

CONCLUSION AND FUTURE SCOPE

Segmentation of a 3D image volume is an important challenge in the medical field. We have tried to segment the 3D image volume into its constituent segments using type-2 fuzzy logic and entropy based global and local Fuzzy membership values.

The algorithm is able to segment a noisy brain MR image volume into CSF region, GM region and WM region. We have used the data images available from the brain web dataset in the raw format. The first step of the algorithm was to convert the brain volume data into its constituent PGM images. The PGM images are then imported into the program and converted into a 3D image vector. For each of the points in the image vector, global and local membership values are computed. After the computation of global and local membership value, Type-2 Interval set is computed for each of the data points, in this case, a voxel. The Type-2 Interval set is then defuzzied and normalized to calculate the final Type-2 Membership value.

The final Membership value is calculated by the weighted sum of the global, local and Type-2 Membership values using 3 regularizing parameters which are selected empirically.

The algorithm is successful in segmenting the Brain Image volume with a very low miscalculation error and a high segmentation accuracy. The Partition coefficient is very high and the partition entropy is very low (<0.1).

This algorithm can be extended to segment the other tissue regions of the brain as well in a relatively less amount of time. Apart from using it just for Brain MR images, it can be extended to be used for other types of clinical images such as lungs.

In the future, we can optimize the algorithm to increase the level of segmentation quality but with lower computational complexity and higher speed of results.