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Energy Minimization Methods in Computer Vision and Pattern Recognition

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Preface

Energy minimization has become an important paradigm for solving many challenging problems within computer vision and pattern recognition over the past few decades. Mathematical models that describe the desired solution as the minimizer of an energy potential arise through different schools of thought, including statistical approaches in the form of Markov random fields and geometrical approaches in the form of variational models or equivalent partial differential equations. Besides the challenge of formulating appropriate energy minimization models, a significant research topic is the design of computational methods for reliably and efficiently obtaining solutions of minimal energy.

This book contains 36 original research articles that cover the whole spectrum of energy minimization in computer vision and pattern recognition, including design and analysis of mathematical models and design of discrete and continuous optimization algorithms. Application areas include image segmentation and tracking, image restoration and inpainting, multiview reconstruction, shape optimization, and texture and color analysis. The articles have been carefully selected through a thorough double-blind peer-review process.

Furthermore, we were delighted that three internationally recognized experts in the fields of computer vision, pattern recognition, and optimization, namely, Andrea Bertozzi (UCLA), Ron Kimmel (Technion-IIT), and Long Quan (HKUST), agreed to further enrich the conference with inspiring keynote lectures.

We would like to express our gratitude to those who made this event possible and contributed to its success. In particular, our Program Committee of top international experts in the field provided excellent reviews. The administrative and financial support from the Hong Kong University of Science and Technology (HKUST), especially from HKUST Jockey Club Institute for Advanced Study (IAS), was crucial for the success of this event. We are grateful to Linus See (HKUST), Eric Lin (HKUST) and Shing Yu Leung (HKUST) for providing very helpful local administrative support. It is our belief that this conference helped to advance the field of energy minimization methods and to further establish the mathematical foundations of computer vision and pattern recognition.

November 2014

Xue-Cheng Tai
Egil Bae
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Marius Lysaker

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