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Automatic Segmentation and Detection of Brain Tumor in MR Image

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Abstract: Here we produce a method which will make an exact outline of the tumor region in the brain. The first method of this is used are Fuzzy C-means (FSM) and the second method is level set method. By using this method a boundary of the brain and the tumor region in the brain is known and this method will provide a clear and clean tracing of the tumor region. The level set method (LSM) is used to split or to merging together. Here the first image of the brain is taken and marked the boundary is detected. Further the tumor part is detected from the MRI images.

I. INTRODUCTION

CANCER is one of the dangerous diseases in the Medical field. Brain is the main part of the human body. Then all parts of the body are controlled by brain cells. So, brain is the important part of the body. Currently brain tumor is a serious disease among children and adults. Brain tumor's location and quickly spreads make a dangerous problem in treatment of tumor. Hence, image segmenting and detecting are energetic way to solve the medical problems of various diseases. Imaging of brain tumor can be done by (CT) computed tomography scan, magnetic resonance image scan, Ultrasound, etc.

Tumor Types

- A. Benign Tumor is a tumor that does not expand in abrupt way it does not affect its neighbor healthy tissues also does not expand to non-adjacent tissues. Moles are example of benign tumors.
- B. Pre-Malignant Tumor is a precancerous stage, considered as a disease, if not properly treated it may lead to cancer.
- C. Malignant Tumor Malignancy is type of tumor that grows better with the passage of time and finally results in the death of a person

II. METHODOLOGY

- 1) *Fuzzy C-Mean*: The fuzzy logic a method to process data by giving partial membership value for each pixel in image. The membership of the fuzzy set ranges from 0 to 1. Fuzzy cluster is basically multi valued logic that permits intermediate values i.e., member of a fuzzy set can also be a member of other fuzzy sets in the same image. There is no sudden passage between complete membership and non-membership. The membership performance states that the blurriness of picture and also for defining the information within the picture.
- 2) *Level Set Algorithm* uses non parametric disfigure models with current contour energy minimizing techniques that solve computation of geodesic. Level set methods governed by curvature defining speeds of moving curves or fronts.

Level set methods are managed by curvature process speed of moving curve.

There are massive number level set ways built for segmenting medical pictures, every one most of the ways follows some similar generic levels.

Initially spotted zero is Associate in Nursing firstly contour haphazardly, in or out of region of interest, set $\phi =$ Euclidean distance process of contour and Function ϕ allowed to evolving according to first or second derivative partial differential equation then it is reinitialized after a number of iterations and go to second statement until the function ϕ converges or $= 0$.

For various applications, number of PDEs can utilized, the solutions of PDEs found to the choice of the parameters which appears in energy functionals. Level sets rely on two central embedded first inserting the interface as zero level set of higher dimensional function, secondly the interface's velocity to this higher dimensional level sets. The development of surface is maintained by a level set equation.

A novel approach is presented for brain tumor segmentation on MRI images which is fully automatic and does not need any user interaction.

Many other methods are also used for the detection of brain tumor in MRI Images

III. BLOCK DIAGRAM

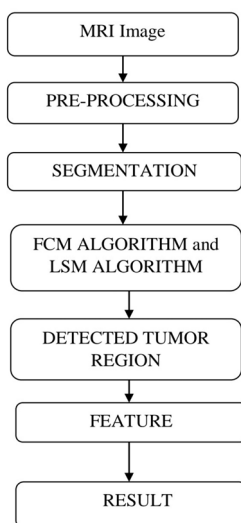


Fig.1: Block Diagram Representation of Steps Involved in Tumor Detection

IV. RESULTS

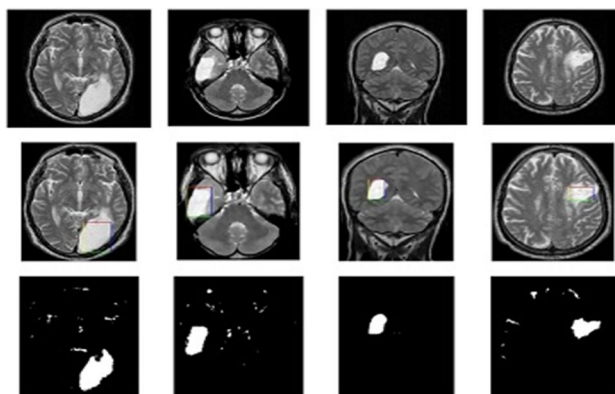


Fig.2: Representation of Tumor detection in MRI Images

CONCLUSION

The main objective of this method is using the FCM and LSM algorithm various steps like image pre-processing, image restoration, image segmentation, have been used and also various formulae are used to form the energies. We can speed up the process and get the exact region of the tumor and there is no reinitializing of the boundary and also the method require less time without any errors.

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