

# Table of Contents

## Invited Paper (1)

CBF: A New Framework for Object Categorization in Cortex . . . . .	1
<i>M. Riesenhuber, T. Poggio</i>	

## Invited Paper (2)

The Perception of Spatial Layout in a Virtual World . . . . .	10
<i>H. H. Bülthoff, C. G. Christou</i>	

## Segmentation, Detection and Object Recognition

Towards a Computational Model for Object Recognition in IT Cortex . . . . .	20
<i>D. G. Lowe</i>	

Straight Line Detection as an Optimization Problem: An Approach Motivated by the Jumping Spider Visual System . . . . .	32
<i>F. M. G. da Costa, L. da F. Costa</i>	

Factorial Code Representation of Faces for Recognition . . . . .	42
<i>S. Choi, O. Lee</i>	

Distinctive Features Should Be Learned . . . . .	52
<i>J. H. Piater, R. A. Grupen</i>	

Moving Object Segmentation Based on Human Visual Sensitivity . . . . .	62
<i>K.-J. Yoon, I.-S. Kweon, C.-Y. Kim, Y.-S. Seo</i>	

## Invited Paper (3)

Object Classification Using a Fragment-Based Representation . . . . .	73
<i>S. Ullman, E. Sali</i>	

## Computational Model

Confrontation of Retinal Adaptation Model with Key Features of Psychophysical Gain Behavior Dynamics . . . . .	88
<i>E. Sherman, H. Spitzer</i>	

Polarization-Based Orientation in a Natural Environment . . . . .98  
*V. Müller*

Computation Model of Eye Movement in Reading Using Foveated Vision . . . . 108  
*Y. Ishihara, S. Morita*

New Eyes for Shape and Motion Estimation . . . . . 118  
*P. Baker, R. Pless, C. Fermüller, Y. Aloimonos*

Top-Down Attention Control at Feature Space for Robust Pattern Recognition . . 129  
*S.-I. Lee, S.-Y. Lee*

A Model for Visual Camouflage Breaking . . . . .139  
*A. Tankus, Y. Yeshurun*

**Active and Attentive Vision**

Development of a Biologically Inspired Real-Time Visual Attention System . . .150  
*O. Stasse, Y. Kuniyoshi, G. Cheng*

Real-Time Visual Tracking Insensitive  
to Three-Dimensional Rotation of Objects . . . . .160  
*Y.-J. Cho, B.-J. You, J. Lim, S.-R. Oh*

Heading Perception and Moving Objects . . . . .168  
*N.-G. Kim*

Dynamic Vergence Using Disparity Flux . . . . .179  
*H.-J. Kim, M.-H. Yoo, S.-W. Lee*

**Invited Paper (4)**

Computing in Cortical Columns:  
Curve Inference and Stereo Correspondence . . . . . 189  
*S. W. Zucker*

**Invited Paper (5)**

Active Vision from Multiple Cues . . . . . 209  
*H. Christensen, J.-O. Eklundh*

**Posters**

An Efficient Data Structure for Feature Extraction  
in a Foveated Environment . . . . .217  
*E. Nattel, Y. Yeshurun*

Parallel Trellis Based Stereo Matching Using Constraints . . . . .	227
<i>H. Jeong, Y. Oh</i>	
Unsupervised Learning of Biologically Plausible Object Recognition Strategies . . . . .	238
<i>B. A. Draper, K. Baek</i>	
Structured Kalman Filter for Tracking Partially Occluded Moving Objects . . . . .	248
<i>D.-S. Jang, S.-W. Jang, H.-I. Choi</i>	
Face Recognition under Varying Views . . . . .	258
<i>A. Sehad, H. Hocini, A. Hadid, M. Djeddi, S. Ameur</i>	
Time Delay Effects on Dynamic Patterns in a Coupled Neural Model . . . . .	268
<i>S. H. Park, S. Kim, H.-B. Pyo, S. Lee, S.-K. Lee</i>	
Pose-Independent Object Representation by 2-D Views . . . . .	276
<i>J. Wieghardt, C. von der Malsburg</i>	
An Image Enhancement Technique Based on Wavelets . . . . .	286
<i>H.-S. Lee, Y. Cho, H. Byun, J. Yoo</i>	
Front-End Vision: A Multiscale Geometry Engine . . . . .	297
<i>B. M. ter Haar Romeny, L. M. J. Florack</i>	
Face Reconstruction Using a Small Set of Feature Points . . . . .	308
<i>B.-W. Hwang, V. Blanz, T. Vetter, S.-W. Lee</i>	
Modeling Character Superiority Effect in Korean Characters by Using IAM . . . . .	316
<i>C. S. Park, S. Y. Bang</i>	
Wavelet-Based Stereo Vision . . . . .	326
<i>M. Shim</i>	
A Neural Network Model for Long-Range Contour Diffusion by Visual Cortex . . . . .	336
<i>S. Fischer, B. Dresp, C. Kopp</i>	
Automatic Generation of Photo-Realistic Mosaic Image . . . . .	343
<i>J.-S. Park, D.-H. Chang, S.-G. Park</i>	
The Effect of Color Differences on the Detection of the Target in Visual Search . . . . .	353
<i>J.-Y. Hong, K.-J. Cho, K.-H. Han</i>	

A Color-Triangle-Based Approach to the Detection of Human Face . . . . .359  
*C. Lin, K.-C. Fan*

Multiple People Tracking  
Using an Appearance Model Based on Temporal Color . . . . .369  
*H.-K. Roh, S.-W. Lee*

Face and Facial Landmarks Location Based on Log-Polar Mapping . . . . .379  
*S.-I. Chien, I. Choi*

Biology-Inspired Early Vision System  
for a Spike Processing Neurocomputer . . . . .387  
*J. Thiem, C. Wolff, G. Hartmann*

A New Line Segment Grouping Method  
for Finding Globally Optimal Line Segments . . . . .397  
*J.-H. Jang, K.-S. Hong*

A Biologically-Motivated Approach to Image Representation  
and Its Application to Neuromorphology . . . . .407  
*L. da F. Costa, A. G. Campos, L. F. Estrozi, L. G. Rios-Filho, A. Bosco*

A Fast Circular Edge Detector for the Iris Region Segmentation . . . . .418  
*Y. Park, H. Yun, M. Song, J. Kim*

Face Recognition Using Foveal Vision . . . . .417  
*S. Minut, S. Mahadevan, J. M. Henderson, F. C. Dyer*

Fast Distance Computation with a Stereo Head-Eye System . . . . .424  
*S.-C. Park, S.-W. Lee*

Bio-inspired Texture Segmentation Architectures . . . . .444  
*J. Ruiz-del-Solar, D. Kottow*

3D Facial Feature Extraction and Global Motion Recovery  
Using Multi-modal Information . . . . .453  
*S.-H. Kim, H.-G. Kim*

Evaluation of Adaptive NN-RBF Classifier  
Using Gaussian Mixture Density Estimates . . . . .463  
*S. W. Baik, S. Ahn, P. W. Pachowicz*

Scene Segmentation by Chaotic Synchronization and Desynchronization . . . . .473  
*L. Zhao*

Electronic Circuit Model of Color Sensitive Retinal Cell Network . . . . .	482
<i>R. Iwaki, M. Shimoda</i>	

The Role of Natural Image Statistics in Biological Motion Estimation . . . . .	492
<i>R. O. Dror, D. C. O'Carroll, S. B. Laughlin</i>	

Enhanced Fisherfaces for Robust Face Recognition . . . . .	502
<i>J. Yi, H. Yang, Y. Kim</i>	

### **Invited Paper (6)**

A Humanoid Vision System for Versatile Interaction . . . . .	512
<i>Y. Kuniyoshi, S. Rougeaux, O. Stasse, G. Cheng, A. Nagakubo</i>	

### **ICA and Space-Variant Imaging**

The Spectral Independent Components of Natural Scenes . . . . .	527
<i>T.-W. Lee, T. Wachtler, T. J. Sejnowski</i>	

Topographic ICA as a Model of Natural Image Statistics . . . . .	535
<i>A. Hyvärinen, P. O. Hoyer, M. Inki</i>	

Independent Component Analysis of Face Images . . . . .	545
<i>P. C. Yuen, J. H. Lai</i>	

Orientation Contrast Detection in Space-Variant Images . . . . .	554
<i>G. Barattoff, R. Schönfelder, I. Ahrns, H. Neumann</i>	

Multiple Object Tracking in Multiresolution Image Sequences . . . . .	564
<i>S. Kang, S.-W. Lee</i>	

A Geometric Model for Cortical Magnification . . . . .	574
<i>L. Florack</i>	

### **Neural Networks and Applications**

Tangent Fields from Population Coding . . . . .	584
<i>N. Lüdtke, R. C. Wilson, E. R. Hancock</i>	

Efficient Search Technique for Hand Gesture Tracking in Three Dimensions . . .	594
<i>T. Inaguma, K. Oomura, H. Saji, H. Nakatani</i>	

Robust, Real-Time Motion Estimation from Long Image Sequences Using Kalman Filtering . . . . .	602
<i>J. A. Yang, X. M. Yang</i>	

XIV      Table of Contents

T-CombNET - A Neural Network Dedicated to Hand Gesture Recognition . . . . . 613  
*M. V. Lamar, M. S. Bhuiyan, A. Iwata*

**Invited Paper (7)**

Active and Adaptive Vision: Neural Network Models . . . . . 623  
*K. Fukushima*

**Invited Paper (8)**

Temporal Structure in the Input to Vision Can Promote Spatial Grouping . . . . . 635  
*R. Blake, S.-H. Lee*

**Author Index** . . . . . 655



<http://www.springer.com/978-3-540-67560-0>

Biologically Motivated Computer Vision

First IEEE International Workshop BMCV 2000, Seoul,

Korea, May 15-17, 2000 Proceedings

Lee, S.-W.; Bülthoff, H.H.; Poggio, T. (Eds.)

2000, XIV, 662 p., Softcover

ISBN: 978-3-540-67560-0