

Diagnosis Of The Feature Extraction For Brain Tumor In Matlab.

Ajay Kumar Sharma¹

Research Scholar Mewar University Chittorgarh (Rajsthan), India, profsharmaak@gmail.com.

Dr. Manju Mandot ²

Director & Professor of Computer Science, JRN Rajasthan Vidhyapeet Udaipur, India,
manju.mandot@gmail.com

Abstract— MRI (Magnetic Resonance Imaging) is an indispensable diagnostic tool in medical science, especially in the diagnostics of diseases & ailments of human brain. MRI is an unsophisticated medical imaging technique used to produce high quality image slices of human brain, which when combined form a 3-D picture of the brain. MRI imaging is widely used for diagnostics & detection of brain tumor due to its high resolution & capability to show brain structure, tumor's size location. The author has proposed hybrid algorithms employing image processing techniques on MRI image for tumor detection & classification. Coefficient in top, down & left, right (horizontal) traversal of image is complete to localize the tumor maximum & fuzzy logic identifies the part of brain affected & generates a list of symptoms & prognosis.

Keywords- Brain tumor, Magnetic Resonance Imaging, Fuzzy logic, Tumor detection

I. INTRODUCTION

A brain tumor occurs when abnormal cells form within the brain.[2] There are two main types of tumors: cancerous (malignant) tumors and benign (non-cancerous) tumors.[2] Cancerous tumors can be divided into primary tumors, which start within the brain, and secondary tumors, which most commonly have spread from tumors located outside the brain, known as brain metastasis tumors.[1] All types of brain tumors may produce symptoms that vary depending on the part of the brain involved.[2] These symptoms may include headaches, seizures, problems with vision, vomiting and mental changes.[1][2][7] The headache is classically worse in the morning and goes away with vomiting.[2] Other symptoms may include difficulty walking, speaking or with sensations.[1][3] As the disease progresses, unconsciousness may occur

II. BRAIN TUMOR

The cause of most brain tumors is unknown.[2] Uncommon risk factors include exposure to vinyl chloride, Epstein-Barr virus, ionizing radiation, and inherited syndromes such as neurofibromatosis, tuberous sclerosis, and von Hippel-Lindau Disease.[1][2][3] Studies on mobile phone exposure have not shown a clear risk.[3] The most common types of primary tumors in adults are meningiomas (usually benign) and astrocytomas such as glioblastomas.[1] In children, the most common type is a malignant medulloblastoma.[3] Diagnosis is usually by medical examination along with computed

tomography (CT) or magnetic resonance imaging (MRI).[2] The result is then often confirmed by a biopsy.[1] Based on the findings, the tumors are divided into different grades of severity.[1]

A. *Signs and symptoms*

The signs and symptoms of brain tumors are broad. People may experience symptoms regardless of whether the tumor is benign (not cancerous) or cancerous.[12] Primary and secondary brain tumors present with similar symptoms, depending on the location, size, and rate of growth of the tumor.[13] For example, larger tumors in the frontal lobe can cause changes in the ability to think. However, a smaller tumor in an area such as Wernicke's area (small area responsible for language comprehension) can result in a greater loss of function..

III. METHODOLOGY

Digital image processing is the use of a digital computer to process digital images through an algorithm.[1][2]. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems.

A. *Image Processing*

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

B. *Feature extraction technique*

In machine learning, pattern recognition, and image processing, feature extraction starts from an initial set of measured data and builds derived values (features) intended to be informative and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human interpretations. Feature extraction is related to dimensionality reduction.[1]

When the input data to an algorithm is too large to be processed and it is suspected to be redundant (e.g. the same measurement in both feet and meters, or the repetitiveness of images presented as pixels), then it can be transformed into a reduced set of features (also named a feature vector). Determining a subset of the initial features is called feature selection.[2] The selected features are expected to contain the relevant information from the input data, so that the desired task can be performed by using this reduced representation instead of the complete initial data.

C. *Matlab*

MATLAB is a system examines focus abbreviated shape, is a clear and versatile programming condition for hail planning, change, coordinate programming and distinctive issues. We can extend the basic MATLAB package by using an additional toolbox. Instances of these toolboxes are: signal getting ready, channel blueprint, bits of knowledge, and significant math. MATLAB's broad documentation is available. MATLAB related issues an extraordinarily powerful newsgroup. MATLAB is an educational lingo. MATLAB licenses clear numerical calculations and portrayal comes to fruition without the prerequisite for front line and dreary programming.

Many data analysis software packages provide for feature extraction and dimension reduction. Common numerical programming environments such as MATLAB, SciLab, NumPy, Sklearn and the

R language provide some of the simpler feature extraction techniques (e.g. principal component analysis) via built-in commands. More specific algorithms are often available as publicly available scripts or third-party add-ons. There are also software packages targeting specific software machine learning applications that specialize in feature extraction.[4]

D. Image Processing Toolbox:

Image Processing Toolbox provides a comprehensive set of reference-standard algorithms and workflow apps for image processing, analysis, visualization, and algorithm development. We can perform image segmentation, image enhancement, noise reduction, geometric transformations, image registration, and 3D image processing. With the image processing toolbox apps, we can automate common image processing workflows. We can segment image data interactively, compare image registration techniques, and batch-process large data sets. Visualization features and apps allow us to browse images, 3D volumes, and videos; adjust contrast; create histograms; and manipulate regions of interest (ROIs).

IV. IMPLEMENTATION

There has been an intermittent improvement of MATLAB during the time with various customers giving data. For fundamental and moved number-crunching, science, and building it is the general course instrument used as a piece of a school circumstance. For development, examination, ask about and higher gainfulness MATLAB is the appropriate choice used by the business. A social event of usage specific courses of action to be particular apparatus compartments is the crucial segment of MATLAB.

A. Input the MRI Images

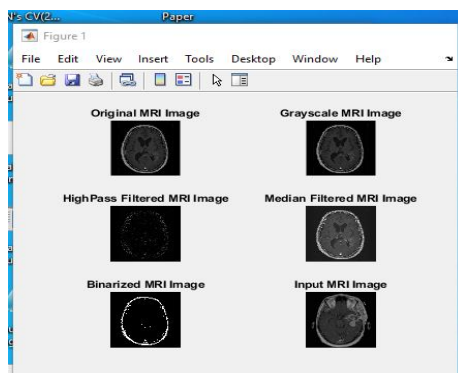


Figure 1:Input the MRI Images.

B. Adaptive Noise Filtartion

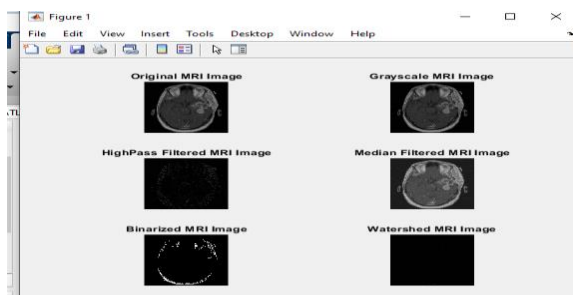


Figure 2: Adaptive Noise Filtartion

C. Skull Detection & Center Orientation

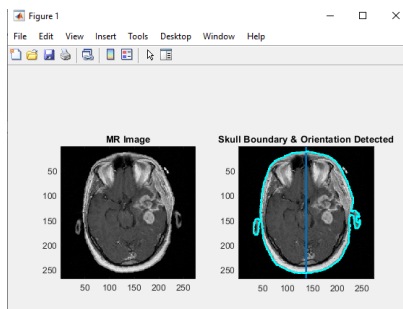


Figure 3: label Skull Detection & Center Orientation

D. Tumor Detection

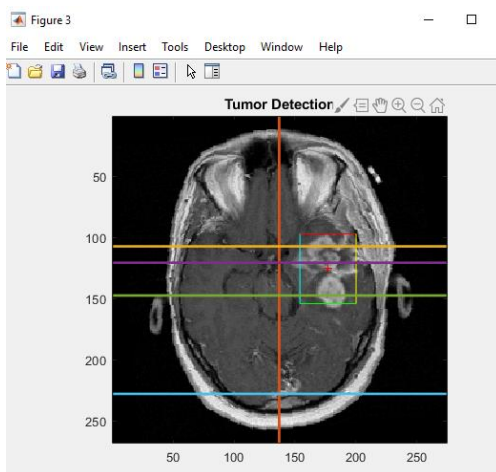


Figure 4: Tumor Detection & Segmentation

V. RESULT AND FUTURE SCOPE

The author has proposed comprehensive automated hybrid algorithm for MRI image processing for brain tumor detection & classification. The proposed system can be used to the basic requisites for tumor detection such as segmentation, registration, Tumor detection & classification etc. The proposed technique has been implemented in MATLAB using MATLAB core function & image processing toolbox. The proposed system has been implemented as a comprehensible fall that encapsulates all the necessary steps & techniques require for final tumor detection. Major classification of steps being GUI based input image selection, adaptive noise filtration skull detection & centre orientation, tumor detection & segmentation. The proposed system not only detects & segments a tumor but also computes important parameters such as tumor size /area also the proposed system is able to locate the part of brain affected by tumor & display associated symptoms & prognosis correlation. The proposed system combines many techniques such as brain area/boundary segmentation for skull detection, Bhattacharya coefficient in horizontal & vertical directions for tumor detection, rule based fuzzy logic for brain part affected data monitor & morphology for tumor segmentation

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