Detection & Investigative Study of Bone Fracture Using Image Processing

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Abstract **- Bone fractures are a common problem in humans because of excessive pressure on the bone or a stupid accident, and also due to osteoporosis and bone cancer. Therefore, a thorough diagnosis of fractures is an important part of treatment. In this work, X-ray / CT imaging is used to diagnose fractures. The goal of this program is to improve the impressive imaging system based on faster and more accurate separation of bone fractures based on information obtained from X-ray / CT images. Pictures of the broken bone are obtained from the hospital and repair techniques are taken, such as pre-repair, dissection, upper vision, and retrieval procedures. Fixed images will be added to make a broken and unbroken bone and will simulate the arrangement of different methods. This project is widely used MATLAB 7.8.0 as a software tool for image capture, image processing and user enhancement interface. The results obtained show the function of that bone fracture visual system with some imperfections and accuracy 85%.**

I.INTRODUCTION

Bones are strong organs in the human body that protect vital organs such as the brain, heart, lungs and other internal organs. The human body has 26 bones of different types, sizes and shapes. The largest bones are female, and the smallest bones are those of the ossicles. Bone fractures are a common problem in humans. A fracture can occur as a result of an accident or any other case that is too severe. There are different types of broken bones that are usually oblique, stiff, pulled, twisted, twisted and twisted. There are different types of medical imaging to see different types of abnormalities such as X-rays, computed tomography (CT), magnetic resonance imaging (MRI), ultrasound, and more. X-rays and CT scans are often used to diagnose fractures because they are the fastest and fastest way for doctors to study bone and joint injuries. Doctors often use X-rays to determine if there is a fracture and a fracture. The database is DICOM images. In modern hospitals, medical images are stored in the standard DICOM (Digital Imaging and Medical Communication) format, which includes text in images. Any attempt to remove and display these Rayesh Raman Department of Radio Review J.S. Images from Medical College and Missouri Hospital must be via pacac (Image Archive and Communication System) Hardware.

II.LITERATURE REVIEW

There are several algorithms for detecting bone fractures. This section provides a comprehensive review of the literature, beginning with the works that Viyajkumar V on al. demonstrated a filtration algorithm to remove Gaussian noise. First estimate the amount of noise from the noisy image, then replace the middle pixel with the average number of pixels around it from the threshold. Compared to other filter algorithms, such as mean, alpha-truncated regions, Wiener, K-devices, bilaterally and trilaterally, this algorithm offers a lower Mean Absolute Error (MAE) and a higher high signal-to-noise ratio (PSNR). In general, DICOM images are marred by salt and pepper noise.

Al-Hafaf X et.al rated the addition of a charging algorithm K to remove salt and pepper noise based on the number of black or white pixels in the 3 × 3 window. Methods: Poisson and Gauss, this method allows them to collectively visualize the Poisson component parliamentary and Gaussian meaning and difference.

Finally, Zain, M. L. etal mentioned the problem of image processing and the reduction of waste by using a filtering system. The next step is to remove the method.

Chan, K.-P.et al devised a method of selecting images using three different methods, such as wave conversion and penetration. The Har method offers a

much higher value of correction compared to the other two methods.

Tijan, T. developed a system to detect fractures in females based on measuring a woman's neck-shaft corner. In subsequent works, Lim, S. E on al, Jap, D. of al and Lum, VL F of al recommended using Gabor, Markov Random Field, and gradient to strengthen the character taken from x-ray images and embedded in Machine Classifiers (SVM) Support Vector. They find that the integration of three SVM classifiers improves the overall organization and comprehension compared to the use of individual classifiers. From this resurrection, He et al. recommended using the "hierarchical" SVM classification system to detect female infertility.

Mahendran, S. et al proposed a fusion of descriptive techniques to automatically detect fractures of the tibia bone. Authors begin by adjusting steps such as binary translation, edge view, noise removal, and section. For the descriptive stage, he uses three common classifiers, such as neural network (NN), front-to-back, vector transmitter (SVM), and Naive Bayes (NB), using the stupid voting method. The next step is to separate the patterns.

China, X. J. et al. They seek a GLCM-compliant method to create X-ray image of the hand and separate the bone regions from the soft tissue regions. The authors begin with the process of adjusting as binary signals change direction and edge view. It is followed by the asset segmentation and GLCM object removal method. , Ao, C. al showed a method of interpreting hand x-rays. They start by seeing the edges of the image, then simply look at the area of interest and finally the part of the image to remove only the carpal bones.

Bielecki, A.et al designed an automatic algorithm for calculating waist width in the X-ray of the arm. In this work, we attempt to automatically arrange bone fractures using imaging techniques based on the information obtained from X-ray / CT images with good organization and first attempt to create all types of bone fractures without focusing on any type of fracture. and also try CT images with a certain limit.

III.METHODOLOGY

X-ray / CT images obtained from the hospital contain normal and broken bone images. In the first step, set the default settings such as RGB to gray and enhance it using the cleaning algorithm to remove image noise. It will then see the edge of the image using the marking techniques on the edge and parts of the image. After splitting, it converts each image into a set of objects using the output technology. Then we build a descriptive algorithm based on the deleted files. Finally, the performance and order of the planned system is evaluated. The flow diagram of the planned bone fracture search system on X-ray / CT images is shown in below Figure 1.

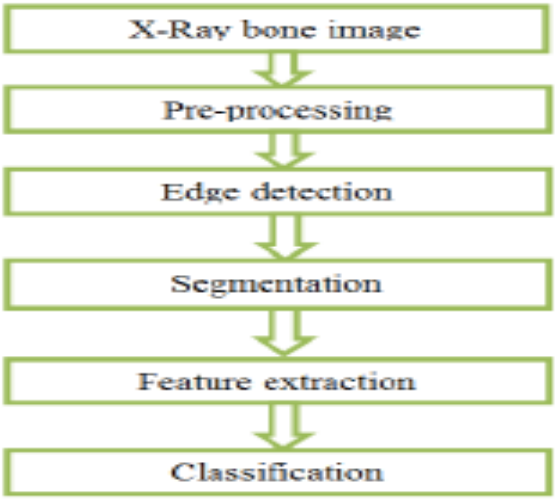

Fig.1.The flow diagram of steps in detecting the bone fracture in X-ray/CT images

3.1 Image pre-processing

In the field of computer imaging imaging, image processing software, noise imaging and image capture play an important role in the success of these systems. X-ray / CT images obtained from the hospital with normal as well as broken bone images. In the first step, use adjusting mechanisms such as RGB to convert gray and remove noise from the image using the central filter.

3.2 Noise removal

Noise can be defined as unwanted pixels present in an image that reduce the image quality. It can be written as: f (x, y) = g (x, y) + η (x, y) The f (x, y) is a noisy image, g (x, y) is the first image and η (x, y) y) the noise level in the image. There are different types of noise present in the image: Gaussian noise, salt and pepper noise, and so on. Salt and pepper are one of the most common types of noise on X-rays. This is usually due to the recording or failure of the detection seen in the image to be clear and black dots. It can be removed

by applying a mathematical change to the images. It protects the edges when removing noise. The central filter is a non-digital digital filter used to remove noise, such as salt and pepper noise.

3.3 Edge Detection

Edge detection is an important function in image processing, which reduces the number of pixels and preserves the image quality by defining the parameters of the objects in the image. Edge viewing is a method of identifying points in a digital image where the brightness of the image changes significantly or, more precisely, to discontinuities. The point where the brightness of the image is automatically aligned to form a set of rounded sections of lines called edges. There are two commonly used top viewing methods: gradient and laplan. The gradient method uses the first graphic image, and the Laplan method uses the second graphical image to find lines. In our method, use a relative edge detector and is a gradient family.

3.4 Segmentation

Segmentation is a method of dividing an image given in equal areas according to other characteristics such as color, intensity, etc. It is an important step in image analysis and finds the object with borders (lines, curves, etc.). This function uses the K-mean method of creation. The purpose of this algorithm is to reduce the objective function, which becomes the ultimate function difference. In this algorithm the average distance or consequence differences between the pixel and the center of the bundle are calculated. This difference usually depends on the strength of the pixels, the color, the design and the location. The quality of the response depends on the initial set of clusters and the value of k. After splitting, cut the image and place the crack with another restriction.

3.5 Feature output

Feature output is a major step in different file format processing. Gray matrix is used for output and selection options. GLCM described by Haralik et al. in 1973. GLCM is the main tool used in image analysis. Decorative images are difficult to visualize patterns that are created by organizations or regions with low-moderations with brightness characteristics, color, shape, size, and more. GLCM is a multi-level messaging system with model numbers whose mode corresponds to other gray levels. We use the Gray Part of the Modern Phenomenon (GLCM) method to find internal notes such as entropy, contrast, harmony, homogeneity.

3.6 Separation

Separation is the process of analyzing data to study a set of data and grouping them into several categories. Each component has its own character and the data for such a section has the same properties of this component. In the described method, different types of selections are used, such as tree selection (DT) and neural network (NN) and meta-classifier. Depending on the colors of the GLCM text, classifiers arrange a given image in a broken and non-broken image unwashed.

IV.RESULTS AND DISCUSSION

As a result of the correction, the appearance of the angles is shown in Figure 2. Figure 2 (a) shows the incoming X-ray image of a female bone. Figure 2 (b) shows the image obtained from the edge and 2 (c) shows the fixed image. The GLCM character is calculated for the separate image and based on this character check if there is a crack or not. The described method is tested on a set of X-ray / CT images including broken and normal images. The database includes a complete 40 images, 20 cracked images and twenty non-cracked images. After the format is released, the images are sorted to make normal and broken images based on GLCM images. The functionality of a systematic system is evaluated in terms of accuracy, comprehension and precision. The analysis is based on the cause. In this work, there are only four possible results for using that for publishing in each case.

The result is a

- True Positive (TP) which refers to cracked images that are clearly marked to be broken.
- True negative (TN) refers to normal (non-open) images that are clearly marked as abnormal.
- False positive (FP) refers to normal (unopened) images incorrectly labeled as broken.
- False Negative (FN) refers to broken images that have been mislabeled (unsealed). The functionality of a structured system is evaluated in terms of accuracy, efficiency, flexibility and flexibility.

Accuracy= (TP+TN)/(TP+TN+FN+FP).

Precision= TP/(TP+FP)
Sensitivity= TP/(TP+FN)
Specificity= TN/(TN+FP)

The classification of the classifier (DT) and neural network (NN) of the selection tree is 53.25%, 75% and 50% respectively. Therefore, combine the upper extremity in a metaclassifier and get the Correction is 85%, the Correction is 76.9%, the Sensitivity is 100% and the Estimated is 70%.

V.CLOSURE

In this work, computer diagnostic techniques for bone detection using X-ray / CT images were shown. Initial pre-treatment removal of noise and edge was detected using a room edge detector. After the section, the location of the fracture is calculated. Patterns tested on a set of images and the results were evaluated according to the GLCM characteristics. The analysis showed that the results obtained were satisfactory and the accuracy of the method was 85%. The division of this method is, in TCT and in some cases X-ray images, it is very difficult to find the location of the fracture, in the future, it is fully performed on CT images and also the type of fracture is included in the section.

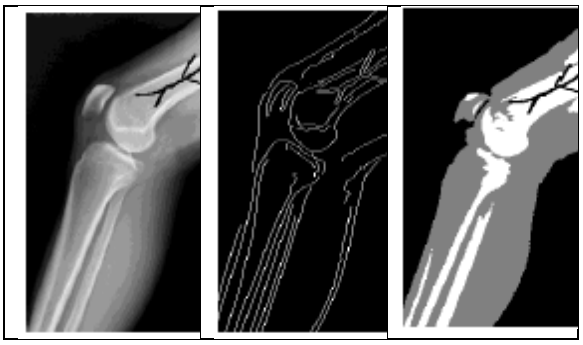

Fig.2 Results of image processing steps (a) input image (b)edge detected image (c) output image

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