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THE IMAGE ANALYSIS OF BONE FRACTURE AND BRAIN TUMOR DETECTION USING IMAGE PROCESSING

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Abstract—The computers are being used in every sphere of our life. In the field of Medical Science, there are number of software's are developed to help the doctors and surgeons with high technical expertise. The traditional scanned reports of X-ray and MRI reports gives the hazy picture, which sometimes leads doctors to make wrong assumptions and that also cause some problems. MR scanned image of the brain and the X-Ray reports of bone fractures are utilized for the entire study in this project. So the segmentation needs to be accurate and efficient to avoid impacts that are caused by various complex biases added to the images. In our propose project, we also detect the fracture in a bone occurs, when the external force exercised upon the bone is more than what the bone can tolerate. The purpose of this project is to find out the accuracy of X-ray bone fracture and Brain Tumor detection using Canny Edge Detection method. In this paper, the software developed using Image processing ,here can used to detect both bone fracture and brain tumor.

Keywords—Brain tumor detection, Edge Detection Algorithm, Fracture Detection,Image Processing, X-Ray Images,

I.INTRODUCTION

Medical image processing is the integration of various fields that include computer science, data science, biological science and medical science. Medical image computation is an effectual and also an economic fashion that aids in the generation of visual representations of the internal part of the body for clinical inspection and medical diagnosis. To extricate the information which is clinically important from the medical image is the principal objective of medical image processing. The field of medical imaging has been witnessing advances not only in acquisition of medical images but also in its techniques and expertise of interpretation. Medical images analysis decreases the doctor's workload. It determines the bone fracture and brain tumor class. In any case, segmentation of brain tumor is yet a critical issue because of different sorts of tumors with various shapes, structure, and size. Many methods have been created for MR image segmentation. Out of which threshold based technique, region based technique, pixel classification, and model based methods are four major classes in segmentation.

Nowadays, X-ray image is widely used for fracture diagnosis and bone treatment as it provides accurate results and quick treatment. Several researches have been previously done for the same purpose. Numerous software's had been implemented to diagnose fracture in human body. In fracture diagnosis is done using canny edge detection method. Software using canny edge detection has been

implemented, and it also provide quite accurate results, but the work can be modified and more refined results can be obtained. This increases the efficiency of software. The same method is used for brain tumor analysis where it get complex for doctor to analyze the disease.

Bones are the rigid organs in the human body which protect important organs such as brain, heart, lungs and other internal organs. Doctors usually uses x-ray images to determine whether a fracture exists, and the location of the fracture. The database is DICOM image. In modern hospitals, medical images are stored in the standard DICOM (Digital Imaging and Communications in Medicine) format.

The different types of fractures that can occur includes: Simple fracture, Open (compound) fracture, Hairline fracture, Greenstick fracture, Complicated fracture, Avulsion fracture, Comminuted fracture, Compression fracture.

Brain tumor segmentation is one of the most difficult and important tasks in medical imaging. A proper segmentation provides quantitative and qualitative information of the tumor that helps doctors to find the most effective treatments for each patient or in case of need to better plan a chirurgical intervention. Nevertheless, this work is usually done manually by experts resulting in a slow, difficult and tedious task that is subject to errors and differences between expert's criteria. In order to overcome these problems many methods have been proposed to automatically perform this task specially when using Magnetic Resonance Images (MRI) of the brain. The current state of the art for this task involves using cutting edge techniques such as Convolutional Neural Networks and Deep Neural Networks.

II. PROBLEM STATEMENT

- Scanning process done by using MRI,X-RAY will produce image which can be analyzed only by the professionals or experts. It can't be analyzed by common people at which stage his desist and this may also contain human errors.
- In our project we will build a model to calculate the probability/the state of bone fracture and brain tumor at which the patient is suffering. This model will produce the image as an output with the defected area highlighted which can be analyzed by the professionalsand patients easily.

III.OBJECTIVE

The main objectives of bone fracture and brain tumor using image processing are enhancing image quality and detection of information in order to clarify image objects in spite of sophisticated details that sometimes make it difficult to process. It is useful to use image-processing methods as the first step to digitize a picture into an image file. The next step is applying some technique to enhance image quality of both brain tumor and bone fracture image, so that doctor will get easy to analyze. Main objective of our system is that same propose System Architecture for both analysis.

IV.PROPOSED SYSTEM

In our proposed system we are going to overcome the existing system by adding two separate systems into one system, where bone fracture and brain tumor disease finding can be done in one single System. The analysis can be done for both bone and brain part and the output will be displayed on display unit.

It starts by taking a set of labeled x-ray images that contain normal as well as fractured bone images and enhance them by applying some filtering algorithms to remove the noise from them. Then, it detects the edges in each image using edge detection methods. After that, it converts each image into a set of features using tools such the Wavelet and the Curve let transforms. Finally, in the testing phase, the performance and accuracy of the proposed system are evaluated.

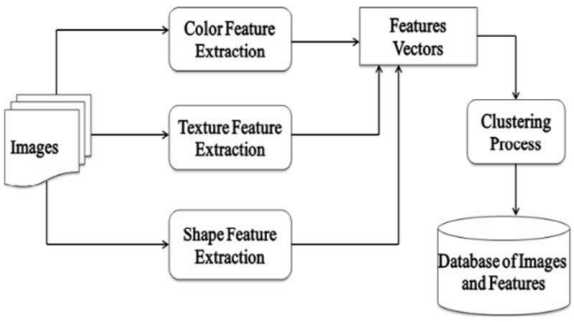

Figure1: Proposed System Architecture

The proposed scheme can be extended for clustering pixel level encrypted images such as medical image database where pixel level encryption is mandatory. The idea is to cluster sensitive images first using the proposed scheme, which will then generate a composite feature vector for each cluster, then, scrambling the medical images within a particular cluster. Finally, the composite feature vector from unencrypted images can be used to represent the cluster with encrypted images.

The software is developed to identify a tumor in the brain MR and bone fracture image. Firstly, a random brain MR image is taken, resized it to 200X200 pixels and converted to a gray scale image. It is then segmented on the basis of KM and FCM clustering methods. In this method, 3 clusters centroid values are taken on basis of which the clustering takes place. In FCM, the centroid values lie between 0-255 since the gray scale values range from 0-255. In clustering, each point has a likelihood of belonging to each group, instead of totally belonging to only one group as it is the situation in the KM algorithm. Find the parameters like segmented area, MSE, PSNR for both clustering algorithm and compare them and the same method is used for bone fracture.

In the proposed system the image of the x-ray / MRI as been taken as the input the image is converted into the gray scale, then the noise in the image is removed by the Gaussian blurring method after this dilation is used which is used to add the pixels in the boundaries of the objects in the given x-ray image to make the objects more visible so it can be seen clearly and that canny edge detection methods is used for removing the edges and smoothing of the given input image, before enhancing the quality of the image at next step quality of the image is enhanced by using black hat and top hat methods the black hat method is used to enhance the quality of the dark objects in the bright background and similarly the top hat does this in opposite where it is used to enhance the quality of the bright objects in the dark background. After this the subtraction method is used to remove negative from the background of the given x-ray image after this the image segmentation takes place and the given image is converted into the binary image which consists of the black and white pixels to represent the objects and minimizes the intra-class variance of the black and white pixels in the x-ray then, boundary detection removes all inner pixels of tumors or cracks and outlines the boundary pixels to get the bounding boxes around the tumor or cracks in the x-ray and at the final step the contours are applied to get the bounding box to show colored boundaries around the tumors or cracks in the x-ray/MRI reports.

V. CONCLUSION

By our proposed system the automated brain and bone fracture monitoring system is implemented and tested with different people X-Rays and MRI reports. Reduce the manual errors. In our proposed system we are going to overcome existing system by adding two separate system into one system, where bone and brain disease finding can be done in one single system. The analysis can be done for bone and brain output is displayed on display unit.

REFERENCES

[1]CristinaStolojescu-Crisan"Politehnica" University of Timisoara."Edge detection techniques for X-ray image

segmentation", Proceedings of the 13th Symposium of Mathematics and itsApplications"Politehnica" University of Timisoara 2016.

[2] LinaChato Department of Electrical and Computer Engineering, Erik Chow Department of Computer Science, "Wavelet Transform to Improve Accuracy of a Prediction Model for Brain disease Patients Based on MR Images"ShahramLatifi Department of Electrical and Computer Engineering. 2018 IEEE International Conference on Healthcare Informatics.

[3] Dhiraj B. Bhakare, Prajwal A. Jawalekar,Sumit D. KordeDepartment of Electronics & Telecommunication Engineering, Prof. Ram Meghe College of Engineering &Management, Bandera Road, Amravati (444602), "A Novel Approach for Bone Fracture Detection Using Image Processing" Maharashtra, India. 2018 International Research Journal of Engineering and Technology (IRJET).

[4]I. Ramirez, A. Martin, E. Schiavi, Area de Matem ´ aticaAplicada, Universidad Rey Juan Carlos (Spain). Institute for Mathematics and Scientific Computing, University of Graz (Austria)."Optimization of a Variation Model Using Deep Learning"2018IEEE 15th International Symposium on Biomedical Imaging (ISBI), Washington, D.C., USA.

[5]M. H. O. Rashid, M. A. Mamun, M. A. Hossain3 and M. P. UddinDepartment of Computer Science & Engineering, Rajshahi University of Engineering & Technology (RUET), Rajshahi, Bangladesh."Brain Tumor Detection Using Anisotropic Filtering, Support Vector Machine (SVM) Classifier and Morphological Operation from MR Images", 2018 IEEE International Conference on Healthcare Informatics.

[6]TanudeepKaur, AnupamGarg, Assistant Professor, Department of CSE, BhaiGurdas Institute of Technology, India"Bone Fraction Detection Using Image Segmentation", International Journal of Engineering Trends and Technology (IJETT) 2016.

[7]KaisarKushibar, SergiValverde, Sandra Gonzalez-Villa, Jose Bernal, Mariano Cabezas,
"Automated sub-cortical brain structure segmentation combining spatial and deep convolution features", Institute of Computer Vision and Robotics, University of Girona, Ed. P-IV, Campus Montilivi, Spain 2018.

[8] KamilDimililera Electrical and Electronic Engineering Department, Faculty of Engineering, Near East University, Nicosia, North Cyprus, Mersin Turkey, "IBFDS: Intelligent Bone Fracture Detection System", 9th International Conference on Theory and Application of Soft Computing 2017.