Experimental results and analysis

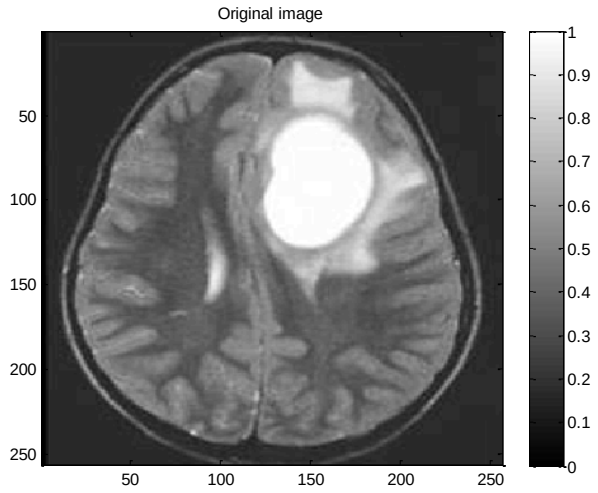
1.1 Software used

The software implementation of the project has been done using MATLAB. MATLAB stands for MATRIX LABORATORY, software developed by Math works (www.mathworks.com) in USA. First of all it is used in military area. For this proposed work, image processing toolbox commands and Image Acquisition commands has been used.

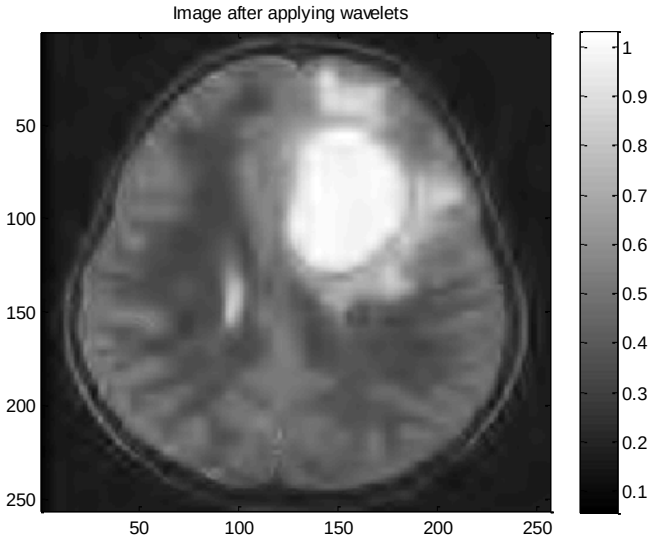
1.2 Results and discussions

Daubechies wavelet has been used for discrete wavelet transform. When the decomposition is done, the image is reconstructed using soft and adaptive thresholding technique. In thresholding basically the noise is removed from the image, the image is compressed and a smooth image is obtained which helps in easy segmentation of tumor. Thresholding provides an easy and the most convenient way to separate the foreground and the background. After thresholding segment the image using fuzzy C-Mean clustering on the basis of intensity. After this edge detection has been applied this generates edges on the intensity boundaries in the image. After this watershed algorithm has been applied in order to separate the tumor region from the rest. Below are the results for a particular image at different steps of the algorithm.

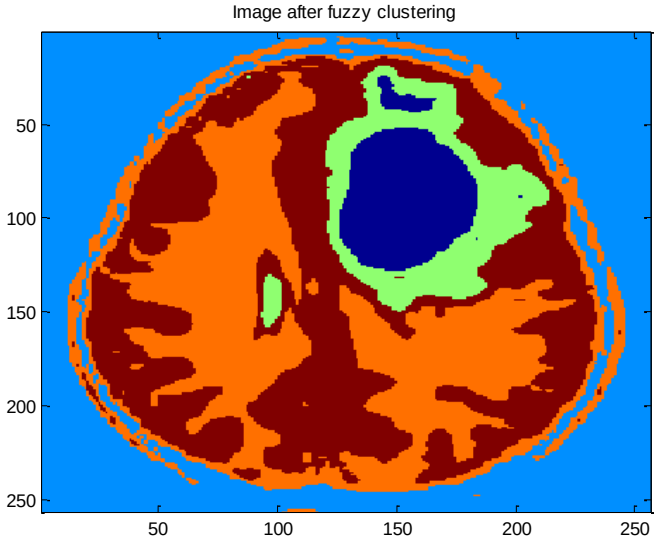
Step 1) read the input image



Step 2) Image after applying wavelets

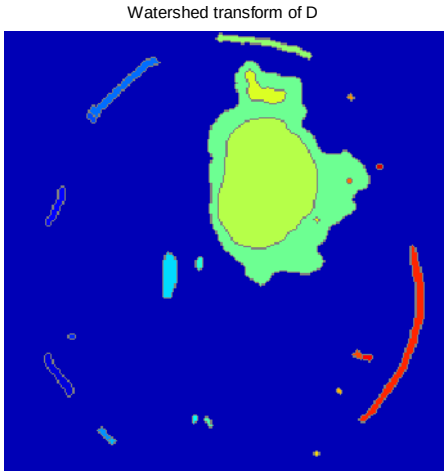


Step 3) Image after Fuzzy c means



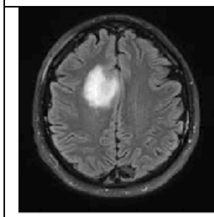
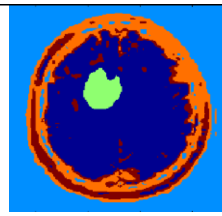
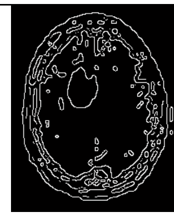
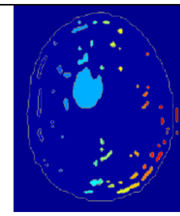
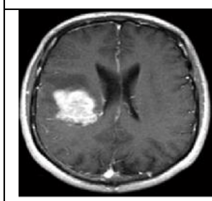
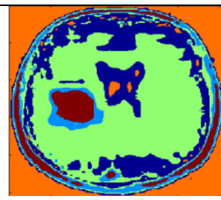
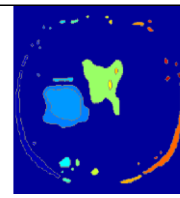
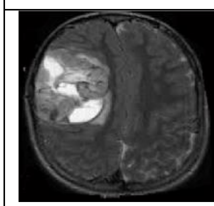
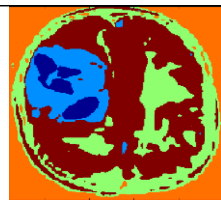
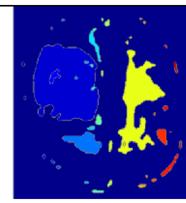
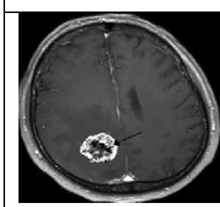
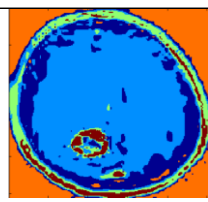
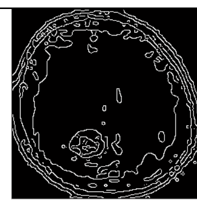
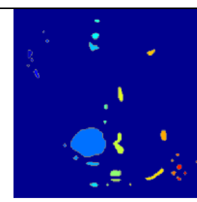
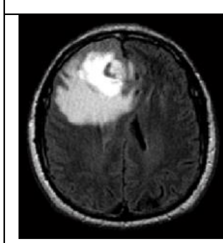
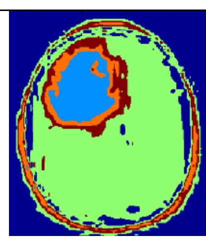
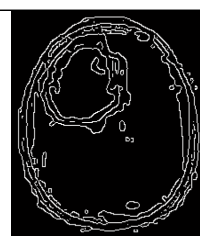
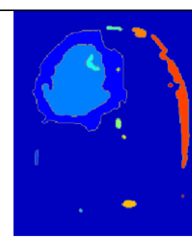
Step 4) Image after canny edge detection

Step 5) Image after applying watershed algorithm



Results for other images has been shown as tabular form

Table 1: Results at different steps for variety of images of brain tumor

Original Image	FCM	Canny Edge Detection	Watershed transform
			
			
			
			
			

Conclusion and future scope

This project describes Brain tumour detection, Segmentation by Using Watershed and fuzzy clustering algorithm and describes the comparative study about the tumour detection. Achieved results are shown in upper section which shows the efficient tumour detection by using than watershed algorithm. As alone watershed is not the good method for detecting tumour, proposed algorithm will be modified for locating the exact tumour area in the image. Till this project, the algorithm is able to segment the tumour portion in a single contour. In future, the desired portion will be further segmented from the rest image.

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