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Design of a Graphical User Interface for Data Preprocessing and Image Segmentation Process in 2D MRI Images

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Abstract : The 2D image segmentation is a significant process in finding a suitable region in medical images such as MRI, PET, CT etc. In this study, we have focused on 2D MRI images for image segmentation process. We have designed a GUI (graphical user interface) written in MATLABTM for 2D MRI images. In this program, there are two different interfaces including data pre-processing and image clustering or segmentation. In the data pre-processing section, there are median filter, average filter, unsharp mask filter, Wiener filter, and custom filter (a filter that is designed by user in MATLAB). As for the image clustering, there are seven different image segmentations for 2D MR images. These image segmentation algorithms are as follows: PSO (particle swarm optimization), GA (genetic algorithm), Lloyds algorithm, k-means, the combination of Lloyds and k-means, mean shift clustering, and finally BBO (Biogeography Based Optimization). To find the suitable cluster number in 2D MRI, we have designed the histogram based cluster estimation method and then applied to these numbers to image segmentation algorithms to cluster an image automatically. Also, we have selected the best hybrid method for each 2D MR images thanks to this GUI software.

Keywords : image segmentation, clustering, GUI, 2D MRI
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