NORSIG 2004

6th Nordic Signal Processing Symposium

June 9 – 11, 2004
Congress and Seminar Centre Meripuisto, Espoo, Finland

T E C H N I C A L   S E S S I O N S

Thursday, June 10, 2004, 10:30 – 11:30

Session 1   **Medical Image Processing I**

Automatic Registration of Spectrophotometric Retinal Images
Halldorsson, Gisli, H, University of Iceland, Iceland
Benediktson, Jon, A, University of Iceland, Iceland
Zoega, Gunnar, M, University Hospital of Iceland, Iceland
Eysteinsson, Thor, University of Iceland, Iceland
Stefansson, Einar, University Hospital of Iceland, Iceland

Color Enhancement and Edge Detection for Confocal Microscopy Fluorescent Images
Albán, Edisson, R, Tampere University of Technology, Finland
Leveelahti, Lotta, University of Turku, Finland
Heiskanen, Kaisa, M, University of Turku, Finland
Ruotsalainen, Ulla, Tampere University of Technology, Finland

Image Processing Verification Tool-IPVT
Heric, Dusan, University of Maribor, Slovenia
Potocnik, Bozidar, University of Maribor, Slovenia

Surface Smoothing Based on a Sphere Shape Model
Tohka, Jussi, Tampere University of Technology, Finland

Session 2   **Filters and Filter Design I**

Properties of the Multiplicative General Parameter Adaptive Algorithm
Vainio, Olli, Tampere University of Technology, Finland
Ovaska, Seppo, J, Helsinki University of Technology, Finland

Designing Multiplicative General Parameter Filters Using Multipopulation Genetic Algorithm
Martikainen, Jarno, Helsinki University of Technology, Finland
Ovaska, Seppo, J, Helsinki University of Technology, Finland

Design of Minimum Phase Digital IIR Filters by Using Genetic Algorithm
Karaboga, Nurhan, Erciyes University, Turkey
Cetinkaya, Bahadir, Erciyes University, Turkey

Least Squares Optimization of 2-D IIR Filters
Dumitrescu, Bogdan, Tampere University of Technology, Finland

Thursday, June 10, 2004, 11:35 – 12:20

Session 3   **Nonlinear Signal Processing**

MLP and SVM Networks – a Comparative Study
Osowski, Stanislaw, Warsaw University of Technology and Military University of Technology, Poland
Siwek, Krzysztof, Warsaw University of Technology, Poland
Markiewicz, Tomasz, Warsaw University of Technology, Poland

Management of Uncertainty within Estimation in Dynamical Context, Application to MEMS
Baili, Hana, École Supérieure d'Électricité, France
Juillard, Jérôme, École Supérieure d'Électricité, France

An Extension of Bussgang's Theory to Complex-Valued Signals
Ermolova, Natalia, Y, Helsinki University of Technology, Finland
Häggman, Sven-Gustav, Helsinki University of Technology, Finland

Session 4   **Filters and Filter Design II**

Comparison of Continuous- and Discrete-Time Modelling of Polynomial-Based Interpolation Filters
Lehtinen, Vesa, Tampere University of Technology, Finland
Babic, Djordje, Tampere University of Technology, Finland
Renfors, Markku, Tampere University of Technology, Finland

On the Use of Multiple Constant Multiplication in Polyphase FIR Filters and Filter Banks
Gustafsson, Oscar, Linköping University, Sweden
Dempster, Andrew, G, University of Westminster, United Kingdom

Kernel Using Piecewise nth Polynomials for Rate Converter
Yukio, Mori, Salesian Polytechnic, Japan
Naoyuki, Aikawa, Nihon University, Japan

Thursday, June 10, 2004, 13:20 – 14:35

Session 5   **Medical Image Processing II**

Evaluation of Noise in DNA Fingerprint Images Produced by Hybridization Techniques
Akbari, Akbar, University of Oslo, Norway
Albregtsen, Fritz, University of Oslo, Norway

Compression Gains in 2D MRCP Biliary Tree Modeling
Logeswaran, Rajasvaran, Multimedia University, Malaysia

Bone Segmentation WA-algorithm
Heric, Dusan, University of Maribor, Slovenia
Potocnik, Bozidar, University of Maribor, Slovenia

Comparison of Pattern Classification Methods in Segmentation of Dynamic PET Brain Images
Koivistoinen, Heidi, Tampere University of Technology, Finland
Tohka, Jussi, Tampere University of Technology, Finland
Ruotsalainen, Ulla, Tampere University of Technology, Finland

Noise Models for Sinusoidal Trajectories Composing Sinogram Data in Positron Emission Tomography
Krestyannikov, Evgeny, Tampere University of Technology, Finland
Happonen, Antti, Tampere University of Technology, Finland
Ruotsalainen, Ulla, Tampere University of Technology, Finland

Session 6   **Wavelets and Filter Banks**

General Formulation for Arbitrary Length Cosine Modulated Filter Banks
Thomas, Tigi, K, National Institute of Technology, India
Hameed, Abdul, National Institute of Technology, India
Elias, Elizabeth, National Institute of Technology, India

Shift Variance and Cyclostationarity in Multirate Filter Banks
Aach, Til, University of Lübeck, Germany

Measuring Shiftability of Frames of Regular Translates
Sampo, Jouni, Lappeenranta University of Technology, Finland
Kamarainen, Joni-Kristian, Lappeenranta University of Technology, Finland
Heiliö, Matti, Lappeenranta University of Technology, Finland
Kälviäinen, Heikki, Lappeenranta University of Technology, Finland

2D Wavelet Transforms with a Spatially Adaptive 2D Low Pass Filter
Abhayaratne, Guruge, CK, Queen Mary University of London, United Kingdom

Wavelet-Packet Subband Structures in the Evolution of the JPEG 2000 Standard
Reisecker, Markus, Salzburg University, Austria
Uhl, Andreas, Salzburg University, Austria

Thursday, June 10, 2004, 14:50 – 16:20

Session 7   **Image Processing I: Compression, Noise Reduction, and Authentication**

Predictive Differential Modulation for CFA Compression
Bruna, Arcangelo, R, STMicroelectronics, Italy
Vella, Filippo, STMicroelectronics, Italy
Buemi, Antonio, STMicroelectronics, Italy
Curti, Salvatore, STMicroelectronics, Italy

Support Vector Machines and Quad-Trees Applied to Image Compression
Saavedra, Ernesto, University of Applied Sciences South Westphalia - Soest Campus, Germany
Grauel, Adolf, University of Applied Sciences South Westphalia - Soest Campus, Germany
Morton, Danny, Bolton Institute of Higher Education, England

Joint Gaussian Noise Reduction and Defects Correction in Raw Digital Images
Bosco, Angelo, STMicroelectronics, Italy
Bruna, Arcangelo, STMicroelectronics, Italy
Santoro, Gaetano, STMicroelectronics, Italy
Vivirito, Paolo, STMicroelectronics, Italy

Image Denoising by Combined Quincunx and Separable Wavelet-Domain Wiener Filtering
Vrankic, Miroslav, University of Zagreb, Croatia
Egiazarian, Karen, Tampere University of Technology, Finland
Gotchev, Atanas, Tampere University of Technology, Finland

Time Invariant Curvelet Denoising
Saevarsson, Birgir, B, University of Iceland, Iceland
Sveinsson, Johannes, R, University of Iceland, Iceland
Benediktsson, Jon, A, University of Iceland, Iceland

Robust Authentication of the JPEG 2000 Bitstream
Norcen, Roland, Salzburg University, Austria
Uhl, Andreas, Salzburg University, Austria

Session 8   **VLSI for Signal Processing**

Implementation of Bit-Level Pipelined Digit-Serial Multipliers
Landernäs, Krister, Mälardalen University, Sweden
Holmberg, Johnny, Mälardalen University, Sweden
Gustafsson, Oscar, Linköping University, Sweden

Pipelining of Digit-Serial Processing Elements in Recursive Digital Filters
Karlsson, Magnus, University of Kalmar, Sweden
Vesterbacka, Mark, Linköping University, Sweden
Kulesza, Wlodek, University of Kalmar, Sweden

Deep Sub-Micron Bus Invert Coding
Lindkvist, Tina, Linköpings Universitet, Sweden
Löfvenberg, Jacob, Linköpings Universitet, Sweden
Gustafsson, Oscar, Linköpings Universitet, Sweden

A Dynamic Element Matching Technique for Flash Analog-to-Digital Converters
Säll, Erik, Linkoping University, Sweden
Andersson, Ola, K, Linköping University, Sweden
Vesterbacka, Mark, Linköping University, Sweden

Low-Complexity Constant Coefficient Matrix Multiplication Using a Minimum Spanning Tree Approach
Gustafsson, Oscar, Linköping University, Sweden
Ohlsson, Henrik, Linköping University, Sweden
Wanhammar, Lars, Linköping University, Sweden

Friday, June 11, 2004, 8:30 – 9:30

Session 9   **Biomedical Signal Measurement and Analysis I**

Multifrequency Bio-Impedance Measurement: Undersampling Approach
Märtens, Olev, Tallinn Technical University, Estonia
Min, Mart, Tallinn Technical University, Estonia

Minimum Spanning Tree Clustering of EEG Signals
Päivinen, Niina, University of Kuopio, Finland
Grönfors, Tapio, University of Kuopio, Finland

Independent Component Analysis Applied to Multielectrode Field Potential Measurements
Tanskanen, Jarno, MA, University of Kuopio, Finland
Mikkonen, Jarno, E, University of Kuopio, Finland
Penttonen, Markku, University of Kuopio, Finland

Disease Detection Technique Using the Principal Orthogonal Decomposition on DNA Microarray Data
Peterson, David, California State University, USA
Lee, Charles, H, California State University, USA

Session 10   **Communications I: Coding and Detection**

Multi-Weight Multi-Length Strict Optical Orthogonal Codes
Tarhuni, Naser, G, Helsinki University of Technology, Finland
Korhonen, Timo, O, Helsinki University of Technology, Finland

Decoding of Punctured Turbo Codes Using Dual Codes
Ruttik, Kalle, Helsinki University of Technology, Finland

Receiver Concepts for Differential Space-Time Modulation Schemes over Flat Time-Varying Channels
Chen, Xiao-Ming, University of Kiel, Germany
Hoeher, Peter, A, University of Kiel, Germany

Soft Output Detection Using Path Detector for Multiple Antennas
Ramirez, Enrique, Helsinki University of Technology, Finland
Nefedov, Nikolai, Nokia Research Center, and Helsinki University of Technology, Finland

Friday, June 11, 2004, 9:40 – 10:55

Session 11 **Biomedical Signal Measurement and Analysis II**

Lightweight Embedded System for Acquiring Simultaneous Electromyogenic Activity and Movement Data (Function-EMG)
Sihvonen, Teuvo, Kuopio University Hospital & Mikkeli Central Hospital, Finland
Sihvonen, Pekka, Savonia Polytechnic, Finland
Kuusrainen, Sami, Savonia Polytechnic, Finland
Grönfors, Tapio, University of Kuopio, Finland

A Novel Wavelet Based Technique for Detection and De-Noising of Ocular Artifact in Normal and Epileptic Electroencephalogram
Soundararajan, Venkataramanan, Indian Institute of Technology (IIT) Guwahati, India
Nerrala Venkataramanan, Kalpakam, Indian Institute of Technology (IIT) Guwahati, India
Jyotindra Singh, Sahambi, Indian Institute of Technology (IIT) Guwahati, India

Multiscale Detection of Transiently Evoked Otoacoustic Emissions
Marozas, Vaidotas, Kaunas University of Technology, Lithuania
Sörnmo, Leif, Lund University, Sweden
Janušauskas, Arturas, Kaunas University of Technology, Lithuania
Lukoševicius, Arunas, Kaunas University of Technology, Lithuania

Deriving a Wavelet Based Scale from the Localized Response of the Human Cochlea
Karam, Jalal, R, Arab Open University, Beirut, Lebanon

Protein is Compressible
Hategan, Andrea, Tampere University of Technology, Finland
Tabus, Ioan, Tampere University of Technology, Finland

Session 12 **Audio Signal Processing I: Speech Enhancement and Musical Instruments**

Pitch Synchronous Addition and Extension for Linear Predictive Analysis of Noisy Speech
Shimamura, Tetsuya, Saitama University, Japan

Inter-Frequency Dependency In MMSE Speech Enhancement
Li, Chunjian, Aalborg University, Denmark
Andersen, Søren, V, Aalborg University, Denmark

A Hybrid Speech Enhancement System Employing Blind Source Separation and Adaptive Noise Cancellation
Low, Siow Yong, Western Australian Telecommunications Research Institute (WATRI), Australia
Nordholm, Sven, Western Australian Telecommunications Research Institute (WATRI), Australia

Decomposition and Modification of Musical Instrument Sounds Using a Fractional Delay Allpass Filter
Välimäki, Vesa, Helsinki University of Technology, Finland
Ilmoniemi, Minna, Helsinki University of Technology, and University of Helsinki, Finland
Huotilainen, Minna, University of Helsinki, Finland

Modal Synthesis of Wind Chime Sounds with Stochastic Event Triggering
Lukkari, Teemu, Helsinki University of Technology, Finland
Välimäki, Vesa, Helsinki University of Technology, Finland

Friday, June 11, 2004, 11:00 – 12:00

Session 13   **Communications II: Control and Interference I**

Domain Selective Interference Excision and Energy Detection of Direct Sequence Signals
Lehtomäki, Janne, J, University of Oulu, Finland
Vartiainen, Johanna, University of Oulu, Finland
Saarnisaari, Harri, University of Oulu, Finland

Selection Process of a Transform Selective Interference Suppression Algorithm
Vartiainen, Johanna, University of Oulu, Finland
Aromaa, Sami, University of Oulu, Finland
Saarnisaari, Harri, University of Oulu, Finland
Juntti, Markku, University of Oulu, Finland

Reducing Impulsive Noise in DSL Systems - Robustness and Delay
Gregorio, F, H, Helsinki University of Technology, Finland
Cousseau, J, E, Universidad Nacional del Sur, Argentina
Figueroa, J, L, Universidad Nacional del Sur, Argentina

Interference Suppression in MIMO HSDPA Communication
Ylioinas, Jari, University of Oulu, Finland
Hooli, Kari, University of Oulu, Finland
Kiiskilä, Kai, University of Oulu, Finland
Juntti, Markku, University of Oulu, Finland

Session 14a   **Fast DSP Algorithms**

A New Fast Level Set Method
Ganoun, Ali, University of Orleans, and University of Garyounis, France
Canals, Raphael, University of Orleans, France

A New, Fast and Low-Cost FFT Estimation Scheme of Signals Using 1-Bit Non-Subtractive Dithered Quantization
Cheded, L, King Fahd University of Petroleum and Minerals, Saudi Arabia
Akhtar, S, King Fahd University of Petroleum and Minerals, Saudi Arabia

Session 14b   **DSP Education**

Integrating the Courses of Digital Electronics and Signal Processing by Median Filters
Koljonen, Janne, University of Vaasa, Finland
Alander, Jarmo, T, University of Vaasa, Finland

Distance Learning in Communications Signal Processing Using MATLAB Web Server
Yan, Peng, Tampere University of Technology, Finland
Valkama, Mikko, Tampere University of Technology, Finland
Renfors, Markku, Tampere University of Technology, Finland

Friday, June 11, 2004, 13:00 – 14:00

Session 15   **Communications II: Control and Interference II**

PAPR Reduction of OFDM Signal Using Turbo Coding and Selective Mapping
Abouda, Abdulla, A, Helsinki University of Technology, Finland

Application of the Generalized Predictive Control Method in Closed-Loop Power Control of CDMA Cellular Communication Systems
Rintamäki, Matti, Helsinki University of Technology, Finland
Koivo, Heikki, Helsinki University of Technology, Finland
Hartimo, Iiro, Helsinki University of Technology, Finland

Distributed Minimum Outage Removal Algorithm for Multi-Rate CDMA Wireless Communication Systems
Elmusrati, Mohammed, Helsinki University of Technology, Finland
Tarhuni, Nasser, Helsinki University of Technology, Finland
Jäntti, Riku, Helsinki University of Technology, Finland
Koivo, Heikki, Helsinki University of Technology, Finland

Session 16   **Statistical Signal Processing I**

Simultaneous Maximum Likelihood Estimation of Time Delay and Time Scaling
Carlson, Johan, E, Luleå University of Technology, Sweden
Sjöberg, Frank, Luleå University of Technology, Sweden

Quantization and Dynamic Range Effects on the Energy Detection
Koivu, Sami, University of Oulu, Finland
Saarnisaari, Harri, University of Oulu, Finland
Juntti, Markku, University of Oulu, Finland

An Adaptive Bayesian Wavelet Thresholding Approach to Multifractal Signal Denoising
Seghouane, Abd-Krim, Institut National de Recherche en Informatique et en Automatique, France

An Easily Implementable Sampling Procedure for Certain Fractal and Other Non-Band Limited Signals
Lafon, S, INRIA, France
Lévy, Véhél, J, INRIA, France

Friday, June 11, 2004, 14:05 – 15:05

Session 17   **Communications III: Performance Analysis**

Performance Analysis of CCK Modulation under Multipath Fading Channel
Liu, Shao-bo, Zhejiang University, China
Huang, Aiping, Zhejiang University, China
Zhang, Zhao-yang, Zhejiang University, China
Zhang, Zhijian, Beijing University of Post and Telecommunications, China

On the Characteristics of MIMO Mutual Information at High SNR
Salo, J, Helsinki University of Technology, Finland
Suvikunnas, P, Helsinki University of Technology, Finland
El-Sallabi, H, M, Helsinki University of Technology, Finland
Vainikainen, P, Helsinki University of Technology, Finland

Performance Analysis of Parallel Interference Cancellation Detector in Downlink MC-CDMA Systems
Duan, Zhanyun, Tampere University of Technology, Finland
Hidalgo Stitz, Tobias, Tampere University of Technology, Finland
Valkama, Mikko, Tampere University of Technology, Finland
Renfors, Markku, Tampere University of Technology, Finland

An Upper Bound on the Ergodic Mutual Information of Ricean Fading MIMO Channels
Salo, Jari, Helsinki University of Technology, Finland
Mikas, Filip, Czech Technical University of Prague, Czech Republic
Vainikainen, Pertti, Helsinki University of Technology, Finland

Session 18   **Statistical Signal Processing II**

Information Theoretic Clustering: A Unifying Review of Three Recent Algorithms
Jenssen, Robert, University of Tromsø, Norway
Eltoft, Torbjørn, University of Tromsø, Norway
Principe, Jose, C, University of Florida, USA

A New Approach to Robust Clustering by Density Estimation in an Autocorrelation Derived Feature Space
Glotsos, Dimitris, Tampere University of Technology, Finland, and University of Patras, Greece
Tohka, Jussi, Tampere University of Technology, Finland
Soukka, Jori, Arctic Diagnostics Oy, Finland
Ruotsalainen, Ulla, Tampere University of Technology, Finland

Independent Component Analysis of Word Contexts and Comparison with Traditional Categories
Väyrynen, Jaakko, Helsinki University of Technology, Finland
Honkela, Timo, Helsinki University of Technology, Finland
Hyvärinen, Aapo, University of Helsinki, Finland

Skewness Maximization for Impulsive Sources in Blind Deconvolution
Pääjärvi, Patrik, Luleå University of Technology, Sweden
LeBlanc, James, P, Luleå University of Technology, Sweden

Friday, June 11, 2004, 15:20 – 16:05

Session 19   **Image Processing II: Pattern Recognition**

Texture Retrieval Using Ordinal Co-Occurrence Features
Partio, Mari, Tampere University of Technology, Finland
Cramariuc, Bogdan, Tampere University of Technology, Finland
Gabbouj, Moncef, Tampere University of Technology, Finland

Pattern Recognition by Grouping Areas in DCT Compressed Images
Daidi, Zhong, Tampere University of Technology, Finland
Irek, Defée, Tampere University of Technology, Finland

Session 20   **Audio Signal Processing II: Speech Recognition**

Annotation and Automatic Recognition of Spontaneously Dictated Medical Records for Norwegian
Markhus, Vidar, Norwegian University of Science and Technology, Norway
Gajic, Bojana, Norwegian University of Science and Technology, Norway
Svarverud, Jacques, Norwegian University of Science and Technology, Norway
Solbraa, Lars Erik, Norwegian University of Science and Technology, Norway
Johnsen, Magne, H, Norwegian University of Science and Technology, Norway

Decoder Issues in Unlimited Finnish Speech Recognition
Hirsimäki, Teemu, Helsinki University of Technology, Finland
Kurimo, Mikko, Helsinki University of Technology, Finland

Using Phone Durations in Finnish Large Vocabulary Continuous Speech Recognition
Pylkkönen, Janne, Helsinki University of Technology, Finland
Kurimo, Mikko, Helsinki University of Technology, Finland

Friday, June 11, 2004, 16:10 – 16:55

Session 21   **Communications IV: Amplifiers and Coding**

Measurements and Modelling of Nonlinear Power Amplifiers
Jantunen, Peter, Helsinki University of Technology, Finland
Gámez, Gilda, Helsinki University of Technology, Finland
Laakso, Timo, Helsinki University of Technology, Finland

Design of Predistorters for Power Amplifiers in Future Mobile Communications Systems
Cheong, MY, Helsinki University of Technology, Finland
Werner, S, Helsinki University of Technology, Finland
Laakso, TI, Helsinki University of Technology, Finland

Exact SER-Precoding of Orthogonal Space-Time Block Coded Correlated MIMO Channels: An Iterative Approach
Hjørungnes, Are, University of Oslo, Norway
Gesbert, David, Eurécom Institute, France

Session 22   **Audio Signal Processing III: Speech Detection and Classification**

Speech Presence Detection in the Time-Frequency Domain Using Minimum Statistics
Sørensen, Karsten, V, Aalborg University, Denmark
Andersen, Søren, V, Aalborg University, Denmark

Detection of Voice Onset Time (VOT) for Unvoiced Stops (/p/, /t/, /k/) Using the Teager Energy Operator (TEO) for Automatic Detection of Accented English
Das, Sharmistha, University of Colorado, USA
Hansen, John, HL, University of Colorado, USA

Clustering Techniques for Acoustic-Phonetic Speech Classification
Pohjalainen, Jouni, Helsinki University of Technology, Finland