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SALT AND PEPPER NOISE REDUCTION USING AND GATE HAVING2D MEDIAN FILTERING

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ABSTRACT: *Noise is a redundant signal that may occur in the image. Salt and Pepper noise is also recognized as impulse noise, independent noise or random noise, random occurrence of black and white pixels .The random occurrence of black and white pixels is Salt and Paper noise. Image de-noising is the first step in analysing, restore quality of the image. In this paper we use 2D median filter for salt and pepper noise, the use of medfilt2 FUNCTION. Median filter is a type of non-linear filter used to condense the amount of intensity variant between one pixel and the other pixel. With the rapid development of multimedia technology, the image scrambling for information hiding is severe in today's world. But, in quantum image processing field, the study on image scrambling is still few. Several image scrambling schemes are in circle but, lot of it is yet to be performed. This paper presents the implementation of "AND" gate using bitwise operation to scramble an image metric. .By using "AND "gate", scrambling an image, so that image can be hidden immensely to avoid third party intervention. We use a non –linear method for removing the noise in this paper. . The median filter was once the most popular nonlinear filter for removing impulse noise because of its good de-noising power and computational efficiency. Here we use 2D median filter. With the rapid development of multimedia technology, the image scrambling for information hiding is severe in today's world. But, in image processing field, the study on image scrambling is still few, lot of it is yet to be performed.*

Keywords*:** *Image scrambling, image processing,2D median.**

I. INTRODUCTION.

Signal is defined as conveying some amount of information orit is also defined as function of one or more independentvariables. Signal with one independent variable is called as onedimensional signal examples of one dimensional signal arespeech signal, noise signal etc. An image is also defined as group of pixels and dependingupon the number of bits images are classified into binary image, grey image and colour image. A binary image consists of either 0 or 1 as pixel value. It is also called as black and white image. 0 refers to black and 1refers to white. A grey image consists of any of the 8 bits in their pixel values.The quality and quantity of an image can be modified when it is in grey format only. A colour image consists of three regions namely red, green andblue (RGB) and each region consists of 8 bits, hence thereshould be 24 bits in their pixel values. Especially in images salt and pepper noise plays a key role. Removal of salt and pepper noise draws researcher's attentionfrom several decades. Different filters are proposed to removethis type of noise and each and every one of them satisfiesseveral performance criteria's. Median filter is one of the non linear filters, which removes the noise from the noisy pixels by using iterative steps.

II.PREVIOUS WORK

Several methods are proposed earlier in order to remove salt and pepper noise from the images and these techniques provide several advantages from one another in different aspects of images. Out of these some of the techniques are described in the following sub sections [1][1]. Mean filter is the filter which de-noises the noisy pixels through checking the similarity of the each pixel in theseelected window with the all the pixels . First, it selects the noisy pixel form the image after that awindow is selected and put that window on the noisy pixel,which should be at the center of the window. After that themean value of the input matrix is determined. And this intensity value is replaced with the noisy pixel value. At eachand every step it checks whether it is a last window or not. If it was last window then the iteration ends or else then againthe new window is selected and after that mean value is determined all these steps are continued until the last windowis reached [2][2]. In this approach median filter of adequate window size is employed in favor of finding corrupted element. Absolutely the distinction among the element of interest and therefore the median filtered output is obtained as well as compared with the edge obtained from the minimum and most element values within the chosen window [3][3]. Hence the corrupted pixels value is one and the uncorrupted pixels value is zero for to update the decision based algorithm one should go with the novel algorithm called as modified decision based unsymmetrical.Trimmed median filter (MDBUTMF). In thisprocess an iteration steps fused to remove noise from the
Noisepixels are as follows [4][4].

III.WORKING

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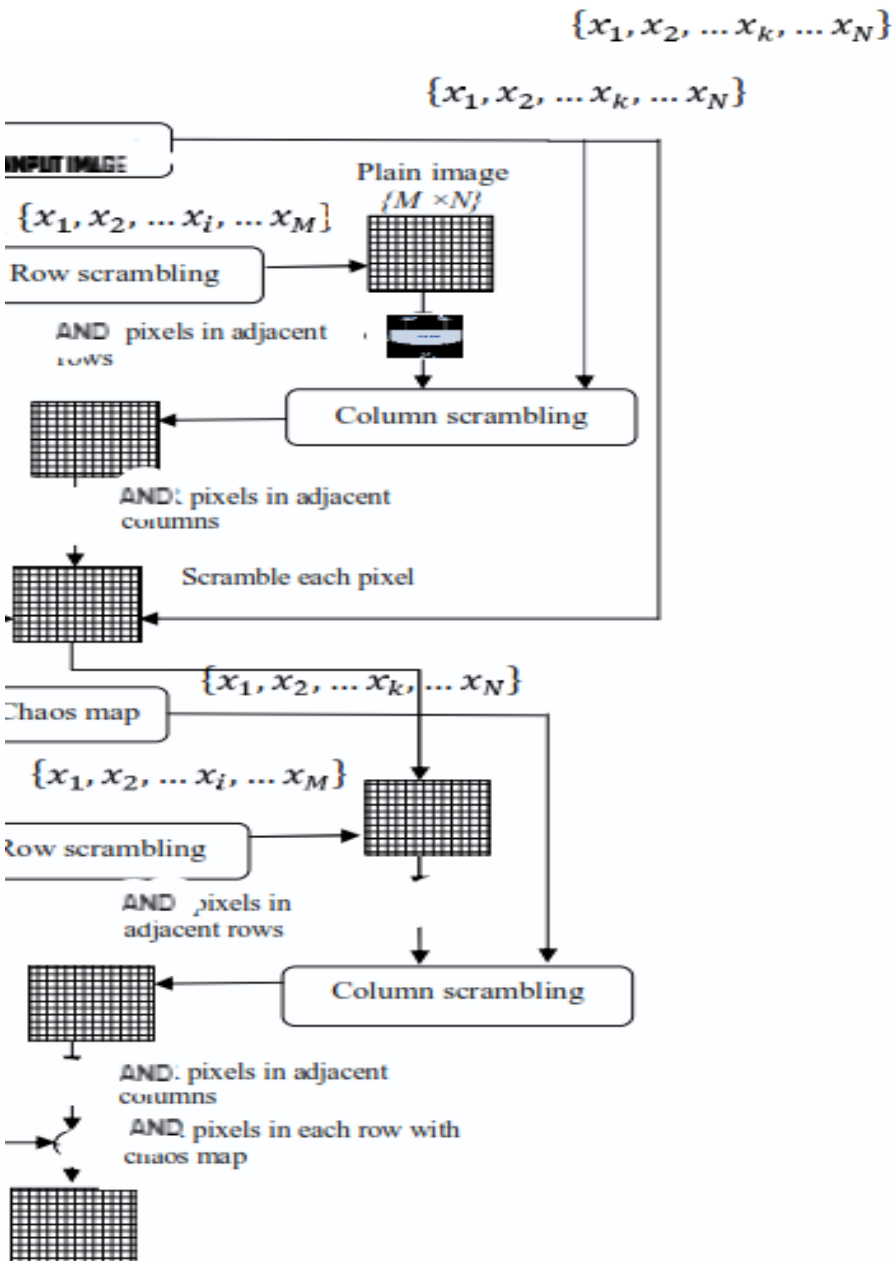

[7][75]

Input a 2D image .Pre-allocate new matrix m+2 by n+2 with zeros Copy 1 to 2 step. Make a window matrix (3 by 3) .Bitwise AND operation to scramble two character matrices by generating a truth table .I need to perform the operation for four characters where each of them have a bit representation as follow

:AND

A = 00

G = 01

C = 10

T = 11

I need to create a table that is two characters together which gives the values for all combinations of ing pairs of characters in thefollowing way.

75 WWW.//HHTPP//GOOGLE.scholar.page.xpxx.edu.in

ANDA G C T
A A G C T
G G A T C
C C T A G
T T C G A

To obtain the output, you need to convert each character into its bit representation, the bits, then use the result and convert it back to example, consulting the third row and second column of the table, by ANDing C and G :

C = 10
C = 10
G = 01
C AND G = 10 AND 01 = 11 --> T

I would ultimately like to apply this rule to scrambling characters in a 5 x 5 matrix. As an example:

A = 'GATT' 'AACT' 'ACAC' 'TTGA' 'GGCT'
'GCAC' 'TCAT' 'GTTC' 'GCCT' 'TTTA'
'AACG' 'GTTA' 'ACGT' 'CGTC' 'TGGA'
'CTAC' 'AAAA' 'GGGC' 'CCCT' 'TCGT'
'GTGT' 'GCGG' 'GTTT' 'TTGC' 'ATTA'
B = 'ATAC' 'AAAT' 'AGCT' 'AAGC' 'AAGT'
'TAGG' 'AAGT' 'ATGA' 'AAAG' 'AAGA'
'TAGC' 'CAGT' 'AGAT' 'GAAG' 'TCGA'
'GCTA' 'TTAC' 'GCCA' 'CCCC' 'TTTC'
'CCAA' 'AGGA' 'GCAG' 'CAGC' 'TAAA'

I would like to generate a matrix such that each element of A gets ANDed with its corresponding element in B .C AND B.
For example, considering the first row and first column:
A{1,1} AND B{1,1} = GATT AND ATAC = GTTG
First, let's define the function that takes two 4-character strings and both strings corresponding to that table that you have. , let's set up alookup table where a unique two-bit string corresponds to a letter. We will also need the lookup table using a class where given a letter, we produce a two-bit string. We want to convert each letter into its two bit representation, and we need the inverse lookup to-do this. After, we AND the bits individually, then use the forward lookup table to get back to where we started. As such:

```
Function [out] = letter AND(A,B)
Codebook = containers. Map({'00','11','10','01'},{'A','T','G','C'}); %// Lookup
InvCodebook = containers.Map ({'A','T','G','C'},{'00','11','10','01'}); %// Inv-lookup
lettersA = arrayfun(@(x) x, A, 'uni', 0); %// Split up each letter into a cell
lettersB = arrayfun(@(x) x, B, 'uni', 0);
valuesA = values(invCodebook, lettersA); %// Obtain the binary bit strings
valuesB = values(invCodebook, lettersB);
   %// Convert each into a matrix
valuesAMatrix = cellfun(@(x) double(x) - 48, valuesA, 'uni', 0);
valuesBMatrix = cellfun(@(x) double(x) - 48, valuesB, 'uni', 0);
   % AND the bits now
ANDdBits = arrayfun(@(x) bitAND(valuesAMatrix{x}, valuesBMatrix{x}), 1:numel(A),
'uni', 0);
   %// Convert each bit pair into a string
XORedString= cellfun(@(x) char(x + 48), ANDedBits, 'uni', 0);
   %// Access lookup, then concatenate as a string
out = cellfun(@(x) codebook(x), ANDedString);
```


Let's go through the above code slowly. The inputs letter ANDare expected to be character array of letters that are composed of , , A,T,G,and C and . We first define the forward and reverse lookups. We then split up each character of the input strings A and B into a cell array of individual characters, as looking up multiple keys in your codebook requires it to be this way.

We then figure out what the bits are for each character in each string. These bits are actually strings, and so what we need to do is convert each string of bits into an array of numbers. We simply cast the string to double and subtract by 48, which is the ASCII code for 0 . By convertingto , you'll either get 48 or 49, which is why we need to subtract with 48.

As such, each pair of bits is converted into a array of bits. We then take each 1x2 of bits between A and BbitAND use to AND the bits. The outputs at this point are still 1 x 2 after this, we concatenate all of the characters together to make the final string for the output. Make sure you save the above in a function

called. Once we have this, we now simply have to use one call that will AND each four element string in your cell array and we then output our final matrix. We will use to do that, and the input into willbe a matrix that is column major defined. We do this as MATLAB can access elements ina 2D array Using a single value. This value is the column major index of the element in the matrix. We define a Vector that goes from 1 to 25, then use to get this into the right 2D form.The reason why we need to do this is because we want to make sure that the output matrix(which is in your example) is structured in the same way. As such:

ind = reshape(1:25, 5, 5); %// Define column major indices

C =arrayfun(@(x) letterXOR(A{x},B{x}), ind, 'uni', 0); % // Get our output matrix

Our final output is:

C =

'GTTG' 'AACA' 'ATCG' 'TTAC' 'GGTA'
'CCGT' 'TCGA' 'GACC' 'GCCC' 'TTCA'
'TATT' 'TTCT' 'ATGA' 'TGTT' 'ATAA'
'TGTC' 'TTAC' 'ATTC' 'AAAG' 'AGCG'
'TGGT' 'GTAG' 'AGTC' 'GTAA' 'TTTA'

we use AND, if we used , OR or XOR with the one-time and it’s extremely important to understand that AND has a 25 percent chance of outputting 1 and a 25%chance of outputting a 0. While OR has a 25%chance of outputting 0 and 75% chance ofoutputting 1. While the XOR operation has a50% chance of outputting 0 or 1.ANDby encrypting an image. Here is a digital image of Charles Babbage:Let’s look at a visual example to see thedifferent scrambling effects of AND vs. OR vsXOR by encrypting an image ... Here is digital image of Charles Babbage:

IV. CONCLUSION

In the AND demonstration, "This happen anytime a random shift of 1 is applied [...]"simply means that the original image data I unchanged when a 1 in the series of randombinary digits is used to operate on the imagedata by means of the AND operation. Take a look at the possibilities:Image data in random bit image data out
0 1 0
1 1 1
As you can see the image… The end of the article claims "This image containsno information about the original image.

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