

Image Textures and Gibbs Random Fields

Image analysis is one of the most challenging areas in today's computer science, and image technologies are used in a host of applications. This book concentrates on image textures and presents novel techniques for their simulation, retrieval, and segmentation using specific Gibbs random fields with multiple pairwise interaction between signals as probabilistic image models. These models and techniques were developed mainly during the previous five years (in relation to April 1999 when these words were written). While scanning these pages you may notice that, in spite of long equations, the mathematical background is extremely simple. I have tried to avoid complex abstract constructions and give explicit physical (to be specific, "image-based") explanations to all the mathematical notions involved. Therefore it is hoped that the book can be easily read both by professionals and graduate students in computer science and electrical engineering who take an interest in image analysis and synthesis. Perhaps, mathematicians studying applications of random fields may find here some less traditional, and thus controversial, views and techniques.

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