

# **2008 IEEE Workshop on Machine Learning for Signal Processing**

**Cancun, Mexico  
16 – 19 October 2008**



**IEEE Catalog Number: CFP08NNS-PRT  
ISBN: 978-1-4244-2375-0**

## Table of Contents

<b>Preface</b> .....	1
Jose C. Principe	
<b>Plenary Lecture: <a href="#">Learning Sequence Kernels</a></b> .....	2
Corinna Cortes, Google Research Inc.	
<b>Kernel Methods</b>	
<a href="#">Content Addressable Memories In Reproducing Kernel Hilbert Spaces</a> .....	9
Erion Hasanbelliu, Jose C. Principe	
<a href="#">Regression Using Gaussian Process Manifold Kernel Dimensionality Reduction</a> .....	14
Kooksang Moon, Vladimir Pavlovic	
<a href="#">A Kernel Canonical Correlation Analysis Algorithm For Blind Equalization Of Oversampled Wiener Systems</a> .....	20
Steven Van Vaerenbergh, Javier Via, Ignacio Santamaria	
<a href="#">A Data-Driven Mixture Kernel For Count Data Classification Using Support Vector Machines</a> .....	26
Nizar Bouguila	
<a href="#">Constrained Adaptive Learning In Reproducing Kernel Hilbert Spaces: The Beamforming Paradigm</a> .....	32
Konstantinos Slavakis, Sergios Theodoridis, Isao Yamada	
<b>The Fourth Annual 2008 MLSP Competition</b> .....	38
Kenneth E. Hild II and Vince D. Calhoun	
<b>Blind Signal Separation</b>	
<a href="#">Multiple TDOA Estimation By Using A State Coherence Transform For Solving The Permutation Problem In Frequency-Domain BSS</a> .....	43
Francesco Nesta, Maurizio Omologo, Piergiorgio Svaizer	
<a href="#">Blind Signal Extraction Via Direct Mutual Information Minimization</a> .....	49
Jani Even, Hiroshi Saruwatari, Kiyohiro Shikano	
<a href="#">Comparing Measures Of Sparsity</a> .....	55
Niall Hurley, Scott Rickard	
<a href="#">Simple And Efficient Algorithm For Distributed Compressed Sensing</a> .....	61
Anh Huy Phan, Andrzej Cichocki, Kim Sach Nguyen	
<a href="#">Blind Separation of Two Multi-Level Sources From A Single Linear Mixture</a> .....	67
Konstantinos Diamantaras	
<a href="#">Flexible HALS Algorithms For Sparse Non-Negative Matrix/tensor Factorization</a> .....	73
Andrzej Cichocki, Anh Huy Phan, Cesar Caiafa	
<b>Biomedical Applications</b>	
<a href="#">A Synthetic Averaging Method On Point Process For Motor Brain Machine Interfaces</a> ....	79
Yiwen Wang, Jose C. Principe	
<a href="#">Detection Of Complex Interactions Of Multi-Locus Snps</a> .....	85
Guoqiang Yu, David Herrington, Carl Langefeld, Yue Wang	
<a href="#">Mixed Effects Models For Eeg Evoked Response Detection</a> .....	91
Yonghong Huang, Deniz Erdogmus, Santosh Mathan, Misha Pavel	
<a href="#">SVM Margin-Based Feature Elimination Applied To High-Dimensional Microarray Gene Expression Data</a> .....	97
Yanxin Zhang, Yaman Aksu, George Kesidis, David J. Miller, Yue Wang	
<a href="#">Analysis Of Ecog Features For Movement Execution Using Denoising</a> .....	103
Aysegul Gunduz, Justin C. Sanchez, Jose C. Principe	
<a href="#">Semi-Supervised Segmentation Using Non-Parametric Snakes For 3D-CT Applications In Radiation Oncology</a>	109
Jayashree Kalpathy-Cramer, Umut Ozertem, William Hersh, Martin Fuss, Deniz Erdogmus	

## Classification and Signal Representation

<a href="#"><u>Supervised Learning Of Classifiers Via Level Set Segmentation</u></a> .....	115
Kush R. Varshney, Alan S. Willsky	
<a href="#"><u>Ternary Bradley-Terry Model-Based Decoding For Multi-Class Classification</u></a> .....	121
Takashi Takenouchi, Shin Ishii	
<a href="#"><u>A Multiclass Decision Rule Minimizing A Loss Function Based On One Class SVM</u></a> .....	127
Nisrine Jrad, Edith Grall-Maés, Pierre Beuseroy	
<a href="#"><u>Compressive Sampling Of Non-Negative Signals</u></a> .....	133
Paul D. O'Grady and Scott T. Rickard	
<a href="#"><u>A Novel AIC Variant For Linear Regression Models Based On A Bootstrap Correction</u></a> ....	139
Abd-Krim Seghouane	
<a href="#"><u>Shift-Invariant Sparse Representation Of Images Using Learned Dictionaries</u></a> .....	145
Jayaraman J. Thiagarajan, Karthikeyan N. Ramamurthy, Andreas Spanias	

## Poster Session: Applications

<a href="#"><u>Echo State Wireless Sensor Networks</u></a> .....	151
Dmitriy Shutin, Gernot Kubin	
<a href="#"><u>Discriminating Visual Stimuli From Local Field Potentials Recorded With A Multi-Electrode Array In The Monkey's Visual Cortex</u></a> .....	157
Nikolay V. Manyakov, Marc M. Van Hulle	
<a href="#"><u>Nano-Scale Fault Tolerant Machine Learning For Cognitive Radio</u></a> .....	163
Jaakko Peltonen, Mikko A. Uusitalo, Joni Pajarinen	
<a href="#"><u>DS/CDMA Linear Receiver Based On Krylov-Proportionate Adaptive Filtering Technique ---An Extension To Complex-Valued Signals</u></a> .....	169
Masahiro Yukawa	
<a href="#"><u>Sunspot Prediction Using Genetic Programming Augmented By Binary String Fitness Characterisation And Comparative Partner Selection</u></a> .....	175
Peter Day, Asoke K Nandi	
<a href="#"><u>Digital Circuit Design Of ICA Based Implementation Of FPGA For Real Time Blind Signal Separation</u></a> .....	181
Mouloud Ounas, Salim Chitroub, Rachida Touhami, Mustapha Yagoub	
<a href="#"><u>Data Processing And Anomaly Detection In Web-Based Applications</u></a> .....	187
Rajagopal G. Sriraghavan, Luca Lucchese	
<a href="#"><u>Human Body Modeling With Partial Self Occlusion From Monocular Camera</u></a> .....	193
Chih-Chang Yu, Hsu-Yung Cheng, Jenq-Neng Hwang, Kuo-Chin Fan	
<a href="#"><u>Edge Detection Via A Fast And Adaptive Bidimensional Empirical Mode Decomposition</u></a> .....	199
Sharif M. A. Bhuiyan, Reza R. Adhami, Jesmin F. Khan	
<a href="#"><u>A Novel Approach To Color Image Compression Using 3-D Discrete Cosine Transform (DCT)</u></a> .....	205
V.K. Nath, D. Hazarika, A. Mahanta	
<a href="#"><u>Trellis-Based Circle Detection</u></a> .....	211
Kenneth E. Hild li, Deniz Erdogmus, Santosh Mathan, Misha Pavel	
<a href="#"><u>Neural Network Acoustic Model With Decision Tree Clustered Triphones</u></a> .....	216
Tomas Pavelka, Pavel Kral	
<a href="#"><u>Adaptive Combination Of IPNLMS Filters For Robust Sparse Echo Cancellation</u></a> .....	221
Jerónimo Arenas-García, Aníbal R. Figueiras-Vidal	
<a href="#"><u>Multi-Feature Audio-Visual Person Recognition</u></a> .....	227
Amitav Das, Ohil K. Manyam, Makarand Tapaswi	
<a href="#"><u>Classification Of Psychotropic Drugs In A High Dimensional Space: Some Preliminary Results On Hypothesis Stability And Power Function</u></a> .....	233
Mireille Tohme, Regis Lengelle, Peter Boeijinga	
<a href="#"><u>Phase Unwrapping And Background Correction In MRI</u></a> .....	239
Tian Lan, Deniz Erdogmus, Susan J Hayflick, J. Urick Szumowski	
<a href="#"><u>Comparing SVM And Convolutional Networks For Epileptic Seizure Prediction From Intracranial EEG</u></a> .....	244

Piotr W. Mirowski, Yann Lecun, Deepak Madhavan, Ruben Kuzniecky <a href="#"><i>Fetal ECG Extraction From A Single Abdominal ECG Signal Using SVD And Polynomial Classifiers</i></a> .....	250
Mohammad Ayat, Khaled Assaleh, Hasan Al-Nashash <a href="#"><i>Gene Expression Dissection By Non-Negative Well-Grouped Source Separation</i></a> .....	255
Yitan Zhu, Tsung-Han Chan, Eric P. Hoffman, Yue Wang <a href="#"><i>Convex Analysis For Separation Of Functional Patterns In Dce-Mri: A Longitudinal Study To Antiangiogenic Therapy</i></a> .....	261
Tsung-Han Chan, Li Chen, Peter L. Choyke, Chong-Yung Chi, Yue Wang <a href="#"><i>Generalization Performance Analysis Of Flow-Based Peer-To-Peer Traffic Identification</i></a>	267
Yi-Hsien Wang, Victor Gau, Trevor Bosaw, Jenq-Neng Hwang, Alan Lippman, Dan Lieberman, I-Chen Wu <a href="#"><i>Homographic Line Generation And Transformation Technique For Dynamic Object Association</i></a> .....	273
Shung Han Cho, Sangjin Hong, We-Duke Cho <a href="#"><i>Towards Automated Lymphoma Prognosis Based On PET Images</i></a> .....	279
Gisele Pappa, Hugues Talbot, David Menotti, Michel Meignan <a href="#"><i>New Approaches Based On One-Class Svms For Impulsive Sounds Recognition Tasks</i></a>	285
Asma Rabaoui, Hachem Kadri, Nouredine Ellouze	
<b>Bayesian Learning and Modeling</b>	
<a href="#"><i>Bayesian Biclustering With The Plaid Model</i></a> .....	291
José Caldas, Samuel Kaski <a href="#"><i>A Dirichlet Process Mixture Of Dirichlet Distributions For Classification And Prediction</i></a>	297
Nizar Bouguila, Djemel Ziou <a href="#"><i>Direct Versus Prediction-Based Particle Filter Algorithms</i></a> .....	303
F. Desbouvries, B. Ait-El-Fquih <a href="#"><i>Online Bayesian Kernel Regression From Nonlinear Mapping Of Observations</i></a> .....	309
Matthieu Geist, Olivier Pietquin, Gabriel Fricout	
<b>Poster Session: Bayesian Learning and Modeling</b>	
<a href="#"><i>On Whitening For Krylov-Proportionate Normalized Least-Mean-Square Algorithm</i></a> .....	315
Masahiro Yukawa <a href="#"><i>Second-Order Improperness In Frequency-Domain Colored Signal Model</i></a> .....	321
Fengyu Cong Tapani Ristaniemi <a href="#"><i>A New Least Squares Adaptation Scheme For The Affine Combination Of Two Adaptive Filters</i></a> .....	327
Luis A. Azpicueta-Ruiz, Aníbal R. Figueiras-Vidal, Jerónimo Arenas-García <a href="#"><i>An Iterative Projections Algorithm For ML Factor Analysis</i></a> .....	333
Abd-Krim Seghouane <a href="#"><i>F-Svc: A Simple And Fast Training Algorithm For Soft Margin Support Vector Classification</i></a> .....	339
Mireille Tohmé, Régis Lengellé <a href="#"><i>Compressive Mahalanobis Classifiers</i></a> .....	345
Paolo Emilio Barbano Ronald Coifman <a href="#"><i>Multiclass Linear Dimension Reduction Via A Generalized Chernoff Bound</i></a> .....	350
Madan Thangavelu, Raviv Raich <a href="#"><i>Sinc-Cauchy Hybrid Wavelet Kernel For Support Vector Machines</i></a> .....	356
Jose George, K. Rajeev <a href="#"><i>Comparison Of A Distance-Based Likelihood Ratio Test And K-Nearest Neighbor Classification Methods</i></a> .....	362
Jeremiah J. Remus, Kenneth D. Morton, Peter A. Torrione, Stacy L. Tantum, Leslie M. Collins <a href="#"><i>Scalable Semidefinite Manifold Learning</i></a> .....	368
Nikolaos Vasiloglou, Alexander Gray, David Anderson	

<a href="#"><u>Signal Denoising With Hidden Markov Models Using Hidden Markov Trees As Observation Densities</u></a> .....	374
Diego H. Milone, Leandro E. Di Persia, Diego R. Tomassi	
<a href="#"><u>Learning On Varifolds</u></a> .....	380
Lei Ding	
<a href="#"><u>Local Estimation Of Displacement Density For Abnormal Behavior Detection</u></a> .....	386
P.L.M. Bouttefroy, A. Bouzerdoum, S.L. Phung, A. Beghdadi	
<a href="#"><u>Online Bayesian Learning For Dynamical Classification Problem using Natural Sequential Prior</u></a> .....	392
Kazue Sega, Yohei Nakada, Takashi Matsumoto	
<a href="#"><u>Adaptation Of Acoustic Sensor Orientation Based On Sensor Characteristics For Improving Tracking Performance</u></a> .....	398
Jinseok Lee, Sangjin Hong, Junghun Ryu, We-Duke Cho	
<a href="#"><u>A Complex Echo State Network For Nonlinear Adaptive Filtering</u></a> .....	404
Yili. Xia, Danilo P. Mandic, Marc M. Van Hulle, Jose C. Principe	
<a href="#"><u>Linearization Of Weakly Nonlinear Volterra Systems Using FIR Filters And Recursive Prediction Error Method</u></a> .....	409
Li Gan, Emad Abd-Elrady	
<a href="#"><u>Model-Robust Design Of Experiments For Sequential Identification Of Ode Parameters</u></a>	415
Hassan El Abiad, Laurent Le Brusquet, Marie-Eve Davoust	
<a href="#"><u>Collaborative Adaptive Filtering In The Complex Domain</u></a> .....	421
Beth Jelfs, Yili Xia, Danilo Mandic, Scott Douglas	
<a href="#"><u>Piecewise Smooth Signal Denoising Via Principal Curve Projections</u></a> .....	426
Umut Ozertem, Deniz Erdogmus, Orhan Arikan	
<a href="#"><u>New Methods For The Identification Of A Stable Subspace Model For Dynamical Systems</u></a> .....	432
Grégory Mallet, Gilles Gasso, Stéphane Canu	

## Learning Theory and Modeling

<a href="#"><u>Principal Graphs And Piecewise Linear Subspace Constrained Mean Shift</u></a> .....	438
Umut Ozertem, Deniz Erdogmus	
<a href="#"><u>Echo State Networks With Decoupled Reservoir States</u></a> .....	444
Bai Zhang, Yue Wang	
<a href="#"><u>Solving Non-Convex Lasso Type Problems With DC Programming</u></a> .....	450
Gilles Gasso, Alain Rakotomamonjy, Stephane Canu	
<a href="#"><u>Fusion Of Heterogeneous Data Sources: A Quaternionic Approach</u></a> .....	456
Clive Cheong Took, Danilo Mandic	
<a href="#"><u>Dimensionality Reduction Of Flow Cytometric Data Through Information Preservation</u></a> ...	462
Kevin M. Carter, Raviv Raich, William G. Finn, Alfred O. Hero Iii	
<a href="#"><u>Data-Dependent Generalization Performance Assessment Via Quasiconvex Optimization</u></a> .....	468
Christopher P. Diehl, Ashley J. Llorens	

## Speech and Audio Processing

<a href="#"><u>Synchronization And Comparison Of Lifelog Audio Recordings</u></a> .....	474
Andreas Brinch Nielsen, Lars Kai Hansen	
<a href="#"><u>Vocal Tract Area Based Artificial Bandwidth Extension</u></a> .....	480
Kaustubh Kalgaonkar, Mark Clements	
<a href="#"><u>Reduction Of Non-Stationary Noise Using A Non-Negative Latent Variable Decomposition</u></a>	486
Mikkel N. Schmidt, Jan Larsen	
<a href="#"><u>Evaluation Of Dialogue Act Recognition Approaches</u></a>	492
Pavel Král, Tomáš Pavelka, Christophe Cerisara	
<a href="#"><u>State-Of-The-Art Sequence Kernels For SVM Speaker Verification</u></a>	498
Jérôme Louradour, Khalid Daoudi	