

# Mathematical Morphology and its Applications to Image and Signal Processing

Proceedings ISMM 2013, Uppsala, Sweden, May 27–29

LNCS vol 7883

## Theory

<b>Similarity between Hypergraphs based on Mathematical Morphology</b> <i>Isabelle Bloch, Alain Bretto and Aurélie Leborgne</i> .....	1
<b>Simplification Operators on a Dimension-Independent Graph-Based Representation of Morse Complexes</b> <i>Lidija Comic, Leila De Floriani and Federico Iuricich</i> .....	13
<b>Random tessellations and Boolean random functions</b> <i>Dominique Jeulin</i> .....	25
<b>Discrete set-valued continuity and interpolation</b> <i>Laurent Najman and Thierry Géraud</i> .....	37
<b>Solving Problems in Mathematical Morphology through Reductions to the U-curve Problem</b> <i>Marcelo Reis and Junior Barrera</i> .....	49
<b>Analytical Solutions for the Minkowski Addition Equation</b> <i>Joel Edu Sánchez Castro, Ronaldo Fumio Hashimoto and Junior Barrera</i> ..	61

## Trees and Hierarchies

<b>A comparison of many max-tree computation algorithms</b> <i>Edwin Carlinet and Thierry Géraud</i> .....	73
<b>Constructive links between some morphological hierarchies on edge-weighted graphs</b> <i>Jean Cousty, Laurent Najman and Benjamin Perret</i> .....	85
<b>A quasi-linear algorithm to compute the tree of shapes of nD images</b> <i>Thierry Géraud, Edwin Carlinet, Sébastien Crozet and Laurent Najman</i> ....	97
<b>Efficient schemes for computing alpha-tree representations</b> <i>Jiří Havel, François Merciol and Sébastien Lefèvre</i> .....	109

<b>Ground truth energies for hierarchies of segmentations</b>	
<i>Bangalore Kiran and Jean Serra</i> .....	121
<b>Playing with Kruskal: algorithms for morphological trees in edge-weighted graphs</b>	
<i>Laurent Najman, Jean Cousty and Benjamin Perret</i> .....	133
<b>Optima on Hierarchies of Partitions</b>	
<i>Jean Serra and Bangalore Kiran</i> .....	145
<b>Semi-connections and hierarchies</b>	
<i>Olena Tankyevych, Hugues Talbot and Nicolas Passat</i> .....	157

## Adaptive Morphology

<b>Stochastic Morphological Filtering and Bellman-Maslov Chains</b>	
<i>Jesús Angulo and Santiago Velasco-Forero</i> .....	169
<b>Saliency-based parabolic structuring functions</b>	
<i>Vladimir Ćurić and Cris L. Luengo Hendriks</i> .....	181
<b>Adaptive Morphologic Regularizations for inverse problems</b>	
<i>Pulak Purkait and Bhabatosh Chanda</i> .....	193
<b>Attribute controlled reconstruction and adaptive mathematical morphology</b>	
<i>Andres Serna and Beatriz Marcotegui</i> .....	205
<b>On Nonlocal Mathematical Morphology</b>	
<i>Santiago Velasco-Forero and Jesús Angulo</i> .....	217

## Colour

<b>Vectorial quasi-flat zones for color image simplification</b>	
<i>Erchan Aptoula, Jonathan Weber and Sébastien Lefèvre</i> .....	229
<b>Morphology for Color Images via Loewner Order for Matrix Fields</b>	
<i>Bernhard Burgeth and Andreas Kleefeld</i> .....	241
<b>A Multivariate Mathematical Morphology based on Orthogonal Transformation, Probabilistic Extrema Estimation and Distance Optimization</b>	
<i>Alexandru Caliman, Mihai Ivanovici, Noel Richard and Gheorghe Toacse</i> ..	253
<b>Group-invariant frames for colour morphology</b>	
<i>Jasper van de Gronde and Jos Roerdink</i> .....	265

## Manifolds and Metrics

### **Mathematical morphology for real-valued images on Riemannian manifolds**

*Jesús Angulo and Santiago Velasco-Forero* ..... 277

### **A Weight Sequence Distance Function**

*Benedek Nagy, Robin Strand and Nicolas Normand* ..... 289

### **The Laplace-Beltrami operator: a ubiquitous tool for image and shape processing**

*Aaron Wetzler, Yonathan Aflalo, Anastasia Dubrovina and Ron Kimmel* .. 299

## Filtering

### **Towards morphological image regularization using the Counter-Harmonic Mean**

*Jorge Larrey-Ruiz, Rafael Verdú-Monedero, Juan Morales-Sánchez and Jesús Angulo* ..... 314

### **A Learning Framework for Morphological Operators using Counter-Harmonic Mean**

*Jonathan Masci, Jesús Angulo and Juergen Schmidhuber* ..... 326

### **Flooding edge or node weighted graphs**

*Fernand Meyer* ..... 338

### **Towards connected filtering based on component-graphs**

*Benoît Naegel and Nicolas Passat* ..... 350

### **Inf-structuring functions and self-dual marked flattenings in bi-Heyting algebra**

*Benjamin Perret* ..... 362

### **From Extrema Relationships to Image Simplification using Non-flat Structuring Functions**

*Guilherme Polo and Neucimar Leite* ..... 374

### **Two applications of shape-based morphology: blood vessels segmentation and a generalization of constrained connectivity**

*Yongchao Xu, Thierry Geraud and Laurent Najman* ..... 386

## Detectors and Descriptors

### **Robust keypoint detection using dynamics**

*Juan Climent and Miguel Angel Cataño* ..... 398

<b>A Granulometry Based Descriptor For Object Categorization</b> <i>Arnaldo Lara and Roberto Hirata Jr.</i> .....	409
<b>Qualitative Comparison of Contraction-based Curve Skeletonization Methods</b> <i>Andre Sobiecki, Haluk Yasan, Andrei Jalba and Alexandru Telea</i> .....	421
<b>Detection of Texture and Isolated Features Using Alternating Morphological Filters</b> <i>Igor Zingman, Dietmar Saupe and Karsten Lambers</i> .....	433

## Applications

<b>Estimation of separating planes between touching 3D objects using power watershed</b> <i>Clara Jaquet, Edward Andò, Gioacchino Viggiani and Hugues Talbot</i> .....	445
<b>Efficient 1D and 2D barcode detection using mathematical morphology</b> <i>Melinda Katona and László G. Nyúl</i> .....	457
<b>Faster Fuzzy Connectedness via Precomputation</b> <i>Filip Malmberg and Robin Strand</i> .....	469
<b>Mask Connectivity by Viscous Closings: Linking Merging Galaxies without Merging Double Stars</b> <i>Ugo Moschini, Michael H.F. Wilkinson and Scott Trager</i> .....	477
<b>Discrete Simulation of a Chladni Experiment</b> <i>Frédéric Rieux</i> .....	489
<b>Automatic Quality Inspection of Microfluidic Chips Using Morphologic Techniques</b> <i>Thomas Schwarzbauer, Martin Welk, Chris Mayrhofer and Rainer Schubert</i>	501
<b>Geography, Mathematics and Mathematical Morphology</b> <i>Christine Voiron-Canicio</i> .....	513