

Brain Tumor Detection using Image Processing

What is the problem?

- The main problem addressed here is the difficulty in detecting brain tumor at an early stage using MRI images.
- Since, they are prone to noise and environmental disturbances. Making it difficult for doctors to accurately detect and diagnose brain tumors.

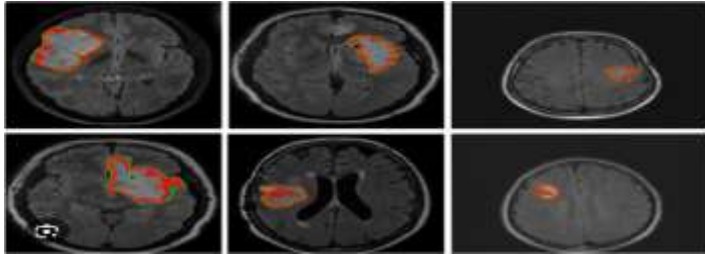


Fig. Brain Tumor Detection Using MRI

What has been done earlier?

Earlier approach for detecting brain tumors mostly relied on image processing techniques which included :

- Image pre-processing – For enhancing the quality of MRI images.
- Segmentation – For separating different regions of an image to identify tumors. Methods like SVM, edge-detection were commonly used.

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What are the remaining challenges? What novel solution proposed by the authors to solve the problem?

Remaining Challenges :

- Many existing systems only detect whether a tumor is present but do not provide high accuracy in detection.
- Previous methods did not classify the tumor's stage or compute its area effectively.
- Some systems were limited to analyze only cancerous image, and could not handle non cancerous cases or stages effectively.

Novel Solution Proposed :

- Pre-processing : Convert MRI images to grayscale, apply noise reduction filters, to enhance image quality for analysis
- Use advanced segmentation technique like U-Net to accurately separate the tumor from brain tissue in the images.
- Implement a CNN to automatically extract features from the segmented images, capturing relevant patterns and structures.
- Replace SVM with CNN's fully connected layers for classifying tumors into different types and stages based on the extracted features.