



# Image Analysis, Random Fields and Markov Chain Monte Carlo Methods: A Mathematical Introduction (Stochastic Modelling and Applied Probability)

By Gerhard Winkler

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## **Editorial Review**

### Review

From the reviews of the second edition:

"This book is concerned with a probabilistic approach for image analysis, mostly from the Bayesian point of view, and the important Markov chain Monte Carlo methods commonly used in this approach. ... this book will be useful, especially to researchers with a strong background in probability and an interest in image analysis. The author has presented the theory with rigor ... he doesn't neglect applications, providing numerous examples of applications to illustrate the theory and an abundant bibliography pointing to more detailed related work." (Pham Dinh Tuan, Mathematical Reviews, Issue 2004 c)

"Based on the Bayesian approach the author focuses on the principles of classical image analysis rather than on applications and implementations. Little mathematical knowledge is needed to read the book, thus it is well suited for lectures on image analysis." (Ch. Cenker, Monatshefte für Mathematik, Vol. 146 (4), 2005)

### From the Back Cover

The book is mainly concerned with the mathematical foundations of Bayesian image analysis and its algorithms. This amounts to the study of Markov random fields and dynamic Monte Carlo algorithms like sampling, simulated annealing and stochastic gradient algorithms. The approach is introductory and elementary: given basic concepts from linear algebra and real analysis it is self-contained. No previous knowledge from image analysis is required. Knowledge of elementary probability theory and statistics is certainly beneficial but not absolutely necessary. The necessary background from imaging is sketched and illustrated by a number of concrete applications like restoration, texture segmentation and motion analysis.

### About the Author

From the reviews:

"This book is concerned with a probabilistic approach for image analysis, mostly from the Bayesian point of view, and the important Markov chain Monte Carlo methods commonly used in this approach. " this book will be useful, especially to researchers with a strong background in probability and an interest in image analysis. The author has presented the theory with rigor ". he doesn't neglect applications, providing numerous examples of applications to illustrate the theory and an abundant bibliography pointing to more detailed related work." (Pham Dinh Tuan, Mathematical Reviews, 2004 c)

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