional hybrid in-painting methods. Image in-painting is process of restoring or removing object in an image. The basic task is to fill the surrounding information to inner sides. This technique boost numerous application like restoring or removing degraded part in image , text removal , stamp or symbol removal and disocclusion in image based rendering (IBR). The problem definition in image in-painting is that it is ill-posed inverse problem. It means that there is no well-defined particular technique. Image in-painting techniques are broadly categorized in two types. First, texture based in-painting and another is the structure based in-painting. The main motivations related to this technique are that in-painting results are degraded for images with combination of texture and structure features. Another motivation is that it consumes more computation time. The working principle of image in-painting is that assumption of pixels in the known and unknown parts of image that share the similar statistical and geometrical structure. In past literature, diffusion-based in-painting was introduced that are best suited for straight line, parabolic curve and for small region. The main drawback of diffusion method is that are not work on unconnected edges and also produces Gradient Reversal artifacts after restoration. With advancement of technology, sparse based in-painting and examplar based in-painting are considering for eliminating problem.

In this digest, sparse based in-painting is introduced on basis of discrete wavelet transform technique based on finding the region pixel, calculating pixel priority and normalizing the in-paint region boundary.

An image can be mathematically represented as [1] =⊂ → → (), Where x is a vector indicating spatial-domain pixel, which in the case of gray scale image (n=2) and is defined as x = (x, y). For color image (m=3) and is defined in (R, G, B) color space. The goal of image in-painting is to calculate the (R, G, B) components of the pixels situated at position x in the unspecified region U, from the pixels situated in the known region S, to finally form the in-painted image. The purpose in term of quality is that reconstructed part seems natural to human naked eye, and is physically imaginable as possible.

Keywords: *image in-painting, resolution*

INTRODUCTION

The filling-in of missing region in an image is known as Image In-painting. In-painting is the art of modifying an image or video in a form that is not easily detectable by an ordinary observer. Image in-painting has become a functional area of research and development in image processing. The image is modified such that modification of image is non detectable for an observer ,who want to know the original mage in practice as same as old artistic .The process is to bring medieval picture, up to date as to fill gaps in between. This process is called as in-painting.

[a]Original photograph [b] In-painted photograph

Fig.[1] *Removing large objects from images*

The exiting in hybrid in painting is broadly classified into two types.one is texture based in-painting and another is structure based in-painting. One drawback of these in-painting is that the in-painting results are not effective for the image with mixture of texture and structure in terms of visual quality [i] what is the most effective application order of the constituents? and [ii] how can one extract a minimal sub-image that may contain best candidates of in-painting source? In this study, the authors propose a new hybrid in-painting algorithm to address the two tasks fully and effectively. Precisely, the authors' algorithm attempts to solve two key ingredients: [i] (right time) determining the best application order for in-painting textural and structural missing regions and [ii] (right place) extracting the sub-image containing best candidates of source patches to be used to fill in a target region.

A comprehensive image in-painting method was proposed to enhance the two critical tasks in the prior hybrid methods, which are [i] setting up the best application order for in-painting textural and structural missing regions and [ii] extracting the sub-image containing best candidates of source patches to be used to fill in a missing region. By integrating our 'execution-order analysis based solution' to task 1 and our image 'context-driven source image extraction solution' to task 2, we were able to consistently improve in-painting quality compared with that of the previous non-hybrid in-painting methods while even spending much shorter processing time compared with the conventional hybrid in-painting methods.

IMPLEMENTATION OF PATCH-BASED INPAINTING METHOD

In this paper of (IMPLEMENTATION OF PATCH-BASED INPAINTING METHOD) .We can use of presenting approach algorithm which makes the exemplar approach will be little faster than previous algorithms using patch-based concept. Different algorithm have been proposed for the image –in painting to acquire good quality in image and also time consuming process .Exemplar based in-painting is much popular algorithm. Currently, the image in-painting technology is an emerging trend in the digital image processing, and also it has many applications in computer graphics, renovation of old films, object elimination in digital photos, red eye alteration, super-resolution, compression, image coding, and transmission. To carry out the work of image in-painting, there is only less technologies, tools, and libraries. As technology getting advanced, there is lots of growth in this area. it is an open source library for providing different functionalities to detect an automatically

restore breakages and damaged parts of the photographs or films. Restore in-painted image provide some tools to be in-painted and also depend on the size of the image to processes.
The image in-painting is developed using different algorithm in java or matlab code. However by these techniques, we cannot get the original image .so to overcome these problem.
Super-resolution also can be used to enhance for close observations to the videos to more accurately identify objects in the scene/image. Clearly, this is pure fiction; after all, there are an infinite number of higher-resolution images that could form the original low-resolution image. Super-resolution is classified as: Single Frame and Multi Frame.

Multi-frame super-resolution uses multiple low-resolution images of the same image from different areas to generate high-resolution output. Single frame super-resolution on the contrast, to produce high-resolution image uses single low-resolution image. In both cases problem is of removing high –frequency detail which are not available in the input image.

In this paper, we provided a small approach for filling image holes in a patch-based method. We also provided the overview of the algorithm which will be used for future experiments and also in the research area.

Various Image In painting Techniques to Restore Image
As previous paper mentions some little point to overcome drawback we refer (Various Image In-painting Techniques to Restore Image).
Image in-painting is a technique which use to restore the damaged image and to fill the region which are not available in input image in visually plausible way. In-painting technique to modify and image in an invisible form. Application is use in rebuilding the damaged image &film, replacement of unwanted objects, red eye correction, image coding.

The main goal of the In-painting is to change the damaged region in an image. In this paper we provide a review of different techniques used for image In-painting. We discuss different in-painting techniques like Exemplar based image in-painting, PDE based image in-painting, texture synthesis based image in-painting, structural in-painting and textural in-painting.

In-painting is the art of restoring lost parts of an image and reconstructing them based on the background information. This has to be done in an undetectable way. The term In-painting is derived from the ancient art of restoring image by professional image restorers in museums etc. Image processing is used image coding and wireless information, and missing part.

Image in-painting
This project demonstrates removing the unwanted image from the original image automatically .Target region is selected and in painted is applicable to it.

Foreground pixels is use for the target region and automatically replaced by the in painting process.

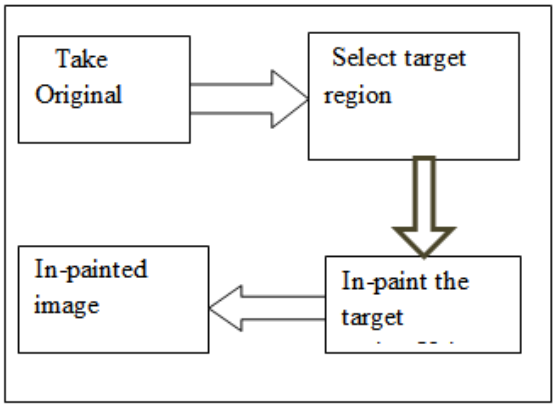

Fig.[2] *Data flow diagram of in painting process*

The conventional schemes that are proposed for image in painting can be divided into two categories:
a.Texture oriented.
b.Structure oriented.
Several researchers have considered texture synthesis as a way to fill large image regions with 'pure' textures-repetitive two dimensional textural patterns. This approach effectively generates new texture by sampling and copying colour values from the source [9]. Though the techniques of texture synthesis are effective, they have difficulty in filling holes in photographs of real world scenes consisting of composite textures. However, the structure- oriented scheme obtains the missing region by propagating linear structure into the target region via diffusion. They are inspired by the partial differential equations. Their drawback is that the diffusion process introduces some blur, which becomes noticeable when filling larger regions.

REGION FILLING ALGORITHM

The damaged colour image is divided into the colour composition and texture composition. In fig[3.] we find the importance of texture composition in colour image re-construction .We have been using the n level wavelet transform to segregate the texture image (Y) into different combinations.

When we repair to the highest frequency layer in the wavelet domain, we will acquire the reconstruction image of the highest resolution. we can obviously find the color composition, Cb and Cr, has the highly neighbouring relativity. We have to use neighbour information of the valid pixel to restore the colour image. As per the concept.

Fig.[3] *Image characteristic*
(a)Texture composition (Y), (b) Color composition (Cb) (c) Color composition (Cr).

Algorithm

1) **Take a damaged image.**
2) **Convert the color image to YCbCr by using conversion formulae.**
3) **For texture composition Y**

1) Apply n-level wavelet transform (we have applied 2-level).
2) Analyse LLn wavelet coefficient (in our case LL2).
3) Apply direction texture decision law.
4) Repeat steps I to IV until n-level =0, now it provides image Y composition in painted results.

For color composition

1) Perform color neighbor interpolation.
2) This provides the image Cb,Cr composition in painted results.
3) Add both texture composition Y and Cb,Cr composition in painted results.
4) Convert Y,Cb,Cr to RGB using conversion formulae.
5) Finally we get in painted image.

CONCLUSION

1. Select desired patch then reconstruct the image, hence Automatic selection will be extended in future.
2. Use of non –rectangular patch for filling in exemplar method could explore.

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