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Emerging Trends in Visual Computing

LIX Fall Colloquium, ETVC 2008
Palaiseau, France, November 18-20, 2008
Revised Invited Papers

Springer

Volume Editor

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Preface

ETVC 2008, the fall colloquium of the computer science department (LIX) of the École Polytechnique, held in Palaiseau, France, November 18-20, 2008, focused on the Emerging Trends in Visual Computing. The colloquium gave scientists the opportunity to sketch a state-of-the-art picture of the mathematical foundations of visual computing.

We were delighted to invite and welcome the following distinguished speakers to ETVC 2008 (listed in alphabetical order):

- Shun-ichi AMARI (Mathematical Neuroscience Laboratory, Brain Science Institute, RIKEN, Wako-Shi, Japan): *Information Geometry and Its Applications*
- Tetsuo ASANO (School of Information Science, Japan Advanced Institute of Science and Technology, JAIST, Japan): *Constant-Working-Space Algorithms for Image Processing*
- Francis BACH (INRIA/ENS, France): *Machine Learning and Kernel Methods for Computer Vision*
- Frédéric BARBARESCO (Thales Air Systems, France): *Applications of Information Geometry to Radar Signal Processing*
- Michel BARLAUD (I3S CNRS, University of Nice-Sophia-Antipolis, Polytech'Nice & Institut Universitaire de France, France): *Image Retrieval via Kullback Divergence of Patches of Wavelets Coefficients in the k-NN Framework*
- Jean-Daniel BOISSONNAT (GEOMETRICA, INRIA Sophia-Antipolis, France): *Certified Mesh Generation*
- Pascal FUA (EPFL, CVLAB, Switzerland): *Recovering Shape and Motion from Video Sequences*
- Markus GROSS (Department of Computer Science, Institute of Scientific Computing, Swiss Federal Institute of Technology Zurich, ETHZ, Switzerland): *3D Video: A Fusion of Graphics and Vision*
- Xianfeng David GU (State University of New York at Stony Brook, USA): *Discrete Curvature Flow for Surfaces and 3-Manifolds*
- Leonidas GUIBAS (Computer Science Department, Stanford University, USA): *Detection of Symmetries and Repeated Patterns in 3D Point Cloud Data*
- Sylvain LAZARD (VEGAS, INRIA LORIA Nancy, France): *3D Visibility and Lines in Space*

- Stéphane MALLAT (École Polytechnique, Centre de Mathématiques Appliquées (CMAP), France): *Sparse Geometric Super-Resolution*
- Hiroshi MATSUZOE (Department of Computer Science and Engineering, Graduate School of Engineering, Nagoya Institute of Technology, NITECH, Japan): *Computational Geometry from the Viewpoint of Affine Differential Geometry*
- Dimitris METAXAS (Computational Biomedicine Imaging and Modeling Center, CBMI, Rutgers University, USA): *Unifying Subspace and Distance Metric Learning with Bhattacharyya Coefficient for Image Classification*
- Frank NIELSEN (LIX, École Polytechnique, Paris, France & Sony Computer Science Laboratories Inc., Tokyo, Japan): *Computational Geometry in Dually Flat Spaces: Theory, Applications and Perspectives*
- Richard NOCK (CEREGMIA, University of Antilles-Guyane, France): *The Intrinsic Geometries of Learning*
- Nikos PARAGIOS (École Centrale de Paris, ECP, Paris, France): *Procedural Modeling of Architectures: Towards Large Scale Visual Reconstruction*
- Xavier PENNEC (ASCLEPIOS, INRIA Sophia-Antipolis, France): *Statistical Computing on Manifolds for Computational Anatomy*
- Ramesh RASKAR (MIT Media Lab, USA): *Computational Photography: Epsilon to Coded Imaging*
- Cordelia SCHMID (LEAR, INRIA Grenoble, France): *Large-Scale Object Recognition Systems*
- Gabriel TAUBIN (Division of Engineering, Brown University, USA): *Shape from Depth Discontinuities*
- Baba VEMURI (CISE Dept., University of Florida, USA): *Information-Theoretic Algorithms for Diffusion Tensor Imaging*
- Suresh VENKATASUBRAMANIAN (School of Computing, University of Utah, USA): *Non-standard Geometries and Data Analysis*
- Martin VETTERLI (School of Computer and Communication Sciences, EPFL, Switzerland): *Sparse Sampling: Variations on a Theme by Shannon*
- Jun ZHANG (Department of Psychology, University of Michigan, USA): *Information Geometry: Duality, Convexity and Divergences*

Invited speakers were encouraged to submit a state-of-the-art chapter on their research area. The review process was carried out by members of the Program Committee and other reviewers. We would like to sincerely thank the contributing authors and thank the reviewers for the careful feedback that helped the authors prepare their camera-ready papers.

Videos of the lectures synchronized with slides are available from

www.videolectures.net

We were very pleased to welcome all the 150+ participants to ETVC 2008.

For those who did not attend, we hope the chapters of this publication provide a good snapshot of the current research status in visual computing.

December 2008 Frank Nielsen

Group picture of the participants at ETVC 2008 (November 19, 2008)

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– DIGITEO
– École Polytechnique
– Groupe de Recherche Informatique & Mathématique (GdR IM)
– University of Antilles-Guyane, CEREGMIA Department

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