RESEARCH ARTICLE

MRI Image Sample Noise Filtration and a Design Toolbox to Generate Complex Phantoms in Medical Image Processing

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Abstract— In this paper a modified spatial filtration approach is suggested for image de-noising applications. The existing spatial filtration techniques were improved for the ability to reconstruct noise-affected medical images. The developed modified approach is developed to adaptively decide the masking centre for a given MRI image. The conventional filtration techniques using mean, median and spatial median filters were analysed for the improvement in modified approach. The developed approach is compared with current image smoothening techniques. The proposed approach is observed to be more accurate in reconstruction over other conventional techniques. In the field of medical image processing, the evaluation of new algorithms is often a difficult task since real data sets do not allow a quantitative evaluation of the algorithms' properties and the correctness of results. Thus, a phantom design toolbox was developed to enable the generation of complex geometries appropriate to simulate anatomical structures as well as realistic image intensity properties and artefacts, such as noise and in homogeneities. This paper describes the most important features of the new toolbox and shows sample phantoms generated so far.

Keywords— Spatial Filter; Image De-noising; Modified Spatial Filter; RMSE; Image Smoothening

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