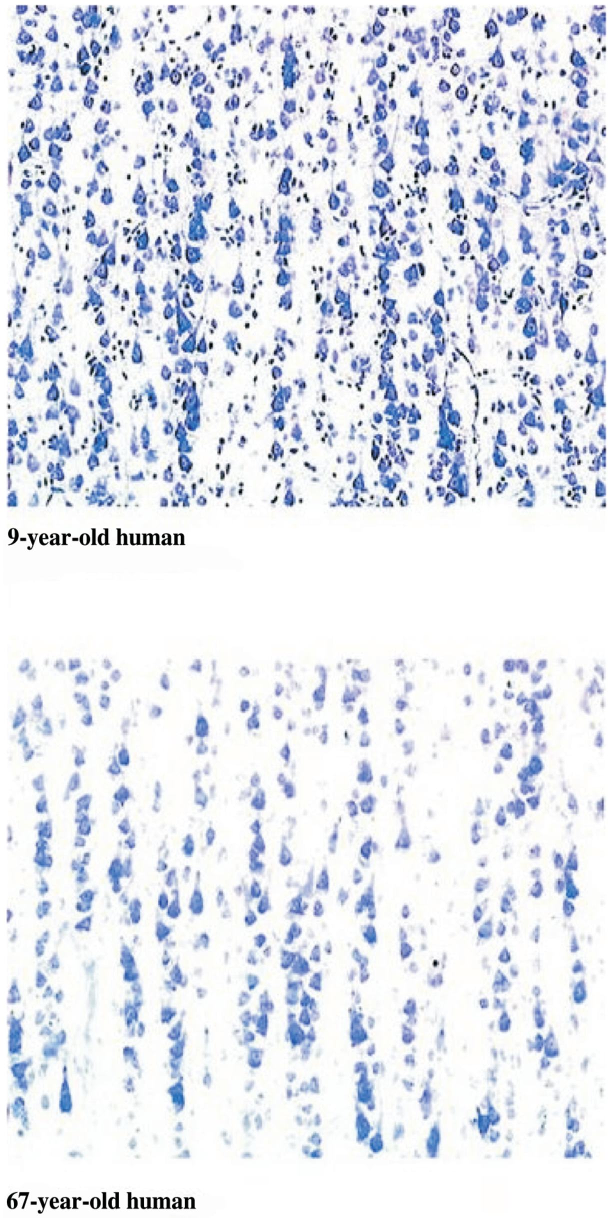


Figure 1. Differences between the minicolumnar structure in 9- and 67-year-old human brains. The bottom picture illustrates that in aging stage the brain loses whole minicolumns and not randomly scattered neurons, which supports the fact that the minicolumn is the basic unit of the human cortex.

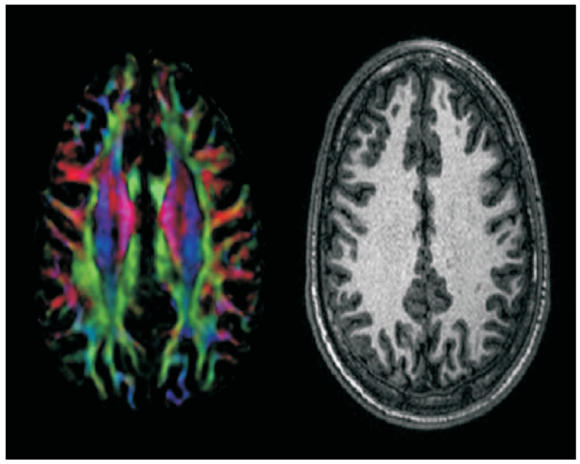


Figure 2. A diffusion tensor image that shows the white matter bundles and the corresponding MRI slice.

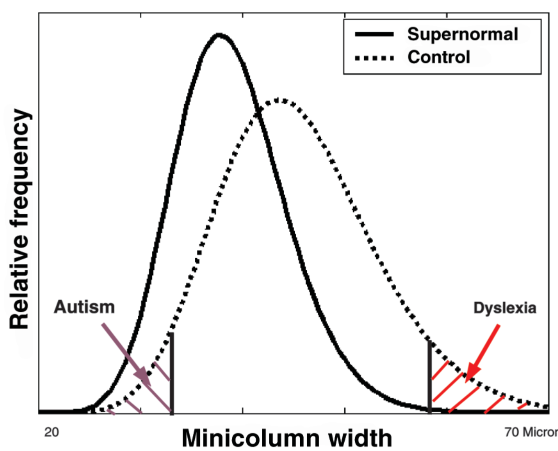


Figure 3. Histogram of the minicolumn width in human brain with the dyslexic and autistic regions illustrated. The Figure demonstrates that the minicolumns in the normal brain have a normal width distribution, whereas in autism all the minicolumns are of smaller width and in dyslexia all the minicolumns are of larger width.

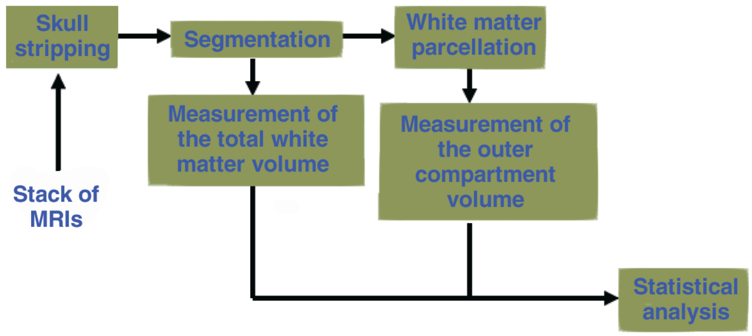
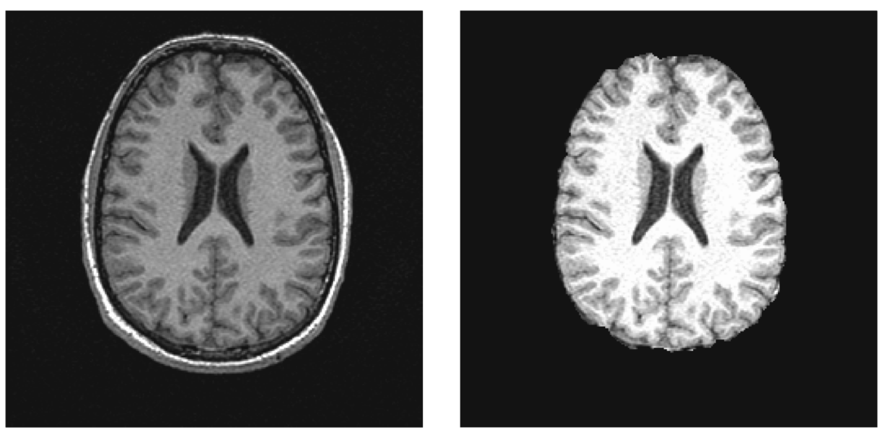
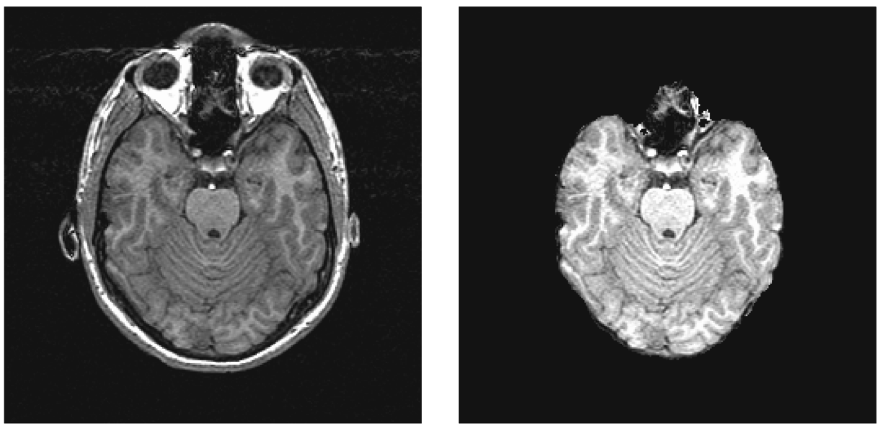


Figure 4. Block diagram of the proposed approach.



(a) (b)

Figure 5. Skull Stripping using MRICro software: (a) MRI slice 71; (b) result of skull stripping.



(a) (b)

Figure 6. Skull Stripping using MRICro software: (a) MRI slice 42, (b) result of skull stripping. The Figure illustrates the efficiency of the software when applied to a complicated brain slice and its ability to remove the eyes and skull.

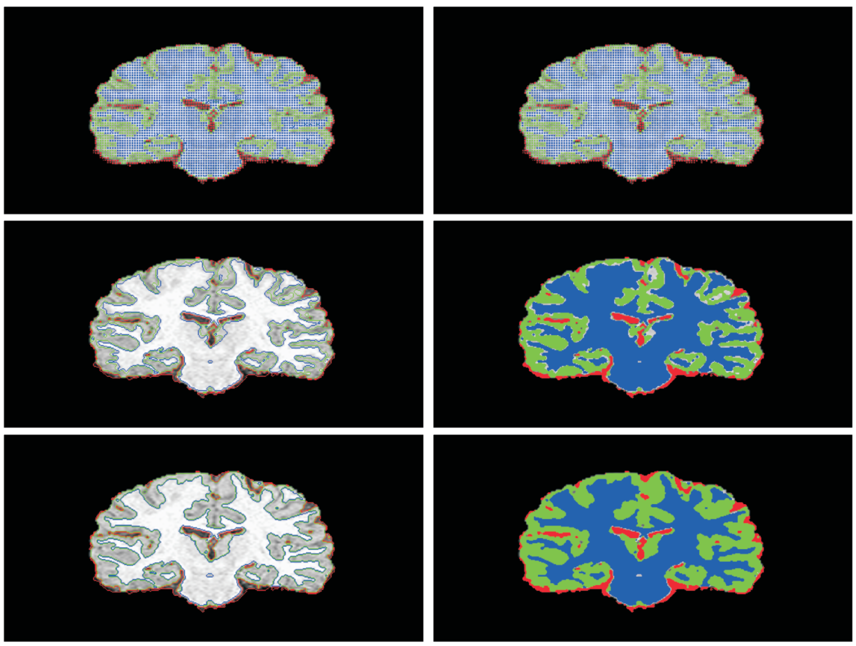


Figure 7. Three steps in the evolution of the three classes of segmentation of a T1-weighted MRI image in the coronal section. **Left column**: blue contour represents white matter region, green contour represents gray matter, and the CSF is marked in red. Associated adaptive regions are given in the right column.

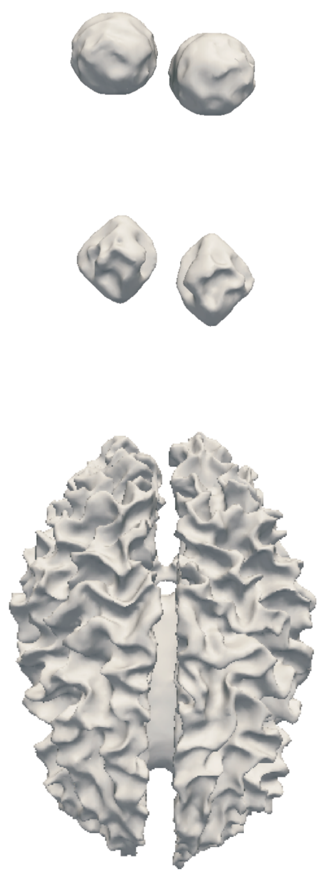


Figure 8. Several steps in a surface evolution to cover the white matter of the brain from an MRI dataset of size $256 \times 256 \times 124$. The top Figure shows initialization of the algorithm by two spheres inside the white matter; the middle illustration depicts an intermediate step that represents evolution; the bottom Figure represents the final result of the surface evolution.

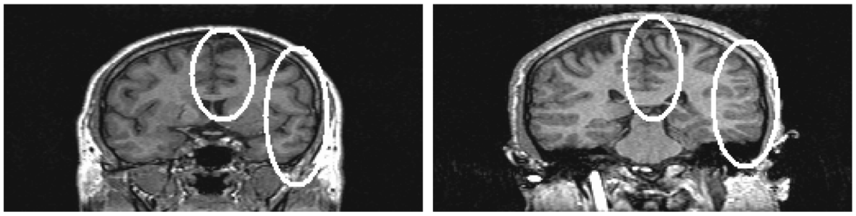


Figure 9. The difference in geometry between normal and dyslexic brains. The marked areas show that the gyrifications in the normal brain (right image) is much more complex than its corresponding part in the dyslexic brain.

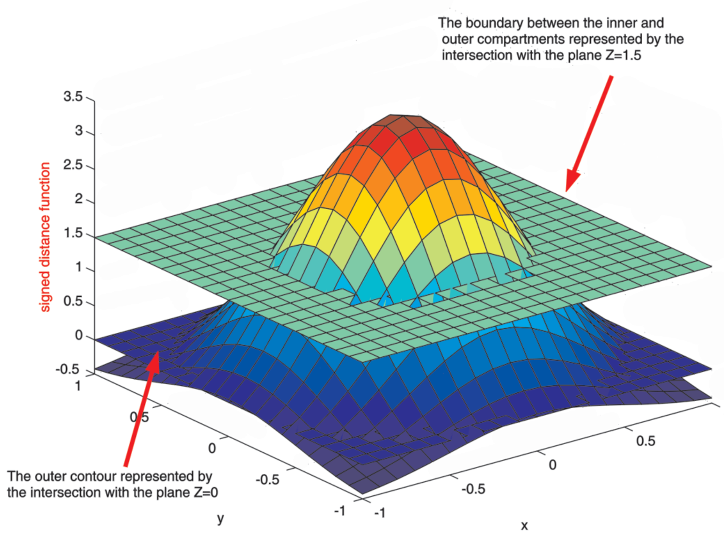


Figure 10. This illustrates the idea of moving the outer contour using the signed distance function ϕ. Intersection of ϕ with plane $z = 0$ represents the original contour, and its intersection with plane $z = d_1$ represents the new boundary. .

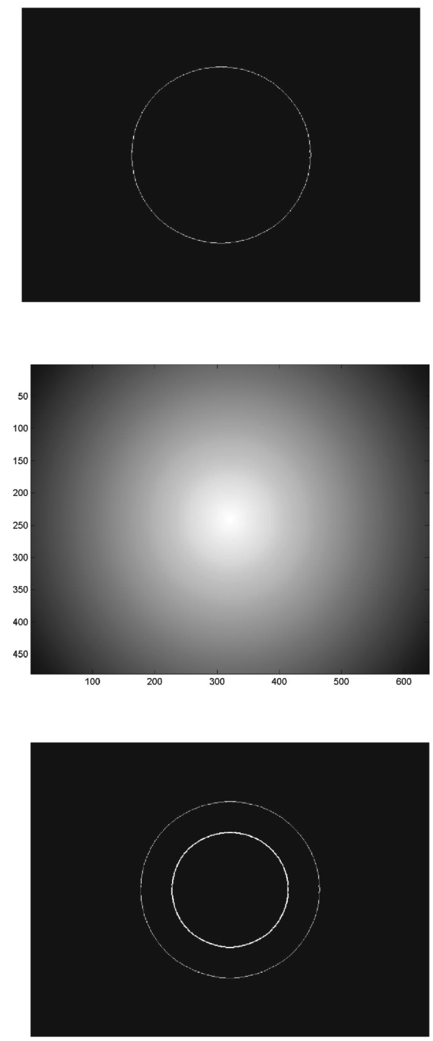


Figure 11. Parcellation results for a synthetic image of a circle. **Top**: original contour. **Middle**: signed distance map. **Bottom**: new boundary superimposed on the original image.

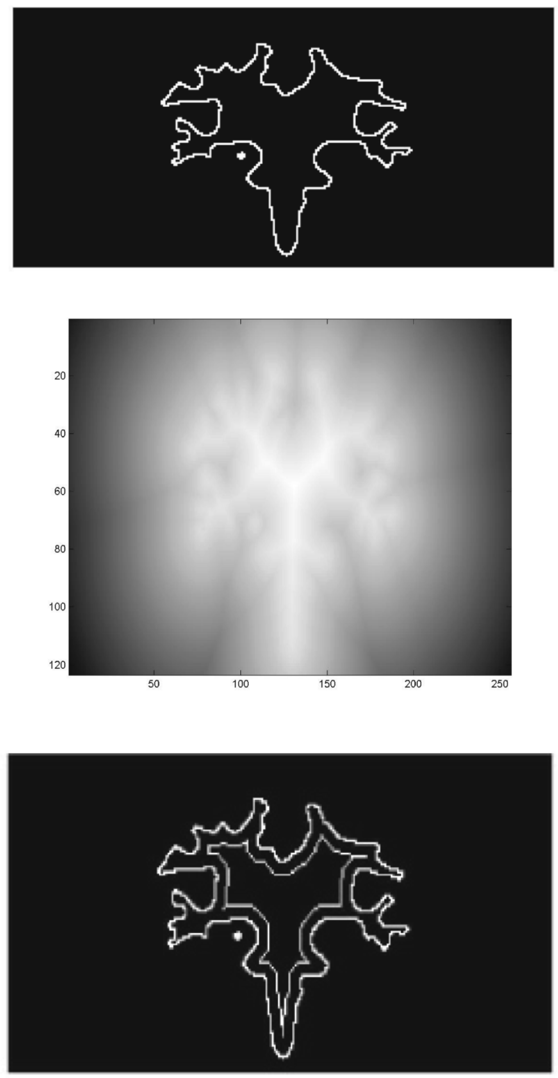


Figure 12. Parcellation results for an MRI slice: **Left**: original contour. **Middle**: signed distance map. **Right**: new boundary superimposed on the original MR image.