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Advances in Brain, Vision, and Artificial Intelligence

Second International Symposium, BVAI 2007
Naples, Italy, October 10-12, 2007
Proceedings

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Library of Congress Control Number: 2007936295

CR Subject Classification (1998): I.2.10, I.4, I.5, J.3, F.1, F.2

LNCS Sublibrary: SL 6 – Image Processing, Computer Vision, Pattern Recognition,
and Graphics

ISSN 0302-9743
ISBN-10 3-540-75554-3 Springer Berlin Heidelberg New York
ISBN-13 978-3-540-75554-8 Springer Berlin Heidelberg New York

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© Springer-Verlag Berlin Heidelberg 2007
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 12172504 06/3180 5 4 3 2 1 0

Preface

Understanding the mechanisms involved in vision and intelligent behavior of the brain, both from a natural and artificial point of view, demands more and more multidisciplinary and integrated approaches of different disciplines: biophysics and neurobiology, visual and cognitive sciences and theoretical neuroscience being only a small sample.

The Brain, Vision and Artificial Intelligence Symposium 2007 (BVAI 2007, Naples, Italy, October 10-12, 2007) was the second edition of a multidisciplinary symposium that aims at gathering scientists involved in the study of basic brain, natural vision, artificial vision, and artificial intelligence to promote discussion, exchange of ideas, and integration.

BVAI 2007 was organized by researchers of the Institute of Cybernetics “E. Caianiello” of the Italian National Research Council, Pozzuoli, Italy (ICIB-CNR), with the support of the Italian Institute for Philosophical Studies (IISF). It was sponsored by EBSA (European Biophysics Societies Association), GIRPR (Italian Group of Researchers in Pattern Recognition), MARS (Microgravity Advanced Research Support) Center, NEATEK SpA, PAN (Palazzo delle Arti Napoli), SINS (Italian Society for Neurosciences), and Regione Campania. Travel grants were provided for deserving young participants by EBSA, SINS and GIRPR. The symposium was held under the auspices of the AI*IA (Italian Association of Artificial Intelligence), Comune di Napoli - Assessorato alla Cultura and SIBPA (Italian Society of Pure and Applied Biophysics), and with the help of the MQC² (Macroscopic Quantum Coherence and Computing) Association.

The scientific program included the participation of eight invited speakers, selected among international leading scientists in the above-mentioned fields: Michael Arbib, University of Southern California (USA), Matteo Carandini, The Smith-Kettlewell Eye Research Institute (USA), Karl Gegenfurtner, Justus-Liebig University (Germany), Petr Lansky, Academy of Sciences (Czech Republic), José del R. Millán, IDIAP Research Institute (Switzerland), Oliviero Stock, IRST and Fondazione Bruno Kessler (Italy), Massimo Tistarelli, University of Sassari (Italy), John K. Tsotsos, York University (Canada). Furthermore, the program included 50 contributions from worldwide participants, presented in plenary oral and poster sessions. The peer-reviewing process for the papers was performed by the Scientific Committee, including distinguished members of the scientific community, together with a number of additional reviewers, appointed by the Scientific Committee members. The accepted contributions were selected among about 80 papers submitted to BVAI 2007.

In this volume, all contributions to the symposium have been gathered according to an increasing degree of abstraction, going from the most elemental aspects of the visual processes to the most complex cognitive ones. The material has been structured into the following parts: Basic Models in Visual Sciences, Cortical Mechanism of Vision, Color Processing in Natural Vision, Action-Oriented Vision, Visual Recognition and Attentive Modulation, Biometric Recognition, Image Segmentation and Recognition, Disparity Calculation and Noise Analysis, Signal Identification in Neural

Models, Natural and Artificial Representation Issues in Artificial Intelligence, Meaning-Interaction-Emotion, Robot Navigation and Control. In our opinion, these topics can be considered the flagstones paving the road to the ongoing integration among research in brain, vision and intelligence. We hope that this volume provides new insights and is the basis of constructive discussions.

We would like to thank the invited speakers and all the contributors, the members of the Scientific Committees, including the additional reviewers and all the participants. Acknowledgements are due to all our sponsors (ICIB-CNR, IISF, EBSA, GIRPR, MARS Center, NEATEK SpA, PAN, SINS, Regione Campania) for their financial contribution. We would like to acknowledge the Steering Committee members for their advice and support. A special thanks goes to the Local Committee and Secretariat members, who provided us with helpful assistance.

July 2007

Francesco Mele
Giuliana Raella
Silvia Santillo
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Table of Contents

Basic Models in Visual Sciences

Physiology of Simple Photoreceptors in the Abdominal Ganglion of <i>Onchidium</i>	1
<i>Takako Nishi, Kyoko Shimotsu, and Tsukasa Gotow</i>	
Diffuse Nerve Net of <i>Hydra</i> Revealed by NADPH-Diaphorase Histochemical Labeling	11
<i>Luigia Cristino, Vittorio Guglielmotti, Carlo Musio, and Silvia Santillo</i>	
On Global Geometry of Image on Eye's Back	21
<i>Paolo d'Alessandro</i>	

Cortical Mechanism of Vision

Independent Encoding of Position and Orientation by Population Responses in Primary Visual Cortex	30
<i>Robert A. Frazor, Andrea Benucci, and Matteo Carandini</i>	
A Neural Model for Attentional Modulation of Lateral Interactions in the Visual Cortex	42
<i>Mia Šetić and Dražen Domijan</i>	
Testing Viewpoint Invariance in the Neural Representation of Faces: An MEG Study	52
<i>Michael P. Ewbank, William A.P. Smith, Edwin R. Hancock, and Timothy J. Andrews</i>	
Modeling Visual Information Processing in Brain: A Computer Vision Point of View and Approach	62
<i>Emanuel Diamant</i>	

Color Processing in Natural Vision

Higher Order Color Mechanisms for Image Segmentation	72
<i>Thorsten Hansen and Karl R. Gegenfurtner</i>	
How Does the Brain Arrive at a Color Constant Descriptor?	84
<i>Marc Ebner</i>	
Temporal Characteristics of Artificial Retina Based on Bacteriorhodopsin and Its Variants	94
<i>Teemu Tukiainen, Lasse Lensu, and Jussi Parkkinen</i>	

Action Oriented Vision

Vision and Action in the Language-Ready Brain: From Mirror Neurons to SemRep	104
<i>Michael A. Arbib and JinYong Lee</i>	
A Neural Network Model for a View Independent Extraction of Reach-to-Grasp Action Features	124
<i>Roberto Prevede, Matteo Santoro, Ezio Catanzariti, and Giovanni Tessitore</i>	
Neuromimetic Indicators for Visual Perception of Motion	134
<i>Claudio Castellanos-Sánchez</i>	
Reversal of “Cubic” and “Cylindric” Figures	144
<i>Jirina Radilova, Cloe Taddei-Ferretti, Carlo Musio, Silvia Santillo, Edoardo Cibelli, Antonio Cotugno, and Tomáš Radil</i>	

Visual Recognition and Attentive Modulation

Different Binding Strategies for the Different Stages of Visual Recognition	150
<i>John K. Tsotsos, Antonio Jose Rodriguez-Sanchez, Albert L. Rothenstein, and Eugene Simine</i>	
The Bayesian Draughtsman: A Model for Visuomotor Coordination in Drawing	161
<i>Ruben Coen Cagli, Paolo Coraggio, Paolo Napoletano, and Giuseppe Boccignone</i>	
Independent Component Analysis of Layer Optical Flow and Its Application	171
<i>Naoya Ohnishi and Atsushi Imiya</i>	
A Self-organizing Approach to Detection of Moving Patterns for Real-Time Applications	181
<i>Lucia Maddalena and Alfredo Petrosino</i>	

Biometric Recognition

Recognition of Human Faces: From Biological to Artificial Vision	191
<i>Massimo Tistarelli, Linda Brodo, Andrea Lagorio, and Manuele Bicego</i>	
Incremental Subspace Learning for Cognitive Visual Processes	214
<i>Bogdan Raducanu and Jordi Vitrià</i>	

Real-Time Robot Manipulation Using Mouth Gestures in Facial Video Sequences	224
<i>Juan B. Gómez, Jorge E. Hernández, Flavio Prieto, and Tanneguy Redarce</i>	

Image Segmentation and Recognition

A Variational Bayes Approach to Image Segmentation	234
<i>Giuseppe Boccignone, Mario Ferraro, and Paolo Napoletano</i>	
Watershed Segmentation Via Case-Based Reasoning	244
<i>Maria Frucci, Petra Perner, and Gabriella Sanniti di Baja</i>	
Digital Removal of Blotches with Variable Semi-transparency Using Visibility Laws	254
<i>Vittoria Bruni, Andrew Crawford, Anil Kokaram, and Domenico Vitulano</i>	
Classification with Positive and Negative Equivalence Constraints: Theory, Computation and Human Experiments	264
<i>Rubi Hammer, Tomer Hertz, Shaul Hochstein, and Daphna Weinshall</i>	
A Graph-Based Clustering Method and Its Applications	277
<i>Pasquale Foggia, Gennaro Percannella, Carlo Sansone, and Mario Vento</i>	
Neural Object Recognition by Hierarchical Learning and Extraction of Essential Shapes	288
<i>Daniel Oberhoff and Marina Kolesnik</i>	

Disparity Calculation and Noise Analysis

Increasing Efficiency in Disparity Calculation	298
<i>Jarno Ralli, Francisco Pelayo, and Javier Diaz</i>	
Patterns of Binocular Disparity for a Fixating Observer	308
<i>Miles Hansard and Radu Horaud</i>	
3D Reconstruction and Mapping from Stereo Pairs with Geometrical Rectification	318
<i>Antonio Javier Gallego, Rafael Molina, Patricia Compañ, and Carlos Villagrà</i>	
Noise Analysis for Depth Estimation	328
<i>Aamir Saeed Malik and Tae-Sun Choi</i>	

Signal Identification in Neural Models

Stimulus-Response Curves in Sensory Neurons: How to Find the Stimulus Measurable with the Highest Precision	338
<i>Petr Lansky, Ondřej Pokora, and Jean-Pierre Rospars</i>	
Molecular Mechanism of Glutamate-Triggered Brain Glucose Metabolism: A Parametric Model from FDG PET-Scans	350
<i>Paola Lecca and Michela Lecca</i>	
Steady-State Properties of Coding of Odor Intensity in Olfactory Sensory Neurons	360
<i>Ondřej Pokora and Petr Lansky</i>	
Input Identification in the Ornstein-Uhlenbeck Neuronal Model with Signal Dependent Noise	368
<i>Laura Sacerdote, Cristina Zucca, and Petr Lánský</i>	
Numerical Results on the Hodgkin-Huxley Neural Network: Spikes Annihilation	378
<i>Dragos Calitoiu, John B. Oommen, and Doron Nussbaum</i>	
Excitatory Synaptic Interaction on the Dendritic Tree	388
<i>Vito Di Maio</i>	
Ghost Stochastic Resonance for a Neuron with a Pair of Periodic Inputs	398
<i>Maria Teresa Giraudo, Laura Sacerdote, and Alessandro Sicco</i>	
Coincidence Detector Properties of Small Networks of Interneurons	408
<i>Angelo Di Garbo, Michele Barbi, and Santi Chillemi</i>	
Computing the Maximum Using Presynaptic Inhibition with Glutamate Receptors	418
<i>Dražen Domijan and Mia Šetić</i>	
Bounds of the Ability to Destroy Precise Coincidences by Spike Dithering	428
<i>Antonio Pazienti, Markus Diesmann, and Sonja Grün</i>	

Natural and Artificial Representation Issues in Artificial Intelligence

Non-invasive Brain-Actuated Interaction	438
<i>José del R. Millán, Pierre W. Ferrez, Ferran Galán, Eileen Lew, and Ricardo Chavarriaga</i>	

Decomposition Approach to Solve Dial-a-Ride Problems Using Ant Computing and Constraint Programming	448
<i>Broderick Crawford, Carlos Castro, Eric Monfroy, and Claudio Cubillos</i>	
Logic as Energy: A SAT-Based Approach	458
<i>Priscila M.V. Lima, M. Mariela M. Morveli-Espinoza, and Felipe M.G. França</i>	
Towards a Formal Approach to Generative Design: An Assistant System for the Creation of Artefact Models	468
<i>Antonio Calabrese, Carlo Coppola, Salvatore Masecchia, Francesco Mele, Antonio Origlia, Antonio Sorgente, and Oliviero Talamo</i>	
Using Software Agent Negotiation for Service Selection	480
<i>Claudia Di Napoli</i>	
A Genetic Algorithm for the Quadratic Multiple Knapsack Problem ...	490
<i>Tugba Saraç and Aydin Sipahioglu</i>	
The Application of Neural Networks in Classification of Epilepsy Using EEG Signals	499
<i>Cenk Sahin, Seyfettin Noyan Ogulata, Kezban Aslan, and Hacer Bozdemir</i>	
Meaning, Interaction and Emotion	
Moving Creative Words	509
<i>Oliviero Stock, Carlo Strapparava, and Alessandro Valitutti</i>	
Applying Neural Networks to Knowledge Representation and Determination of Its Meaning	523
<i>Mladen Stanojević and Sanja Vraneš</i>	
New Frameworks to Boost Feature Selection Algorithms in Emotion Detection for Improved Human-Computer Interaction	533
<i>Halis Altun and Gökhan Polat</i>	
The Significance of Empty Speech Pauses: Cognitive and Algorithmic Issues	542
<i>Anna Esposito, Vojtěch Stejskal, Zdeněk Smékal, and Nikolaos Bourbakis</i>	
Human Robot Interactions: Towards the Implementation of Adaptive Strategies for Robust Communication	555
<i>Stanislao Lauria</i>	

Robot Navigation and Control

A Neurosymbolic Hybrid Approach for Landmark Recognition and Robot Localization	566
<i>Paolo Coraggio and Massimo De Gregorio</i>	
A Robotic Architecture with Innate Releasing Mechanism	576
<i>Ernesto Burattini and Silvia Rossi</i>	
An Application of Vision Systems to the Path Planning of Industrial Robots	586
<i>Vincenzo Niola, Cesare Rossi, and Sergio Savino</i>	
Tracking Trajectories with a Robotic Manipulator with Singularities	595
<i>Luis Gracia and Josep Tornero</i>	
Motion Planning for Wheeled Mobile Robots Based on Singularity Criteria	606
<i>Luis Gracia and Josep Tornero</i>	
Author Index	617