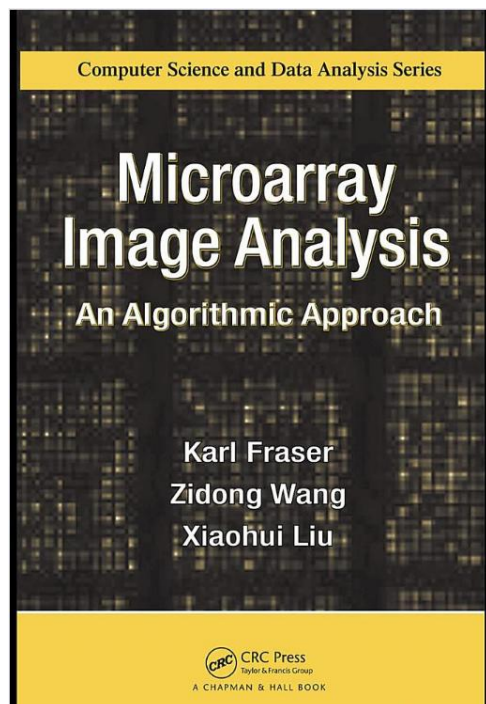


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MICROARRAY IMAGE ANALYSIS

AN ALGORITHMIC APPROACH



Chapman and Hall/CRC
ISBN-13: 978-1-4200-9153-3
Hardback
335 pages
2010

One of the greatest challenges to utilize the high-throughput potential of DNA microarray technology is the decoupling of the requirements of operator assistance from the analysis stages of the process. In pursuit of such goal, *Microarray Image Analysis: An Algorithmic Approach* proposes an automatic system for microarray image processing, built upon and extended traditional analytical-based methods and custom-designed novel algorithms, to achieve this decoupling.

In the beginning of the book the focus is placed on a new technique that takes advantage of a multiview approach to image analysis. The challenges of applying powerful traditional techniques (e.g. clustering) to full-scale microarray experiments are also addressed. Further are presented and analyzed:

- an effective feature identification approach;
- an innovative technique that renders highly detailed surface models yielding clearer observations to feature regions of interest;
- a new approach to subgrid detection with better performance which could be used in other areas of image analysis;
- a novel technique for the background removal process;
- a useful technique for removing “noise”.

The authors also propose an expectation–maximization (EM) algorithm which shows great promise for modeling gene regulatory networks from gene expression time series data on genome-wide scale. The overall benefits of these techniques in the biological and computer sciences are discussed in the final chapter where future research topics are also outlined. The fields of image processing, data analysis, and molecular biology are systematically integrated throughout the text to advance the state of the art in this important area. Despite the fact that the main focus of the book is placed on improving the processes involved in the analysis of microarray image data, the described methods could be applied to a much broader range of problems in the areas of medicine and computer vision analysis.

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