Brain Tumor Detection from MRI Images

Summary

Currently, the Medical image processing is one of the most challenging and emerging field in the evolution of technology. Processing of MRI images is one of the part of this field. This project describes a strategy to detect & extraction of brain tumor from patient’s MRI scan images of the brain. This method includes some noise removal functions, segmentation and morphological operations which are the basic concepts of image processing. The detection and extraction of tumor from MRI scan images is done using C++ with the help of OpenCV.

Introduction

Medical imaging plays a central role in the diagnosis of brain tumors. Early imaging methods – invasive and sometimes dangerous – such as pneumoencephalography and cerebral angiography have been abandoned in favor of non-invasive, high-resolution techniques, especially magnetic resonance imaging (MRI) and computed tomography (CT) scans. Neoplasms will often show as differently colored masses (also referred to as processes) in CT or MRI results.

From these high-resolution images, we can derive detailed anatomical information to examine human brain development and discover abnormalities. Now-a-days there are several methodology for classifying MR images, which are fuzzy methods, neural networks, atlas methods, knowledge based techniques, shape methods, variation segmentation. MRI consists of T1 weighted, T2 weighted and PD (proton density) weighted images and are processed by a system which integrates fuzzy based technique with multispectral analysis.

The primary stage in image analysis is the pre-processing of the MRI scan image which includes image enhancement methods, segmentation method, and some morphological operations. There are assumptions made about the size and shape of the tumor for the morphological operations.

Method

The method used in this project includes two stages. Firstly, the pre-processing stage, where the image is enhanced and segmentation operation is performed. And secondly, the morphological operation stage. These stages are