Brain Tumor Detection using CT scan Image by Image Processing

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ABSTRACT

Hydrocephalus or brain tumor is critical problem in the medical world and also milestone in medical industries because analysis the brain tumor is bigger issue. It's very difficult to analysis the tumor available in brain. And it's essential to evaluate pre operation as well as the post operation. Analysis the tumor in pre-operation is quite easy compare to post operation because pre operation is straight forward problem. We have more advance technology to analysis but in cause of the post operation and analysis because after operation we can't able to pressing on the brain due to distorted anatomy and subdural from brain and CSF so we used a CT scan (Computational Tomographic) for segmentation Of brain image in various dimension. So it's quite easy to analysis the problem. We can also identify the spot of the damage accurately and it useful treatment by using some advance technology we can also detect whether cancer or normal tumor. So that it easy to medical world to treat further because in medical world analysis and spot the disease is a milestone. This process became easy, fast and efficient diagnosis.

KEYWORDS: Straight forward problem, CTScan, Post operation, Pre operation

I. INTRODUCTION
HEMORRHAGE

Brain Hemorrhage a type of stroke, which occurs due to the bleeding or around the brain tissues as a result of intracranial tumor. Because of an accident, trauma may affect the brain cerebral thus causing swelling which may lead to edema pooled blood from surrounding tissues and in future it cause a abnormal tumor tissues which lead to death or critical health issue.

TYPES OF HEMORRHAGE

Based upon the damage it will change it types or variety in four type.

Type 1 Layer:

Intra Cerebral hemorrhage (ICH) type of stroke occurs due to the oxygen supply of reduce or lost an brain interruption of its blood supply. The location of ICH was nearby the surface or in deep areas of the brain. It is a type of stroke caused by bleeding within the brain tissues or brain cerebral itself.

Type 2 Layer:

Subdural hemorrhage (SDH) are the collection of blood or fluid, increase the rate of flow in blood or fluid the potential space between the dura and arachnoid mater of the meninges around the brain. The meninges refer to the connective tissue membranes that line the skull and vertebral canal. There are three layers of meninges known as dura mater, arachnoid mater and pia mater. It encloses the brain and the spinal cord.

Type 3 Layer:

Extradural hemorrhage (EDH) are the bleeding between the inside of the skull and the outer covering of the brain called as "dura mater". Dura mater or arachnoid mater are the thick membrane made of dense irregular connective tissue that surrounds the brain and spinal cord. Extradural hemorrhage (EDH) are often caused by a skull fracture during childhood or adolescence. An extradural hemorrhage occurs when this are a rupture of a blood vessel, usually an artery, which then bleeds into the space between the "dura mater are arachnoid mater" and the skull.

Type 4 Layer:

Subarachnoid hemorrhage **(SAH)** are the life-threatening type of stroke caused by bleeding in the space surrounding the brain. A stroke are caused when the brain is deprived of oxygen because of an interruption of its blood supply. Subarachnoid hemorrhage are caused by ruptured aneurysm.

PROBLEM STATEMENT

The scope of the project are tumor initialization in brain CT Scan images. The main purposes for detection of brain tumors are to provide aid to clinical diagnosis. The scope are to provide an algorithm that protect the presence of a tumor by combining several procedures to provide a trustworthy method of tumor detection in CT Scan brain images. Various methods are used such as clarity, inversely adaptation, denial of an image, image take away, weathering, enlargement, portal and sketch of the tumor. The scope of

this project are CT Scan brain images' tumor extraction and The project are representation in simpler form such that are understandable by patient as well as doctor in easy manner. Humans psychology to understand colored images better than black and white images, So we are using colors to make the highlight the image simpler enough to be understood by the patient along with the medical staff.

Scope of the project
The concept of these project are to bring some useful information in common format in front of the client, importantly for the medical staff treat to the patient. Scope of the project are to define an concept that will result in analysis the medical image of the tumor from the CT Scan brain image. The final image will be able to provide more data such as measurement, proportions and location of the tumor, plot smooth and stages of the tumor and its limitation provides us various information related to the brain stroke that can prove useful for various cases, which will provide a better base for the staff to decide the problem and location.

II. RELATED WORKS
According to benign also can be growth as malicious which are consists of cancerous cells. Malicious are the rapid growing tumor which is invasive and life threatening. Brain tumor are also called as brain cancer since the malicious contains cancerous cells that able to destroy any nearby cell. The states that Primary brain tumors include any tumor that starts in the brain. Initial brain tumors can start from brain cells, the membranes around the brain (ménages), nerves, or glands. Tumors can directly destroy brain cells. They can able to damage cells by producing swelling, by also placing pressure on other parts of the brain, and increasing pressure on the skull. A metastatic brain tumor are a cancer that has spread from anywhere in the body to the brain. According to the conventional definition of brain tumor includes neoplasm's originating from brain parenchyma as well as from ménages and even tumors of the pituitary gland or of osseous intracranial structure that can indirectly affect brain tissues. Histogram contains intensity value of 0-255. The zero value is the darkest part while the 255 was the white or the brightest side. Using the scatter analysis approached used the mixture Gaussian filter for the extracted part pixel intensity. However, most of the method used is more on MRI Scan Image modality compared to CT Scan images because it are good resolutions. CT Scan images of human body parts help medical doctors in diagnosing illness like brain tumor, colon cancer, lung cancer and so forth. However, it was a quite difficult to obtain the important features in the images because it was limited by the system efficient and it also need doctor training.

III. SYSTEM STUDY
3.1. INTRODUCTION OF THE PROBLEM:
Hemorrhage is a medical condition in which there is an abnormal tumor developed in the brain. Which may be normal or cancer tumor. There are various type of tumor intra cerebral hemorrhage (ICH), Subdural hemorrhage (SDH), Extradural hemorrhage (EDH) which used to leak of fluid in the cerebrum fluid are flow at high rate. Which cause a brain tumor cancer and also suffer very high pain. Many cause doctor suffer to analysis. The brain tumor whether it was normal or cancer tumor and also accurate position of the tumor in the early stages itself was very easy to cure the infection and treat the patient very well. Also reduce the

pressure to analysis the location. Previous research project it is difficult to analysis the accurate location or area. By MRI Scan so that only we used CT Scan image for accurate analysis or spot the accurate result major difficult of project was noise of image so that it used to reduce the noise and enlarge the image size and reduce the noise rate. Then further increase the high rate efficiencies. Because of the brain was more sense able and difficult area to analysis the cause and effect of the brain. We can't able analysis manual because it was very sense able area. And also make user-friendly we used in the color pattern also. To differences infected area and normal area because of the black and white color shade was difficult to analysis the spot of infected area sample CT Scan image are attached along with these
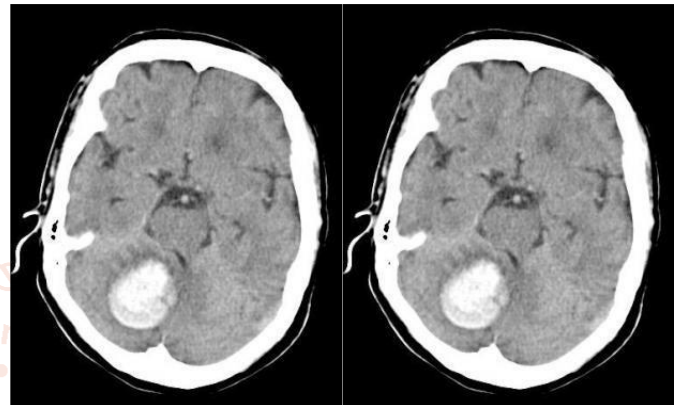

Figure 1. Sample Pre-operative (pre-op) CT scan slices of a hydrocephalic patient B) Segmented CT -slices of the same patient.

IV. SYSTEM ARCHITECTURE:
The System Architecture a design that used to represent the user to upload the medical image or CT Scan in the application ten it used to analysis the scan image using software application that application used to divided the medical image in to various segmentation layers such as preprocessing, morphological operation, segmentation and detection. Preprocessing layer that used to resizing, segmentation layer that used to edge detection with sobel operator by using 3x3 kernels segment approximation one for horizontal changes and one for vertical. Morphological operation is a complex sequence to analysis pixels region further segmentation is a third layer that used to layer CT Scan image further and processing the image edge, vertex etc., analysis the boundaries. Detection layer that used to analysis whether patient as normal tumor or cancel tumor. It used for further treatment for both doctor as well as patient.
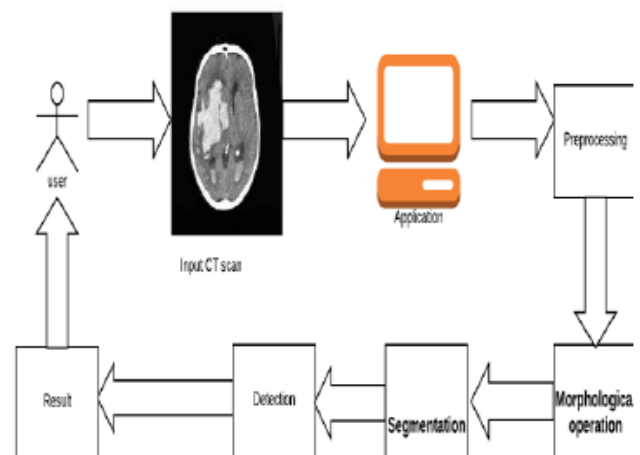

Figure 2. System architecture design

V. SOFTWARE DEVELOPMENT MODULES:

➢ Pre processing

➢ Morphological operation

➢ Segmentation

➢ Feature extraction

1. PRE-PROCESSING:

Pre-processing improves the quality of an image. In this system, preprocessing techniques are developed to remove the skull portion surrounding the tissues.

Conversion of Image:

The CT Scan image are a converted into gray scale image to make it dissimilarity. The dissimilarity image helps in giving exact information about the tissues.

Re-sizing

Resizing is an important step in image preprocessing. It is required for various purposes such as display, storage and transmission of images. While displaying an image, the resolution of the display devises imposes constraints on the maximum size of the display screen. Resizing is changing the dimensions of an image. It is done so as it fits on the system user interface. The converted gray scale image is resized to 256 pixels by 256 pixels size.

Edge Detection

Edge detection are used to detect the boundary area or surface. Which upload on the software that used to analysis the issue on the CT Scan Image. Edge are act as boundaries for an images. There are calculated by a kernel 3x3 kernel matrix which are convolved with a original images or CT Scan image. Edges themselves are boundaries of object surfaces. Which often lead to oriented localized changes of intensity in an image. In the system sobel operation are used for edge detection. The Sobel operation are worked based on convolving the image with splitting up images, separate and integer value

2. MORPHOLOGICAL OPERATION:

Dilation and erosion operators are further used in complex sequences of opening and closing. Opening consists of a weathering are followed by a dilation and can be used to eliminate all pixels in regions that are too small to define a structuring element. The Closing operation are work based on eliminating a small holes and fills gaps in the contours. After opening and closing reconstruction operation, the complement of the gray scale image are taken, to calculate the regional maxima. Later, we are super imposed these markers on the original images or CT Scan Image.

3. SEGMENTATION:

Segmentation layer used to analysis and segment the image clearly. Watershed algorithms works for images which as a low contrast. Thus it helps in separating out the distinct regions. The watershed algorithm are computed on the slope of the original image or CT Scan image, so that the drainages basin boundaries are located at high slope points.

4. FEATURE EXTRACTION:

After segmentation, we extract certain features of the image and input it further to a classifier. Thus main aim of this feature extraction is to reduce the original datasets by measuring certain features. The classifier used are a GLCM (Grey Level Co-occurrence Matrix). The GLCM functions characterize the various of the image by calculating how for pairs of pixel with specific values or terms and in a specified spatial relationship or similarity occur in an image, thus develop a GLCM, and then extracting statistical measures from this matrix and determinants. A GLCM are a matrix where the number of rows and columns are equal to the number of gray levels.

VI. CONCLUSION

The final outcomes of the project is help the both doctor as well as patient because detecting the type of hemorrhage is very crucial step or complex step to analysis through software application our main aim to analysis spot that affect and also analysis whether it was normal tumor or cancer tumor. Using watershed algorithm these automatic detection process is more complex operation morphological operation are performed to compute the foreground and background markers. The use of feed forward network with back propagation has helped in reducing error at the output. Thus detecting the hemorrhage efficiently. Even non-technical users will find this concept useful since this system is implemented using GUI (Graphical User Interface) so it will provide a clear result.

VII. ACKNOWLEDGMENT

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