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Image in painting and Compression Using DCT Algorithm

[1]Seema Devi & [2]Varun sanduja
[1]M.tech student,Deptt of ECE;Chandigarh Group of Colleges Technical Campus, Jhanjeri
[2]Assistent Professor,Chandigarh Group of Colleges Technical Campus, Jhanjeri
[1]email:chaudharyn710@gmail.com;[2] email:varun.cgctc@gmail.com

Abstract-

This research work has major focus on images which have cracks and minor distortions in them. This prevents any compression technique to give the best output. Hence there is a need to first eliminate those distortions from the images before applying compression. A system is proposed, in which K-Nearest Neighbor Algorithm is implemented after the DCT Step, to remove the distortions before compressing it. The neighboring color of the distorted part can be used to merge with the damaged part. So basically, we have to store less color intensities to save the same image without the distorted piece which will result in more optimized compression ratio. It will be greatly valuable for observer perspective.

Keywords: Image processing; KNN algorithm; in painting

I.INTRODUCTION

In this Digital age where bulk of data is getting transferred each and every second, different compression methods is a necessity. By being able to compress images to a small fraction of their original size, we can save a significant amount of disk space. Likewise transportation of images starting from one computer then onto the next gets to be simpler and quick [1].

1.1 Compression algorithm:

As stated above, Image compression Algorithms can be partitioned into: Lossy and Lossless. Decompression after lossless compression yields the same input image. Lossy compression brings about loss of information and the decompressed picture is not exactly the equal as the first.

1.1.1 Lossy Algorithm

This data compression technique is finished with loss of value and originality (Fig. 1). The original in sequence is never recovered over after compression. A pair of normal case of lossy compression is establishing in streaming features in the web, additionally the VOIP utilizes lossy compression strategy. The algorithm may pick a more modest extent of pixels whose color value contrasts fall inside the limits of our discrimination, and replacement those for the others.[1]

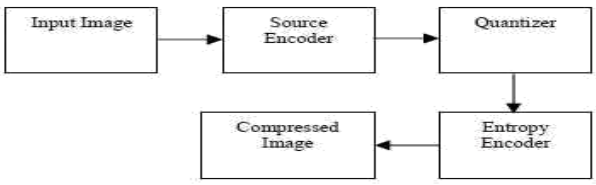

Fig .1: Lossy Algorithm

1.1.2 Lossless Algorithm:

The data compression technique retains the originality of the file after compression by exploiting only the statistical redundancy of a data file (Fig.2). The original file can be retrieved back after decompression. It can lessen it to about half of that size, conditional upon the sort of file being compressed.

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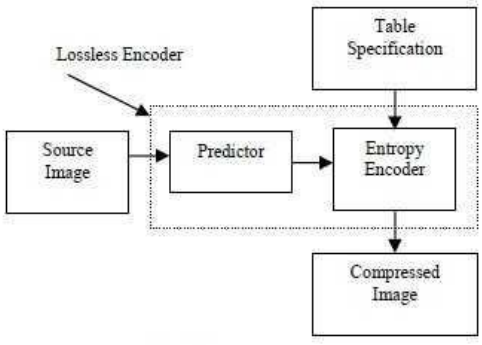

Fig. 2: Lossless Algorithm

1.2 Joint Photographic Experts Group (JPEG):

JPEG is an abbreviation for "Joint Photographic Experts Group" [3]. For its standard coding method the Discrete Cosine Transform (DCT) is utilized. The authors in [4] first confirmed that DCT in a general sense is the same to the KLH (Karhunen–loeve–hotelling) alter that performs a de-correlation course In light of the fact that each coefficient can be dealt separately without losing compression proficiency, de-correlation is essential for compression. Basically, the nxn 2-D version of DCT disintegrates a nxn block of an image into a set, each with a specific spatial frequency. Because of this, we can reduce the information not visible to the human eyes. The redundancies existing, are of the following types,

1.Coding Redundancy: Present when a smaller amount than optimal code words are used.

2.Interpixel Redundancy: results from correlations between the pixels of an picture

3.Psychovisual Redundancy: is due to data that is ignored by the human visual system (i.e. visually non essential information).

1.3 8X8 FDCT and DCT

At the input to the encoder, source image samples are assembled into 8x8 blocks [14], stimulated from unsigned integers to signed integers, and input to the Forward DCT (FDCT). At the output from the decoder, the Inverse DCT (IDCT) yields 8x8 sample blocks to construction the reconstructed image

1.4 Quantization

The 8x8 blocks are set for quantization. The coefficients Fu,v, are real numbers, which will be stored as integers, hence we require to round them off. It is done in a manner that encourages more famous compression. as a substitute of fundamentally rounding the coefficients, Fu,v is primary partition by a quantizing factor and after that confirmation round(Fu,v / Qu,v).

1.5 Encoder

Entropy coding includes arranging the image mechanism in a "zigzag" order utilizing run-length encoding (RLE) algorithm that groups equivalent frequencies as one, and after ward utilizing Huffman coding.The value in the higher left corner represents the average of the complete block. Moving to the right builds the horizontal frequency while affecting down increases the vertical frequency. The zeros can be unnoticed afterwards.[2]

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II. FLOW CHART OF IMAGE INPAINTING ALGORITHUM:

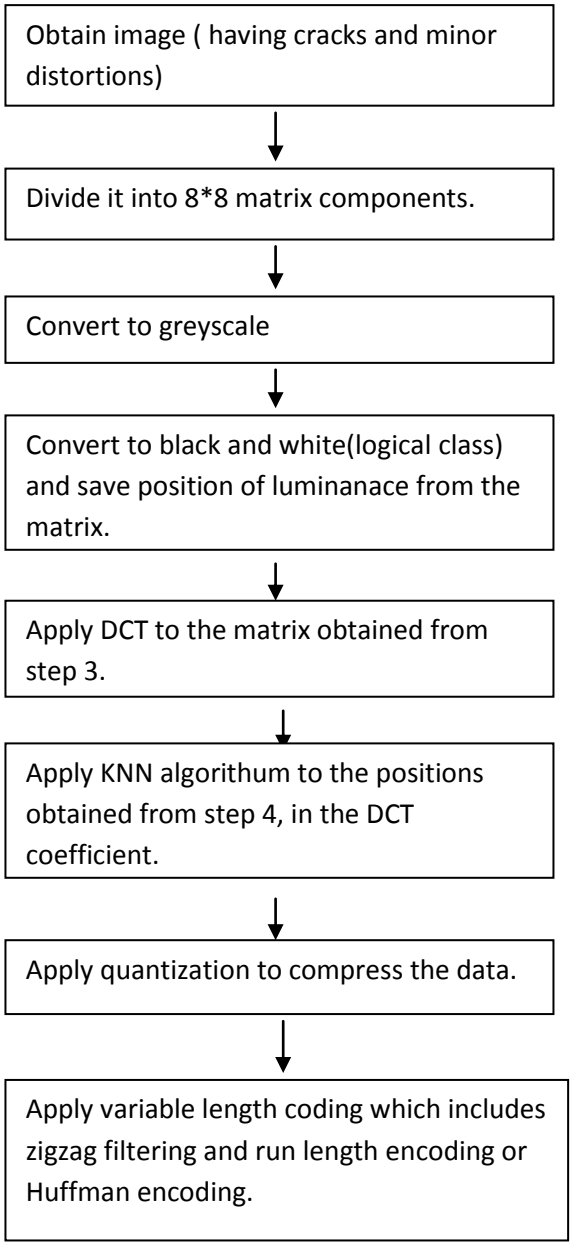
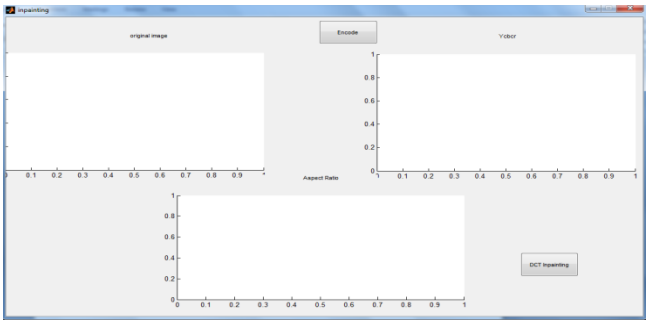


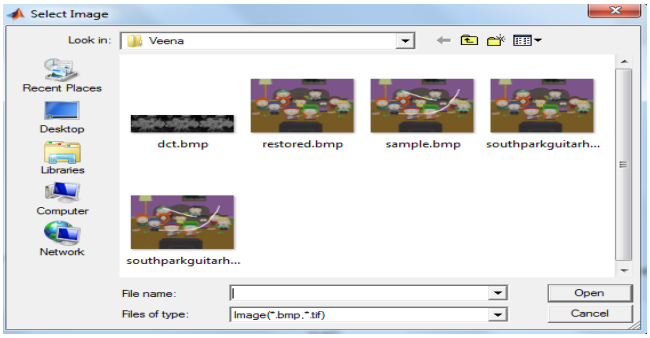
Fig. 3: Flow chart of purposed algorithum.

III. RESULTS ANALYSIS:

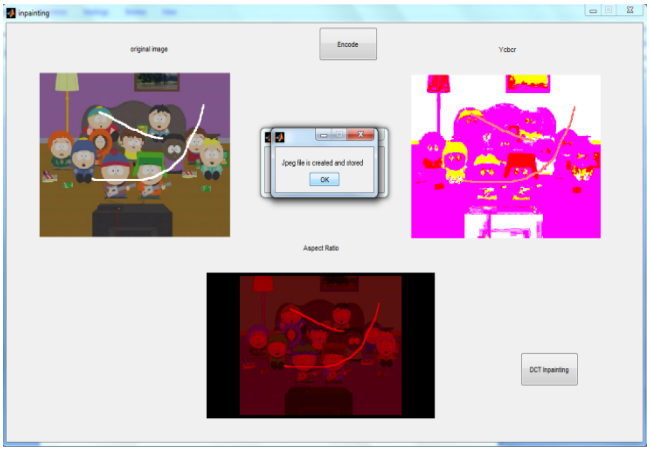
1. Running the file inpainting.m which is used to implement the standard jpeg algorithm, we have achieved these outputs.



2. Import the distorted uncompressed image.



3. The message box shows that the jpeg file is created and stored in the hard drive.



4. Now import the same distorted uncompressed image for our inpainting algorithm.

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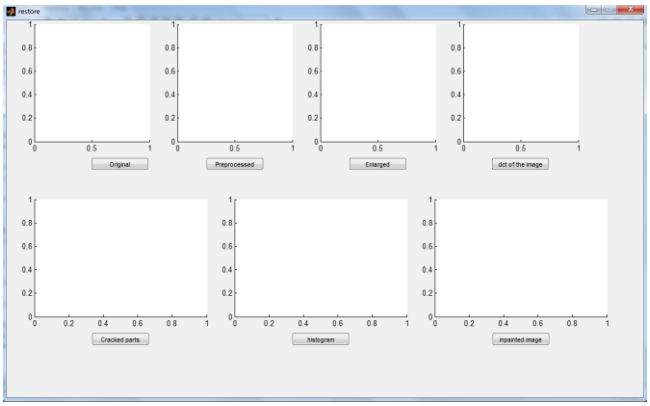
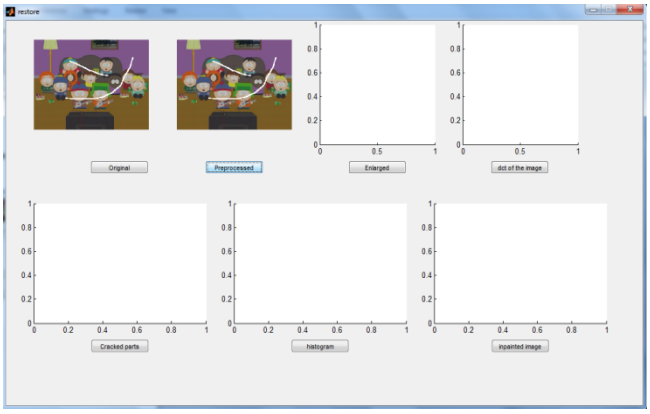
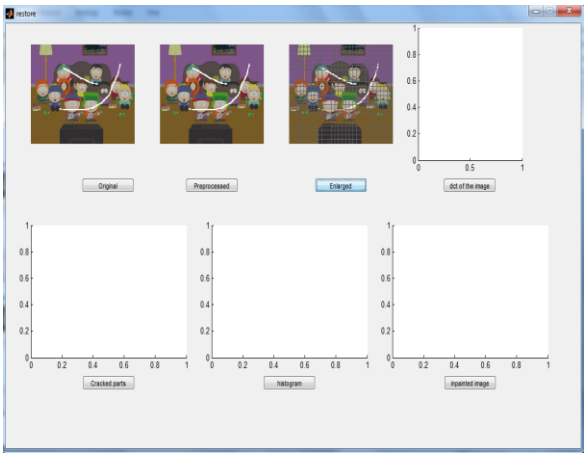


5. GUI of restore algorithm.

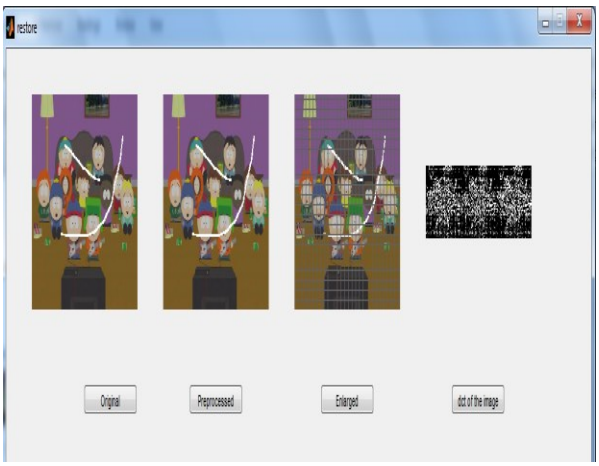
6. Importing the image.

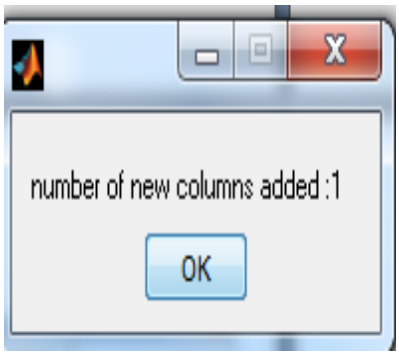


6. Enlarge the image and show each bl.ock of 64 pixels



7. DCT image.





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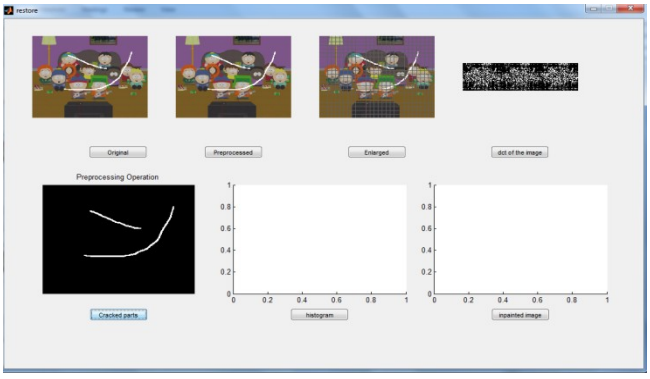
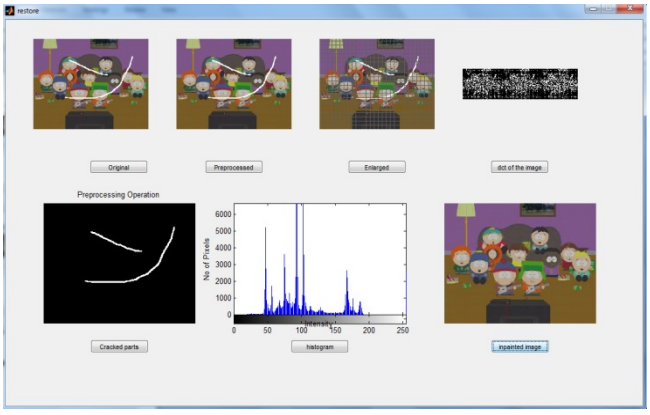
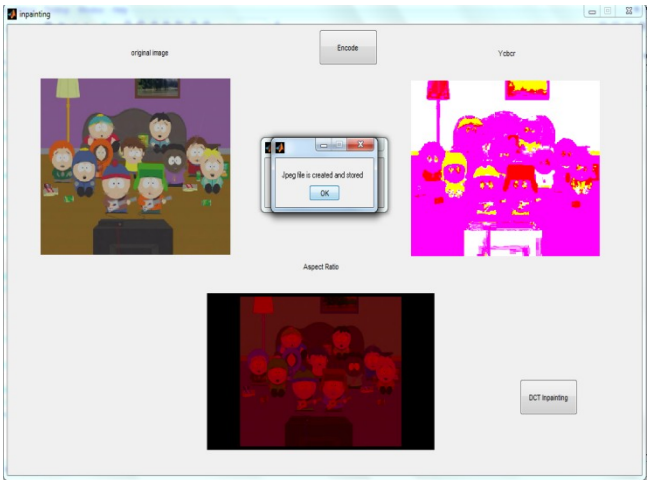
8. Showing the cracked parts



9. Restored image is stored in the hard drive.



10. Now we will follow the same compression algorithm and the compressed image is stored in the hard drive.



IV. CONCLUSION

This paper analyzes coding algorithm of JPEG image and proposes a K-Nearest Neighbor (KNN) approach to perform inpainting in the DCT Coefficients to get a more optimized compression ratio. The proposed methodology is expected to outperform the compression ratio of the Baseline JPEG Algorithm dealing with images having cracks and distortions. The reason behind this is plain and simple. Images having distortions will have anomalies in the distorted parts which will contribute to the size of the image. If those distortions are removed before compression, the output will be more optimized. The proposed methodology is expected to give a good PSNR value compared to the output of JPEG Baseline Algorithm. The output image from the system is expected to be visually more attractive to the Human eyes because of the removal of noise that were present before compressing the image.

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