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Text Fusion in Grayscale Medical Images at Area of Non-Interest

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ABSTRACT
Text hiding in medical images is very important technology now days in image processing. The doctors can store lots of important information related to their the patient's reports and need some space to store and the proper place and name which relates that image with that data. In this work we are going to search noisy pixels at AONI. We can find many technique to AOI (area of interest) for the particular image and will fuse the related document in the NAOI (non area of interest) of the image, and we have many techniques to hide text data in the medical images one of form them is to fuse data at the boarders part of the images and build the particular and pre defined boarder space. But we are going to propose a algorithm in which we will search noisy pixels of the image at AONI to embed data in that noisy portions to save the boarder size.
In this work we will use Fuzzy Logic based algorithms and various other techniques to find the coordinates of the noisy pixels and will hide our text data on that and the remaining data will be embed into the border area of the images. Our proposed technique is like Least Significant Bit to store text data in pixels.
Keywords: - Text fusion, Medical images, Electronic Patient Record, Text data

I. INTRODUCTION

Because of development of latest technologies in communication and computer networks, exchange of medical images between hospitals has become a usual practice now days. Healthcare institution that handles many patients, the doctors often sought from different experts. It require the exchange of the medical data of the patient among the experts which includes the clinical images, prescriptions, initial diagnosis etc. With the increasing use of World Wide Web, these digital images can be easily accessed and manipulated. Considering patient's privacy and diagnostic accuracy, the prevention of medical images from tampering tends to be an urgent task. It is required to imbibe the aspects of confidentiality, authentication and integrity with the distribution of these images in the Health Information System.

Medical images are exchanged for number of reasons, for example teleconferences among clinicians, interdisciplinary exchange between radiologists for consultative purposes, and distant learning of medical personnel. Most hospitals and health care systems involve a large amount of data storage and transmission such as administrative documents, patient information, and medical images, and graphs. Among these data, the patient information and medical images need to be organized in an appropriate manner in order to facilitate using and retrieving such data and to avoid mishandling and loss of data. In order to overcome the capacity problem and to reduce storage and transmission cost, data hiding techniques are used for concealing patient information with medical images. Those data hiding techniques can be also used for authentication.

These applications demand large amount of patient information available in one single image rather than over several entities. It is therefore essential to efficiently embed large amount of data in the medical images while achieving high imperceptibility in order to meet the demand of these applications.

II. LITERATURE SURVEY

In this section which is literature survey deals with the work done by various researchers during last years on medical images. The number of studies in the literature dedicated to watermarking of medical images is not very extensive. In previous techniques we hide the electronic patient record in the NAOI .

Bur in this study we proposed a technique to hide the electronic patient record (EPR) in the LSB (Least Significant Bit) of noisy positions of the gray scale levels of a medical image. This imposes three characteristics for the medical information records. Confidentiality, Reliability and Availability.

III. PROPOSED METHOD

Objectives

The proposed work consists of two modules

Module I

It the first module we check the host image file on which we are going to implement our algorithm to matlab workspace and do the required changes on that like if the image is in RGB format we change it into grayscale and if the image size is too large then it can be converted into nominal size.

Then the normalization of light intensity for the image is to be done so that we can get more specific intensities to work with that.

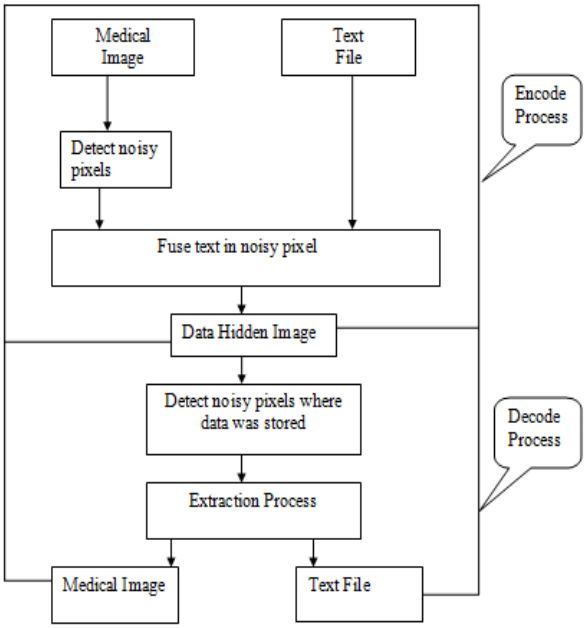
After the normalization we proceed with the finding the noisy pixels in the image by various scanning methods. We are going to implement a new fuzzy logic based (5x5) and (3x3) matrix scanning algorithm which will scan the whole picture in several directions and according to the direction of the majority carries the direction on the preceding pixel will be decided. According to which we can able to decide whether the point is a noise or not.

Modules II

After detecting the noisy coordinates of the image we add our data to them as a watermarking content and save the positions where we are going to fuse our patient data in image.

After fusing the data in noisy coordinates we will check its PSNR and MSE in image.

Flow Chart of process



ALGORITHM

First of all take a grayscale medical image.

In grayscale image value of RGB is equal.

Encoding

Read text file that to be hiding.

Detect noisy pixel y in the image. Draw 3*3 matrix .Now calculates no. of votes that decide the given pixel is noise or not.

if (no of votes >4) then

Noise element

Else

Not noise element

end

1. In this step check ASCII value of a character y which we want to store in noise.
2. Now we will subtract 32 from it.
3. Pixel Value=x & Data Value=y
4. If

Value taken is y >x

Then add both

x+y

Else If

Value taken is x>y

Then subtract

x-y

end

5. Now store new value i.e. (x+y) or (x-y) in green matrix of noisy pixel in LSB.

Decoding

1. Now repeat the step 2 of encoding for detect noisy pixel. Now subtract value of R from G i.e. G-R
2. O/P=(G-R)+32

IV. EXPERIMENTAL RESULTS

Calculate Mean Square Error (MSE) and Peak Signal To Noise Ratio (PSNR)

(1). Mean Square Error (MSE)

$$MSE = \frac{1}{M\,N}\sum_{x=0}^{M-1}\sum_{y=0}^{N-1}\left(f(x,y) - f'(x,y)\right)^2$$

Where *M, N* is the size of the image and contains *M* x *N* pixels, *f(x, y)* is the host image and *f'(x, y)* is the watermarked image.

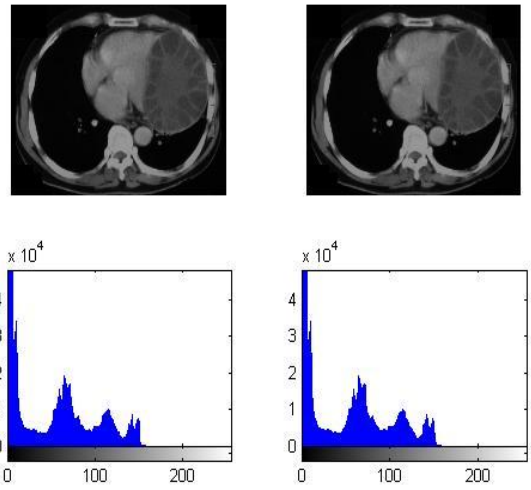
(2). Peak Signal to Noise Ratio (PSNR)

$$PSNR = 10 \times \log_{10} \frac{255^2}{MSE} dB$$

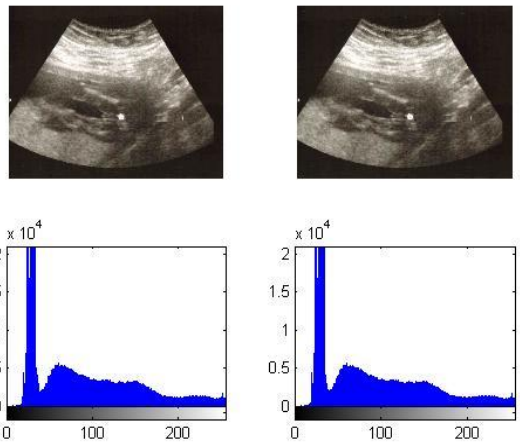
PSNR penalizes the visibility of noise in an image. Values over 36 dB in PSNR are acceptable in terms of degradation, which means no significant degradation is observed by the human eye.

MAGE	PSNR	MSE
ound Image	53.73	0.2776
ay Image	50.32	0.6082

Histogram for X-Ray image:



Histogram for Ultrasound image:



V. CONCLUSION

In this paper we use Least significant bit method and store the data. There are many techniques to fuse text data in the medical images one of form them is to fuse data at the outer boarders of the images and build the particular and pre defined boarder space. But in this paper we study store the data in noisy pixal of the medical images. We got better results than other previous research. Our algorithm can gives integrity to medical images.

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