# Table of Contents

Preface ................................................................................................................................................ xiv

Acknowledgment ................................................................................................................................... xviii

## Section 1

**Graph-Based Methods for Image Matching**

**Chapter 1**
Graph Matching Techniques for Computer Vision ............................................................................... 1

* Mario Vento, Università di Salerno, Italy  
  Pasquale Foggia, Università di Salerno, Italy

**Chapter 2**
Geometric-Edge Random Graph Model for Image Representation ............................................... 42

* Bo Jiang, Anhui University, China  
  Jing Tang, Anhui University, China  
  Bin Luo, Anhui University, China

**Chapter 3**
The Node-to-Node Graph Matching Algorithm Schema ................................................................. 58

* Guoxing Zhao, Beijing Normal University, China  
  Jixin Ma, University of Greenwich, UK

## Section 2

**Graph-Based Methods for Image Segmentation**

**Chapter 4**
Unsupervised and Supervised Image Segmentation Using Graph Partitioning .............................. 72

* Charles-Edmond Bichot, Université de Lyon, France

**Chapter 5**
Motion Segmentation and Matting by Graph Cut ............................................................................ 95

* Jiangjian Xiao, Ningbo Industrial Technology Research Institute, P.R. China
Chapter 6
Hypergraph Based Visual Segmentation and Retrieval .................................................. 118
  Yuchi Huang, General Electric Global Research, USA

Chapter 7
Recent Advances on Graph-Based Image Segmentation Techniques .......................... 140
  Chao Zeng, University of Technology-Sydney, Australia
  Wenjing Jia, University of Technology-Sydney, Australia
  Xiangjian He, University of Technology-Sydney, Australia
  Min Xu, University of Technology-Sydney, Australia

Section 3
Graph-Based Methods for Image and Video Analysis

Chapter 8
Graph Embedding Using Dissimilarities with Applications in Classification .................. 156
  Horst Bunke, University of Bern, Switzerland
  Kaspar Riesen, University of Bern, Switzerland

Chapter 9
Generative Group Activity Analysis with Quaternion Descriptor ................................. 174
  Guangyu Zhu, National University of Singapore, Singapore
  Shuicheng Yan, National University of Singapore, Singapore
  Tony X. Han, University of Missouri, USA
  Changsheng Xu, Chinese Academy of Sciences, China

Chapter 10
Shape Retrieval and Classification Based on Geodesic Paths in Skeleton Graphs .......... 190
  Xiang Bai, Huazhong University of Science and Technology, P.R. China
  Chunyuan Li, Huazhong University of Science and Technology, P.R. China
  Xingwei Yang, Temple University, USA
  Longin Jan Latecki, Temple University, USA

Chapter 11
Discriminative Feature Selection in Image Classification and Retrieval ....................... 216
  Shang Liu, Beihang University, China
  Xiao Bai, Beihang University, China

Chapter 12
Normalized Projection and Graph Embedding via Angular Decomposition .................. 231
  Dengdi Sun, Anhui University, China
  Chris Ding, Anhui University, China & University of Texas at Arlington, USA
  Jin Tang, Anhui University, China
  Bin Luo, Anhui University, China
Chapter 13
Region-Based Graph Learning Towards Large Scale Image Annotation................................. 244

Bao Bing-Kun, Institute of Automation, Chinese Academy of Sciences, China
Yan Shuicheng, National University of Singapore, Singapore

Chapter 14
Copy Detection Using Graphical Model: HMM for Frame Fusion................................. 261

Wei Shikui, Beijing Jiaotong University, China
Zhao Yao, Beijing Jiaotong University, China
Zhu Zhenfeng, Beijing Jiaotong University, China

Section 4
Graph-Based Methods for Image Processing

Chapter 15
Multi-Scale Exemplary Based Image Super-Resolution with Graph Generalization ............... 281

Wang Jinjun, Epson Research and Development, Inc. USA

Chapter 16
Graph Heat Kernel Based Image Smoothing ................................................................. 302

Zhang Fan, University of York, UK
Edwin R. Hancock, University of York, UK
Liu Shang, Beihang University, China

Compilation of References ................................................................................................. 331

About the Contributors ........................................................................................................ 364

Index ................................................................................................................................... 372