VAAGDEVI COLLEGE OF ENGINEERING

(Department of Electronics and Communication Engineering)

Major Project Presentation

on

A Novel Denoising and Segmentation of Brain Tumors in MRI Images

Under The Guidance Of:

Ms.G.Radhika

Assistant Professor

Presented by

K.Preetham Ganesh – 15641A0496

B.Chandu - 15641A0479

Ch.Sai - 15641A0462

ABSTRACT

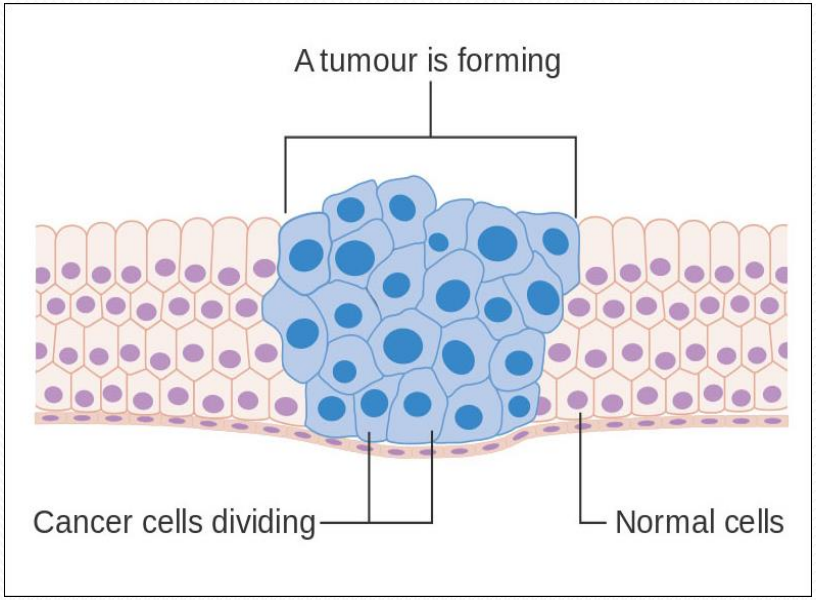
- Brain tumor extraction and its analysis are challenging tasks in Medical image processing because brain image is complicated.
- Segmentation plays a very important role in the medical image processing.
- In that way MRI (magnetic resonance imaging) has become a useful medical diagnostic tool for the diagnosis of brain.
- The main goal of our work is to show the de-noising algorithms based upon the discrete wavelet transform (DWT) that can be applied successfully to enhance noisy multidimensional magnetic resonance (MR) data sets.
- Further part of work will be devoted to feature extraction with DWT, Feature selection using PCA and classification using SVM Classifier.

What is Tumor?

- A swelling or enlargement; one of the four classic signs of infla mmation.
- In general, tumors are divided

Into three groups:

- Benign
- Premalignant
- Malignant

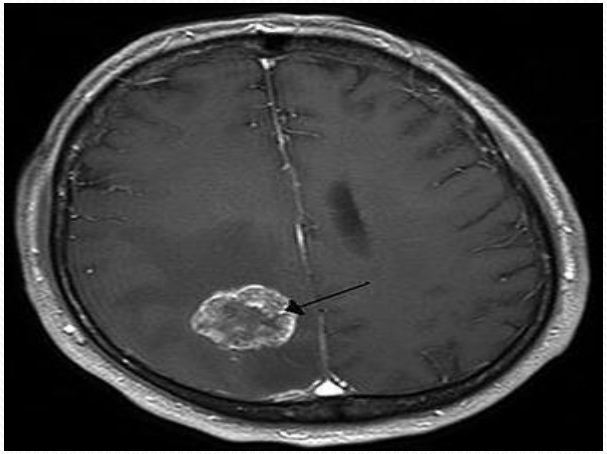


Brain Tumor

A **brain tumor** occurs when abnormal cells form within the brain.

Symptoms may include

- Headaches,
- Seizures,
- Problem with vision,
- Vomiting, and mental changes.



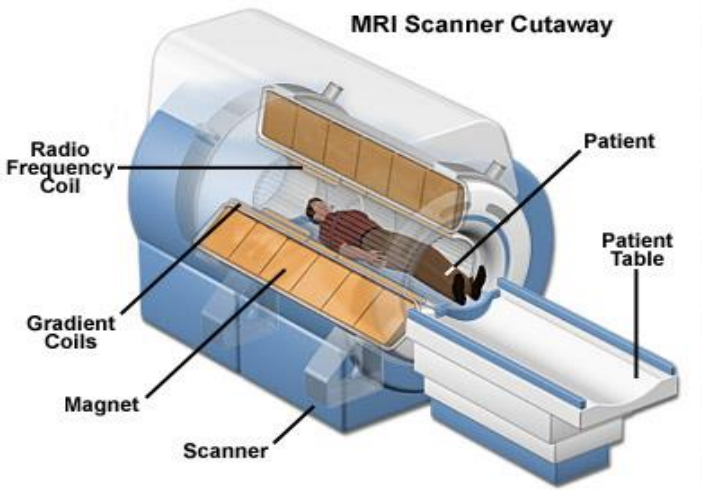
Brain Tumor Area

Diagnostic methods

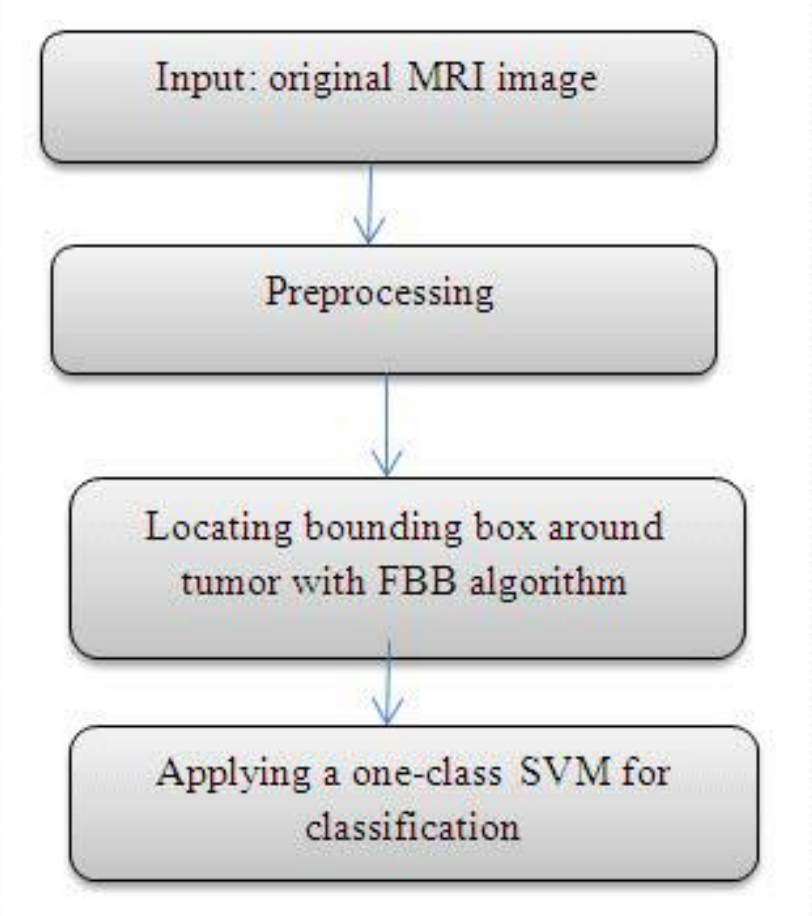
- **Techniques**
  - Performing Biopsy
  - **Performing Imaging**
    - X-Rays
    - Ultra sounds
    - CT
    - **MRI**

INTRODUCTION

- MR imaging is a popular medical Imaging technique used in radiology .To visualize detailed internal structures.



BLOCK DIAGRAM



Software used

- MATLAB (2013 and Above)

Resources Implemented

- Anisotropic diffusion filter
- Fast Bounding Box (FBB)
- Support vector machine Classification

Proposed Method and Materials

- Our main intension in current work is brain image denoising and segmentation algorithms using FBB and SVM for improved performance.

- Pre-Processing stage
- FBB Procedure
- SVM Classification

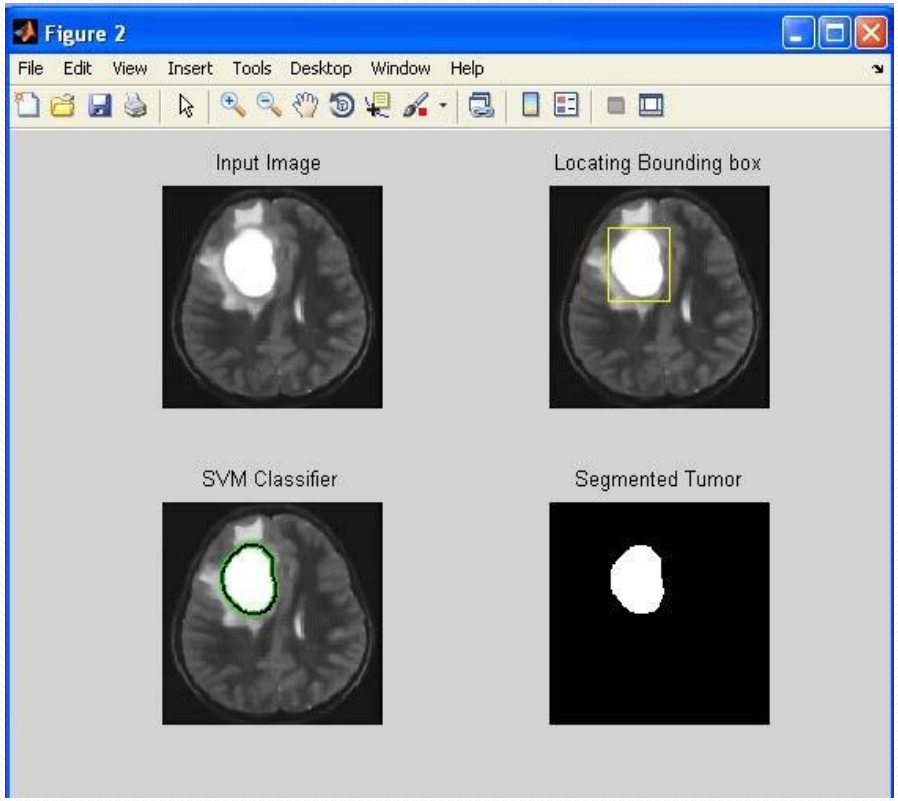
WORKING

- First phase is a pre-processing stage in which unusable parts of human brain are detached and anisotropic diffusion filter is applied to remove noise present in MRI images by embedding 8-connected neighborhood.
- In the second phase to know the tumor location we used FBB (Fast Bounding Box) process, and one class SVM is opted for substantial training sample set usage. Finally by opting the one class SVM classifier involving the Radial Basis Function (RBF) kernel is employed for locating exact tumor portion and isolates it from useful healthy texture region in MRI images.

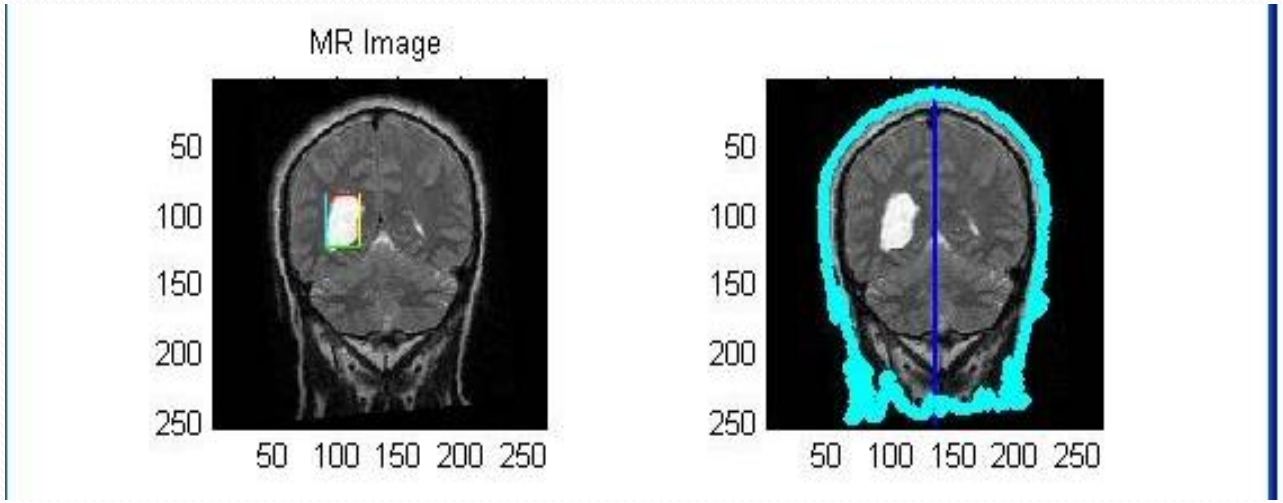
APPLICATION/IMPROVEMENTS

- Segmented tumor obtained with precision are very useful for radiologists and specialists to have a good idea of estimating tumor position and size which is greatly dealt with ease and without any prior information using this project.

RESULT

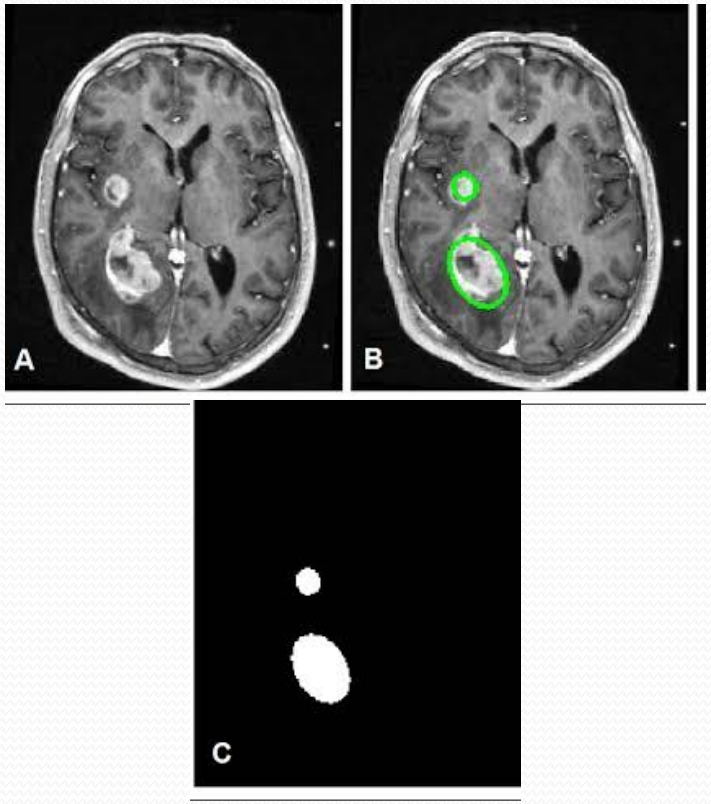


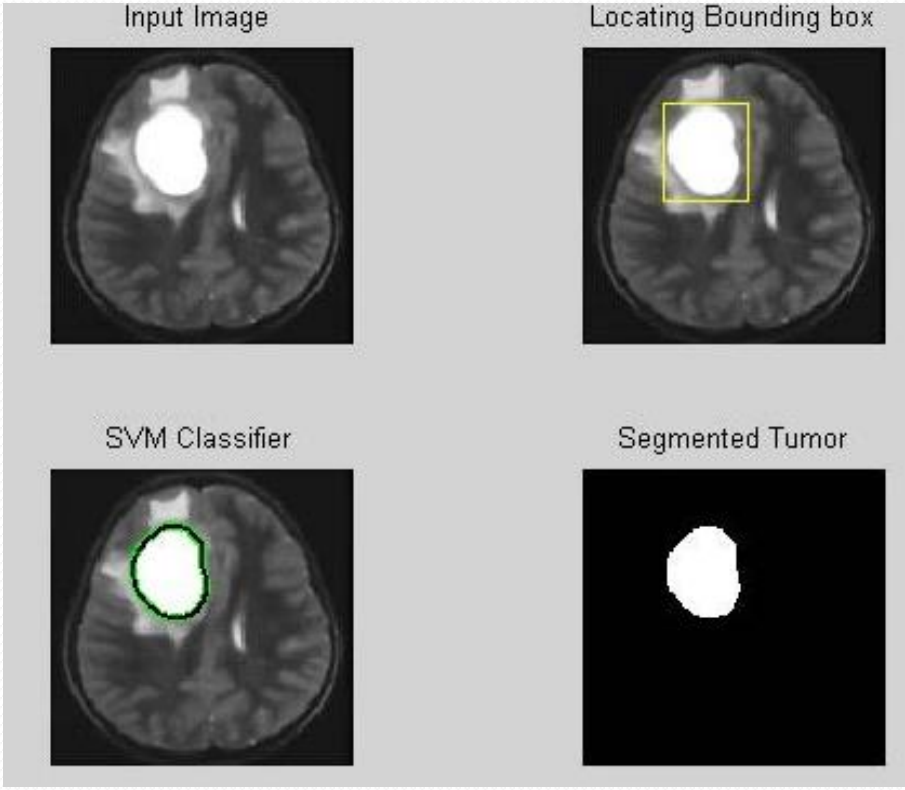
Pre-processing, Fast Bounding Box (FBB) and one class SVM classification of third image



Detailed Segmentation Technique

Comparison with Previous Methods





Chen-ping YU- Tumor Segmentation (vs) Proposed Method

Comparison Results

- Chen-Ping Yu tumor detection and segmentation uses Edge Detection Segmentation where as the proposed model used region based image segmentation.
- This model uses the FBB Algorithm and SVM Classification where as Chen-Ping YU detection directly uses object tracking algorithm which have slightest noise around the segmented tumor
- As Chen-Ping YU model lacks bounding box algorithm some region beyond the tumor area is also included in the output. So its not universally acceptable.

References

- Diaz I, Boulanger P, Greiner R, Murtha A. A critical review of the effect of de-noising algorithms on MRI brain tumor segmentation. IEEE Annual International Conference on Engineering in Medicine and Biology Society (EMBC); 2011 Sep. p. 3934-7.

- Fazli S, Nadirkhanlou P. A novel method for automatic segmentation of brain tumors in MRI images. IJASCSE. 2013; 2(6).

- Chen-Ping-YU, Image Segmentation of Brain Tumor using Magnetic Resonance Imaging Images in Medicine and Biology Society (EMBC); 2011 Sep. p. 3934-7.

- Singh SK, Singh KB, Singh V. Medical image de noising and fast bonding box algorithm. IRJES. 2012 Sep; 1(1):001-8.

- Zhou1 J, Chan KL, Chong VFH, Krishnan SM. Extraction of brain tumor from MR images using one-class support vector machine. IEEE Proceedings of 27th Annual Confer- ence on Engineering in Medicine and Biology; Singapore. 2005. p. 6411-4.

THANK YOU

QUERIES!?