AN APPROACH TO DETECT BONE TUMOR USING SVM AND GLCM

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Abstract

According to the survey, it can be noted that most of the people all over the world get affected by dangerous diseses such as cancers, breast cancer, lung cancers, and tumors, in any part of the body, in such a case bone tumor is considered to be the most dangerous one because its prediction is very difficult for any one to know.Also it is a highly a risk factor to cure, often it leads to death if a person is with carelessness. It is even more difficult to find the segment the area of bone tumor. So we proposed a method to predict bone tumor using Matlab Image Processing technique to segement the area of bone tumor using SVM and GLCM algorithm.There are two sorts of bone tumors, Noncancerous (Benign) and Cancerous (Malignant). The considerate tumor becomes exceptionally enormous and push on close by tissues, when evacuated by medical procedure, they don't normally reoccur. Threatening tumor has a bigger core that appears to be unique from a typical cell's core and can likewise reoccur after they are evacuated.There are different image modalities like X-beam, MRI and CT examines. The MR imaging system is the best since it has a higher goals. Attractive reverberation imaging (MRI) is a non-intrusive clinical framework used to show 2D pictures of the body. This strategy depends on a procedure that utilizes exceptionally charged attractive fields and radio waves to make pictures of within the body. It is a safe technique for getting pictures of the human body. Its information are generally pertinent and it helps in early discovery of tumors and exact estimation of tumor limits.

Keywords: SVM, GLCM.

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I. INTRODUCTION

Medical image processing is an important field of research as its outcomes are used for the betterment of health issues. A tumor is an abnormal growth of tissues. As the tumor grows, the abnormal tissue displaces healthy tissue. Bone tumors develop when cells within a bone divide uncontrollably, forming a lump or mass of abnormal tissue. There is a large class of bone tumor types which have different characteristics. There are two types of bone tumors, they are Noncancerous type (Benign) and Cancerous type (Malignant). The benign tumor grows veryonline large and press on nearby tissues, once the tumor is removed by surgery, they don't usually reoccur. Malignant tumor which is the dangerous tumor has a larger nucleus that looks different from a normal cell's nucleus and can also reoccur after they are removed.According to the survey, it can be noted that most of the people from all over the world get affected due to bone tumor, some of the examples of benign bone tumor include osteoma, osteoid osteoma, osteochondroma, osteoblastoma one of the giant cell bone tumor and also malignant bone tumor include distal femur and proximal tiba(around the joint).We introduce such a system to detect bone tumor using Matlab Image Processing technique to find the segmented area of bone tumor. Despite an advanced technology is improving, there are relatively bone tumor researches. Therefore, this system represents a step towards finding segmented area of bone tumor.

II. LITERATURE SURVEY

[1] Emran Mohammad Abu Anas, et al., "Automatic segmentation of wrist bones in CT Using a statistical wrist shape pose model" proposed a method of automatic wrist bone segmentation technique for CT images based on a statistical model that captures the shape and pose variations of the wrist joint across 60 example wrists at

nine different wrist positions. framework based on a Gaussian Mixture Model. the disadvantage is tumor can't be predicted at starting stage.

[2] Sinan Onal, et.al., "Automated localization of multiple pelvic bone structures in MRI" stated a method Pelvic bone structures are at present recognized physically on MRI to find reference focuses for estimation and assessment of pelvic organ prolapse (POP). . Results show that the proposed strategy can find the bone structures of intrigue precisely in 87-91% of the pictures. The inconvenience is Non tumor district is anticipated as tumor.

[3] N.S.Makrogiannis, et.al., "Image-based tissue distribution modeling for Skeletonal muscle quality characterization".The prediction and characterization is necessary to understand the changes that occur with aging and age-related metabolic diseases such as diabetes and obesity and how these diseases affect trajectories of health and functional status. Exact tumor region is predicted not it contains the noise during segmentation.

[4] Heena Hooda, et.al., "Brain tumor segmentation: performance analysis Using k-means, fuzzy c-means and region Growing algorithm" This paper talk about the exhibition investigation of picture division strategies, viz., K-Means Clustering, Fuzzy C-Means Clustering and Region Growing for identification of mind tumor from test MRI pictures of cerebrum. The presentation assessment of the previously mentioned methods is done based on mistake rate.

[5] P.Natarajan, et.al., "Tumor detection using threshold operation in MRI brain images" This method contains a strategy for efficient detection of a brain tumor in MRI brain images. The method consists of preprocessing by using sharpening and median filters, enhancement of image is performed by histogram equalization, segmentation of the image is performed by thresholding.

[6] Fenchel, et.al., "Automatic labeling of anatomical structures in MR fastview images" developed the statistical models of deformation and appearance are the both parameters implemented on the GPU (graphics processing unit), which permits computing the atlas based labeling using GPU hardware acceleration.

[7] Kurkure,, et.al., "Automated segmentation of thoracic aorta in non-contrast CT images," proposed a method for a method for localization, centerline extraction, and segmentation of the thoracic aorta in noncontrast cardiac-computed tomography (CT) images.

[8] Kyung-Sub Moon, et.al., "Benign osteoblastoma of the occipital bone" Plain X-ray films and CT scans demonstrated an osteolytic mass surrounded by the sclerotic rim within the diploic space. MRI proved to be the very effective for the evaluation of intracranial extensions of the tumor. In result it is very difficult to formulate a differential diagnosis against other osteoblastic tumors, or osteoid osteoma, in view of its radiological appearance.

III. PROBLEM DEFINITION

People face a lot of difficulties in the process of finding the accurate area of bone tumor, people are subjected to a lot health issues in finding bone tumor the way they are exposed to radiation such as ultraviolet ray imaging etc., which is very harmul to human body. There are several method to find bone tumor with the lagging of some issues like, not able to find the accurate area of bone tumor, the tumor cannot be predicted at the beginning stage, the non tumor area is predicted as tumor area, and it also faces cost issues. The project is designed in such a manner to accomapany the economic feasibility, the technical feasibility, and the operational feasibility, which overcomes the above all issues in an optimized manner using MATLAB image processing technique.

IV. SOFTWARE DESCRIPTION

MATLAB:

MATLAB is a high-level language and it provides an interactive environment for numerical computation, visualization, and programming. Using MATLAB, one can analyze data, develop algorithms, and create models and applications. The language, tools, and built-in math functions enable us to explore multiple approaches and reach a solution faster than traditional programming languages, such as C/C++ or Java. MATLAB provides a wider range of applications, including signal processing and communications, image and video processing, control systems, test and measurement, and computational finance. More than a million of engineers and scientists in industry use MATLAB, as the language of technical computing. MATLAB gives a scope of numerical calculation techniques for investigating information, creating calculations, and making models. The MATLAB language incorporates scientific capacities that help regular designing and science activities Core math capacities use processor-streamlined libraries to give quick execution of vector and network estimations.

IMAGE AQUISITION:

Image Acquisition Toolbox empowers you to secure pictures and video from cameras and edge grabbers straightforwardly into MATLAB and SIMULINK. You can distinguish equipment naturally and design

equipment properties. Propelled work processes let you trigger obtaining while at the same time handling on top of it, perform foundation securing, and synchronize testing over a few multimodal gadgets. With help for numerous equipment merchants and industry models, you can utilize imaging gadgets going from modest Web cameras to top of the line logical and modern gadgets that meet low-light, fast, and other testing necessities.

GLCM:

GLCM stands for gray level co-occurence matrix A co-occurrence matrix or co-occurrence distribution is a matrix that is defined over an image to be the distribution of co-occurring pixel values (grayscale values, or colors) at a given offset.The offset value is compared each and every pixel value of the matrix The offset, is a position operator that can be applied to any pixel in the image.An image with different pixel values will produce a co-occurrence matrix, for the given offset.The value of the co-occurrence matrix gives the number of times in the image that the and pixel values occur in the relation given by the offset.The process of gray level co-occurrence matrix is done to change the image into gray format and for the enhancement process.A GLCM is a matrix where the number of rows and columns is equal to the number of gray levels in the image.

SVM ALGORITHM:

Svm stands for support vector machine,it is a part of machine learning which uses supervised learning algorithm for binary classification or regression Support vector machines is one of the developing algorithm which are popular in many applications such as natural language processing,image processing,machine learning, artificial intelligence, speech and image recognition, and many other computer vision.A support vector machine builds up an optimal hyperplane as a decision surface such that the margin of separation between the two classes in the data is maximized. Support vectors refer to a small subset of the training observations that are used as support for the optimal location of the decision surface.Support vector machines fall under a class of machine learning algorithms called kernel methods and also referred to as kernel machines. "Support Vector Machine" (SVM) is an administered AI calculation which can be utilized for both characterization or relapse difficulties. Be that as it may, it is for the most part utilized in grouping issues. Right now, plot every datum thing as a point in n-dimensional space (where n is number of highlights you have with the estimation of each element being the estimation of a specific arrange. At that point, we perform arrangement by finding the hyper-plane that separate the two classes.

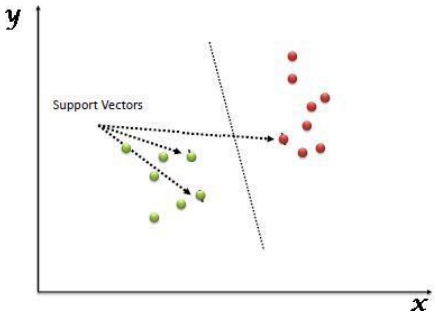

Fig 1 SVM

The above figure shows the separation of two distinct classes by utilizing svm calculation. Bolster Vectors are basically the co-ordinates of individual perception. Support Vector Machine is a boon docks which best isolates the two classes (hyper-plane/line).You can take a gander at meaning of help vectors and a couple of instances of its working here.

V. PROPOSED METHODOLOGY

BLOCK DIAGRAM:

The major blocks involved in this project are shown in fig 2. It comprises Image aquistiion, RGB to gray conversion to convert the image to gray format. Thresholding is a technique to adjust image intensities to enhance contrast. Because of this enhancement visual quality will be little bit better and also easy to analysis. The values will be varied up to 256.Morphological operation is an image processing operation that processes images based on shapes, In a morphological operation, each pixel in the image is adjusted based on the value of other neighborhood pixel. Algorithm is SVM classifier is used to classify the morphological technique and features will be extracted.

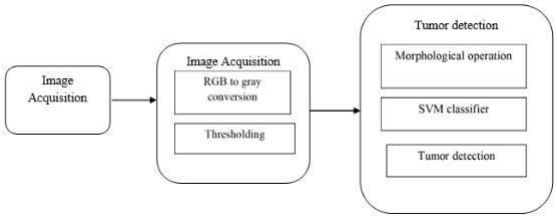

Fig 2 Block diagram

WORKING PROCESS:

The working process behind this project uses matlab image processing technique.The basic principle or algorithm is SVM algorithm.In this method svm classifier is used to segment the portion of cancer detected area, given a broad set of databases(images) as

input, the input image should be in the jpg format or x-ray image then the image is sent to the image acquisition process.In image acquisition process there is a dataset consists of bone tumour (Benign (Non-cancerous) and Malignant (Cancerous)).Among those images select anyone of the image to classify. In preprocessing, two plane conversions is done by converting into gray format if the taken image as supposed to be three plane image,using GLCM the image is converted to gray format by A co-occurrence matrix that is defined over an image to be the distribution of co-occurring pixel value at a given offset .The offset,is a position operator that can be applied to any pixel in the image. Thresholding is a technique for adjusting image intensities to enhance contrast. Because of this enhancement visual quality will be little bit better and easy to analysis. The values will be varied up to 256. In this methos, SVM Classifier used to segment the cancer detected portion. To segment the portion,the svm machine is trained continuously with the required coding and the acquired image is sent to the morphological operation including dilation and erosion method will be applied extracted throughout the filtered image. By the method of morphological, a boundary will be drawn over the affected portion. Then, the region enclosed by bounding box will be splitted out separately with the svm classifier.

VI. CONCLUSION

This method of sementing the area of bone tumor is very accurate which is very helpful to the medical image processing technique in the medical field. This can therefore be a very useful for the doctors and people to analyse the situation on their own without relying on veterinarians for every small problem. Also the features are extracted.

VII. RESULTS AND DISCUSSIONS

The picture shown in fig 3 is the final output which was obtained .The marked region is the affected particular area which is found.

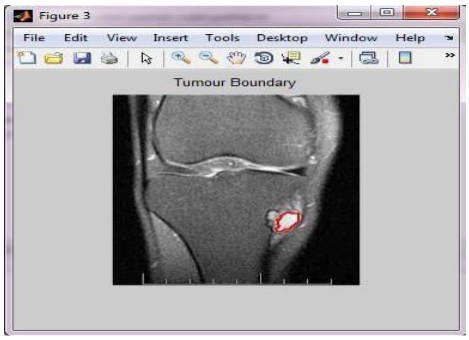

Fig 3 Tumor boundary

VIII. FUTURE SCOPE

This system is an optimized process of detecting the bone tumor which reduces time complexity, cost effect, human effort. So, the process is an advanced effort in the medical field. Hence the future scope of this project bone tumor detection can be further implemented to detect the percentage accurate size of bone tumor and more parameters can be predicted..

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