Image Inpainting using Hybrid Technique

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***Abstract*: Image segmentation algorithm and inpainting algorithm are the key ingredients in the process of inpainting after studying many image-inpainting algorithms. Therefore, analyzing, comparing and verifying the segment algorithm and inpainting algorithms, the system model which owns segment and repair evalua- tion function is constructed, so it can optimize the segmentation algorithms and the inpainting algorithms; finally make the inpainting result better. This project present a new inpainting algorithm that is based on image mapping.**

In this project there is comparison of Inpainting Algorithm example based inpainting, Coherent Sensitive Hashing Algorithm and Proposed Technique. A hybrid technique is proposed which takes the advantage of example based In-painting & Coherent Sensitive Hashing which gives better results. The experimental results show the advantage that new technique produces output images with better perceived visual quality. *(Abstract)*

***Index Terms*: Inpainting, Coherent Sensitive Hashing, perceived visual quality** *(key words)*

I. INTRODUCTION (HEADING 1)

Digital image inpainting is an important issue in the domain of image restoration and an international interesting research topic in recent years, and it has different terminology names in different areas. For example, it is called error concealment in the signal transmission. Now many image inpainting methods proposed, which are mainly two categories. One repairs small-scare damaged digital images, and the other repairs large-scale digital image through filling with image information. Those inpainting methods which can repair different damaged image have their advantages, disadvantages and applied range.

Image inpainting is an important research field. It has very board applications such as digital restoration of ancient paintings, text removal and objects removal in images, film restoration, damaged block recovery of compressed digital image or video, etc. Its main objective is to fill a missing region of an image with pixels from the other known image regions so that the output image can be visually plausible.[1].

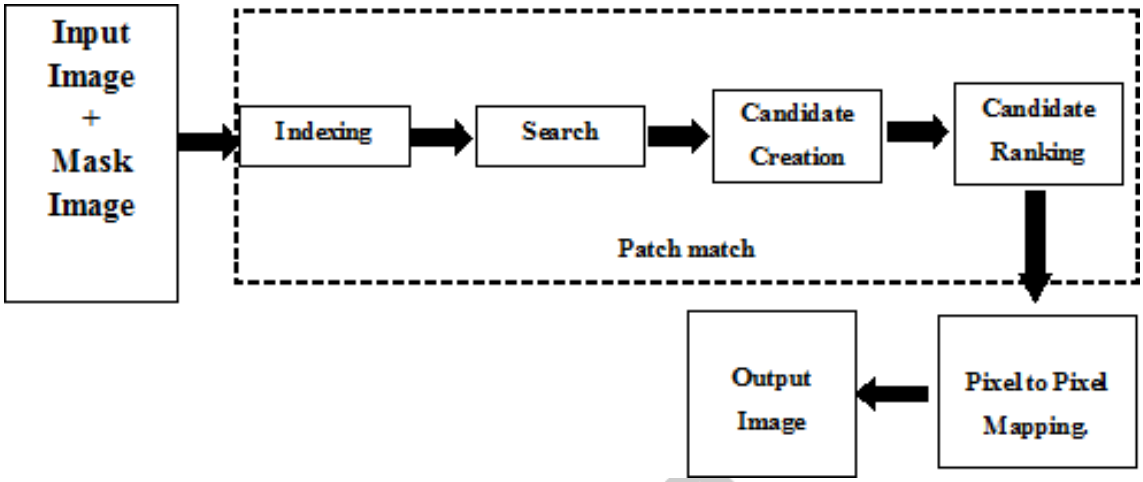
II. BACKGROUND AND CONTEXT

I. The image Inpainting technology is a hotspot in computer graphics. And it has important value in a heritage preservation, film and television special effects production, removing redundant objects etc. In the fine art museums, this Inpainting concept is used for degraded paintings. Conventionally Inpainting is carried out by professional artist and usually its very time consuming process because it was the manual process.The main goal of this process is to reconstruct damaged parts or missing parts of image. And this process reconstructs image in such a way that the in- painted region cannot be detected by a casual observer. Inpainting technique has found widespread use in many applications such as restoration of old films, object removal in digital photos, red eye correction, super resolution, compression, image coding and transmission. Image Inpainting reconstruct the damaged region or missing parts in an image utilizing spatial information of neighboring region. Image Inpainting could also be called as modification and manipulation of an image. In image inpainting we would like to create original image but this is completely unfeasible without the prior knowledge about the image. In case of digital images we only have the image we are working on available to us and thus we are filling in a hole that encompasses an entire object. It is impossible to replace that entire object based on the present's information. Considering this as the aim of the inpainting algorithm is not only reconstruct what used to be in that whole. But instead to create a visually pleasing continuation of the data around the hole in such a way that it is not detectable by ordinary observer.

III. PROBLEM STATEMENT

The main objective of research is proposing a new inpainting algorithm that firstly segments the source region using mean-shift segmentation technique. Then, it classifies the segments that are adjacent to the missing region based on their perimeter relative percentage, to be either large segment inpainting problem or no uniform segments inpainting problem or in paint each of them independently. Since human eye is very sensitive to any produced artifacts in large uniform regions, the algorithm invests more effort to inpaint large uniform regions is less sensitive to any produced artifacts of no uniform regions. As the main idea of the proposed technique is that if the algorithm is going to produce an error, then it has to be un-noticeable by the user. The experimental results show the efficiency of the proposed algorithm to produce more plausible output.

IV. SYSTEM DEVELOPMENT



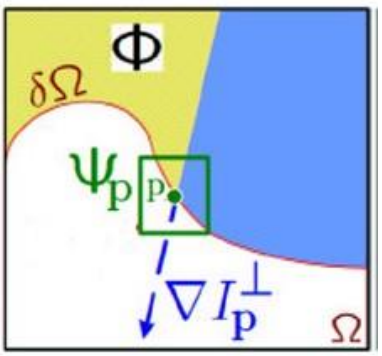
The Proposed Method is as follows:

1. Firstly the input image and its mask image is given as input.
2. After giving input image and its mask image indexing is done for getting hash value and creates hash table. After that it search the patches in the input image.
3. After finding the patches it create the candidate for each patch with the help of mask input image and based on this it does the ranking for each patch.
4. After that it will inpaint the image using pixel to pixel mapping. The template is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin in this template measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

V. MEAN-SHIFT SEGMENTATION TECHNIQUE

Mean shift is a very powerful clustering technique [12]. It is used for image seg- mentation, clustering, visual tracking, space analysis, mode seeking. Mean shift is a nonparametric iterative algorithm, for density gradient estimation using a gener- alized kernel approach. It can be summarized as follows: For each data vector Xi in d-dimension space where i = 1. . . n mean shift defines a window around it and computes the mean of data point, as in equation 1, Then move X in the direction of the mean shift vector Xt+1 = xt + m(x) repeats the algorithm till it converges.

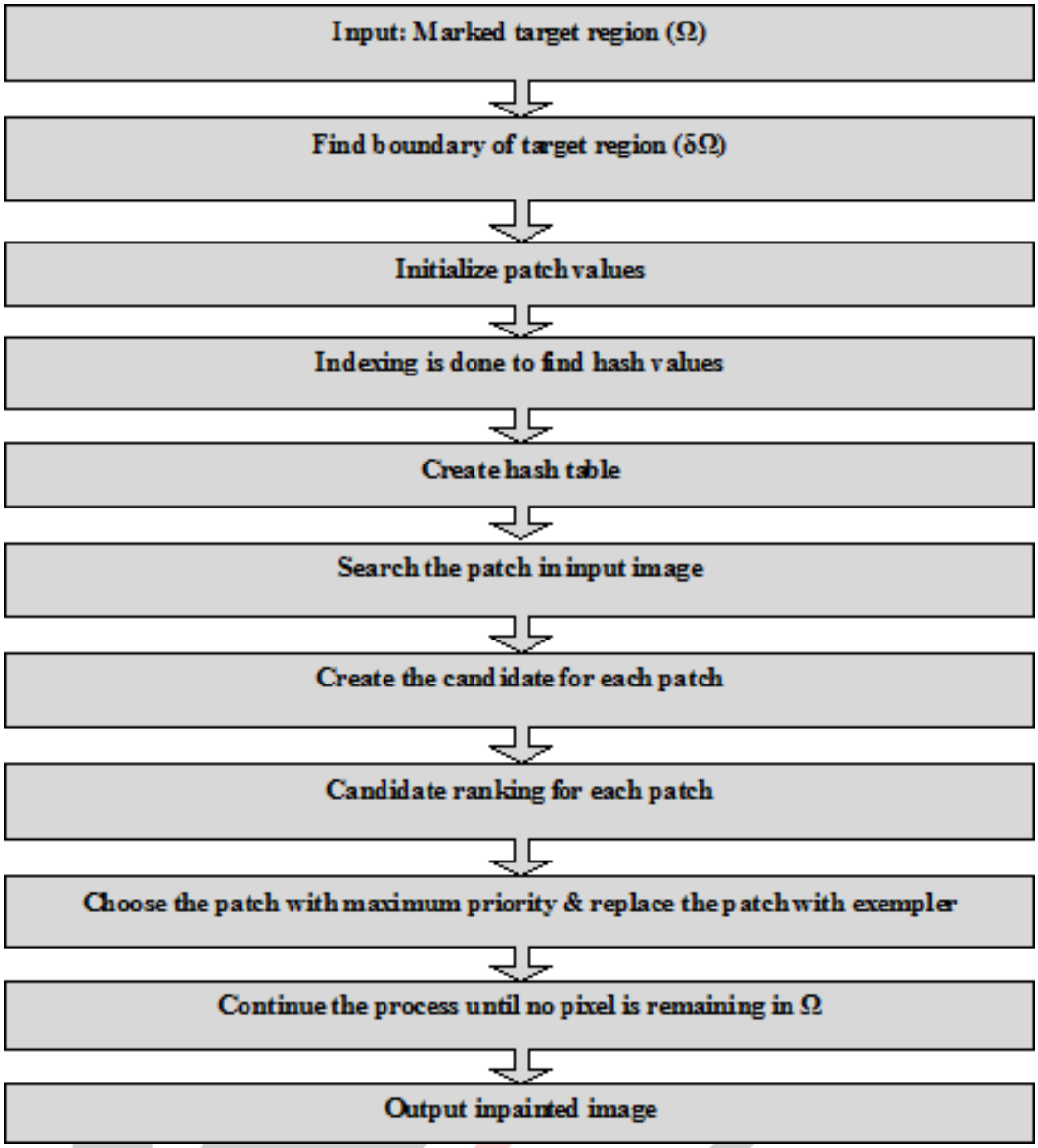
(a) Source Region and Target Region



(b) Selected patch to be inapainted

VI. *PROPOSED TECHNIQUE*

To look out about increasing the value of accuracy and reducing the timecomplex- it. To form out this both and reducing the error possibility a hybrid technique is proposed.

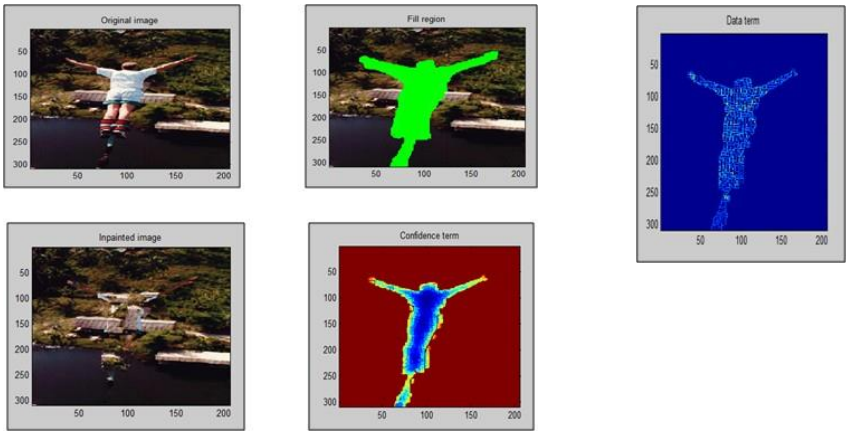


VII RESULTS

To verify the efficiency of the proposed method and the quality of output images, we compared its results to Coherent Sensitive Hashing Algorithm and Example Based Inpainting Technique.

1. **Using example based inpainting we get following results:**

1.1) For Image- bungee Results Using example based inpainting

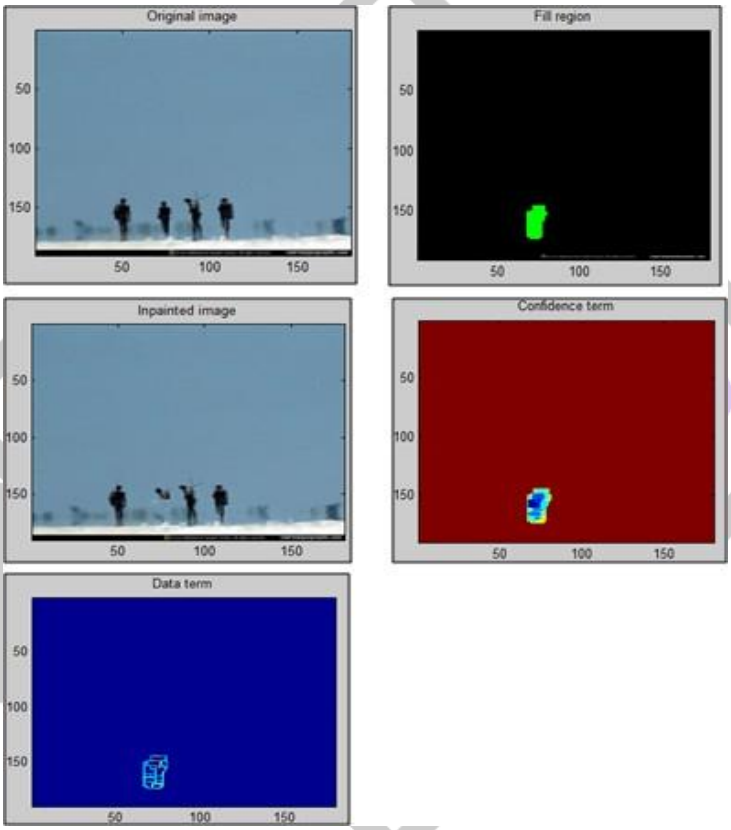


1.2) Result Using Coherent Sensitive Hashing (CSH):
Input and Output image using Coherent Sensitive Hashing shown in fig.

a) Input Image

b) Output Image

1.3) Results for other images:-
Using example Based Inpainting Results for mage-Nat



1.4) Results using Coherent Sensitive Hashing
Results for Image-cow

Input Image **Output Image**

VIII. Conclusions

In this project a technique is proposed which is hybrid of Example Based Inpainting an Coherent Sensitive Hashing to overcome the problem of image in- painting .Here a comparison is done between the two existing techniques and pro- posed technique of inpainting. In this Technique after giving an input image first it create hash table, then it compares the original image and mask image. Base on that it finds best patch match using hash table values and fill the missing patch. The disadvantage of Coherent Sensitive Hashing is it only fill the patch which results into remain some portion to inpaint. To overcome the problem a technique is proposed in which it combines Coherent Sensitive Hashing & Exemplar Inpainting.

The experimental results shows that proposed technique gives better and more efficient results than Coherent Sensitive Hashing technique and Example Based Inpainting. Image quality point of view the output image getting by pro- posed technique is good than both of existing techniques. Layout the algorithm for approximate dense nearest patch search which follows the concepts of LSH search scheme, but combines image coherency cues, as well as appearance cues in a novel manner.

It was shown to be faster than Patch Match and more accurate, especially in textured areas. Its high incoherence improved reconstruction results and also enhanced the visual quality of the output image. The experimental results have proven that proposed algorithm has enhanced the visual quality of the output image.

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