

Segmentation of Medical and Material Images

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Despite advances in image segmentation methods from materials science to biomedical imaging, the accurate contour extraction remains a complex task, especially in presence of high noise levels and low contrast [1].

In this framework, we compare several segmentation techniques, which include geometric active contours and snakes based on gradient vector flow [2], analyzing their performance in two applications. One is mass segmentation in X-ray mammograms, which may exhibit significant variability in gray level distribution depending on breast features and image post-processing. The other is morphological characterization of microplastics in optical microscopy images, which can contain aggregated particles difficult to distinguish. The segmentation methods are combined with different pre-processing strategies for contour extraction optimization. The analyzed mammograms are taken from open-access clinical databases, while the microscopy images are acquired on ad hoc prepared samples, containing plastic standards, with known size and shape, and irregularly shaped particles originated from contamination.

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References

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