NEW ASPECTS of SIGNAL PROCESSING, COMPUTATIONAL GEOMETRY and ARTIFICIAL VISION

10th WSEAS International Conference on SIGNAL PROCESSING, COMPUTATIONAL GEOMETRY and ARTIFICIAL VISION (ISCGAV '10)

Taipei, Taiwan
August 20-22, 2010
NEW ASPECTS of SIGNAL PROCESSING, COMPUTATIONAL GEOMETRY and ARTIFICIAL VISION

10th WSEAS International Conference on SIGNAL PROCESSING, COMPUTATIONAL GEOMETRY and ARTIFICIAL VISION (ISCGAV '10)

Taipei, Taiwan
August 20-22, 2010
Editors:
Prof. Nikos E. Mastorakis, BULGARIA
Prof. Valeri Mladenov, BULGARIA
Prof. Zoran Bojkovic, SERBIA

International Program Committee Members:

Antonio Alves, BRAZIL
Nowshad Amin, MALAYSIA
Horia Andrei, ROMANIA
A. Andreatos, GREECE
E. Antonidakis, GREECE
Rafic Bachnak, UNITED STATES
Nikos Bardis, GREECE
Dimitri Bertsekas, USA
Luigino Benetazzo, ITALY
Krishnamurthy Bhat, INDIA
Yuval Bistritz, ISRAEL
Razvan Bologa, ROMANIA
Taxiarchis Botsis, NORWAY
El ouahidi Bourabid, ALGERIA
Hamida Bouguerira, ROMANIA
Leon Chua, USA
Massimiliano Caramia, ITALY
George Carutaus, ROMANIA
Costin Cepisca, ROMANIA
Shang-Kuan Chen, TAIWAN
Cheng-chuan Chen, TAIWAN
Chin-Tun Chuang, TAIWAN
Daniel Cristian Cismaru, ROMANIA
Spiros Courrellis, UNITED STATES
Krzysztof Cyran, POLAND
Masumeh Damrudi, IRAN
Carlo Dell’Aquila, ITALY
Beixing Deng, CHINA
Radu Dobrescu, ROMANIA
Bojan Dolsa, SLOVENIA
Petr Ekel, BRAZIL
Darie Eleonora, ROMANIA
Abeer El-korany, EGYPT
Monica Enache, ROMANIA
Sorin Enache, ROMANIA
Wen-Pinn Fang, TAIWAN
Hassan Farsi, IRAN
Adrian Filipescu, ROMANIA
Maria I. Garcia Planas, SPAIN
Ioannis Gonos, GREECE
Eladio Gutierrez, SPAIN
Daphne Halkias, GREECE
Mohamed Hamada, JAPAN
Florin Hartescu, ROMANIA
Andrei Horvat-Marc, ROMANIA
Chen-Chien Hsu, TAIWAN
Ya-Hsin Hsueh, TAIWAN
Tauqeer Hussain, PAKISTAN
Fumiaki Imado, JAPAN
Konstantinos Ioannou, GREECE
Adrian Ionescu, UNITED STATES
Shahram Javadi, IRAN
Ming-Jer Jeng, TAIWAN
Tadeusz Kaczorek, POLAND
Devinder Kaur, UNITED STATES
Stamatos Kartalopoulos, USA
Mila Kazic, MONTENEGRO
Nikos Koutsoupias, GREECE
Deniss Kumlander, ESTONIA
Aouni A. Lakis, CANADA
Athina Lazakidou, GREECE
Keon Myung Lee, KOREA
Stanca Liana-Maria, ROMANIA
Seongan Lim, KOREA
Fernando Lorenzo-Garcia, SPAIN
Ming-chih Lu, TAIWAN
Xia Mao, CHINA
Castor Marino, SPAIN
Zuzana Martinakova, SLOVAKIA
George Mavrommatis, GREECE
Baritz Mihaela, ROMANIA
Sandra Florentina Mihalache, ROMANIA
Sallehuddin Mohamed Haris, MALAYSIA
Maria Morandi Cecchi, ITALY
Abdelaziz Mourad, ALGERIA
Hossein, Shahram, IRAN
Marina Novak, SLOVENIA
Mirko Novak, CZECH REPUBLIC
Vicenzo Niola, ITALY
Manuela Panoiu, ROMANIA
Kostas Passadis, GREECE
Camelia M. Pintea, ROMANIA
Sebastiano Pizzutilo, ITALY
Ioannis Pountourakis, GREECE
Nicolae Pop, ROMANIA
Dan Popescu, ROMANIA
Dorin Popescu, ROMANIA
Nicolae Popoviciu, ROMANIA
Martin Poupa, CZECH REPUBLIC
Ioannis Prousalidis, GREECE
Mircea Preda, ROMANIA
Valeriu Prepelictua, ROMANIA
Ricardo Quiros, SPAIN
Dobrescu Radu, ROMANIA
Mohammadreza Raffie, IRAN
Victor Manuel Rivas Santos, SPAIN
Buchmann Robert Andrei, ROMANIA
Marcos Rodrigues, UNITED KINGDOM
Leszek Rutkowski, POLAND
Saeed-Reza Sabbagh-Yazdi, IRAN
Preface
This year the 10th WSEAS International Conference on SIGNAL PROCESSING, COMPUTATIONAL GEOMETRY and ARTIFICIAL VISION (ISCGAV '10) was held in Taipei, Taiwan, August 20-22, 2010. The conference remains faithful to its original idea of providing a platform to discuss filter design and structures, fast algorithms, adaptive filters, nonlinear signals and systems, signal reconstruction, time-frequency analysis, spectral estimation, echo cancellation, psychoacoustics, broadband audio coding, signal processing for music, binaural systems, room acoustics, machine vision, image coding, radar, sonar, mobile communications, image and scene analysis etc. with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors
# Table of Contents

Plenary Lecture 1: Impulse Noise Removal with Polynomial Interpolators  
*Cheng-Hsiung Hsieh*  
11

Secure Steganography for Audio Signals  
*A. M. Negrat, A. Kumar*  
13

De-Speckling of SAR Images by Directional Smoothing of Wavelet Coefficients and De-Blurring  
*Ashkan Masoomi, Zargham Heydari*  
17

DWT-Based Watermarking Technique Associated with Embedding Rule  
*Hwei-Jen Lin, Che-Wei Lu, Chiang-Ming Chiang*  
23

Precise News Video Text Detection/Localization Based on Multiple Frames Integration  
*Shwu-Huey Yen, Hsiao-Wei Chang*  
29

Facial Feature Replacement  
*Hwei-Jen Lin, Chung-Yung Chen, Hua-Wei Hsia*  
35

Nearest Neighbor Searching in High Dimensions Using Multiple KD-Trees  
*Shwu-Huey Yen, Chao-Yu Shih, Hsiao-Wei Chang, Tai-Kuang Li*  
40

Performance of an Adaptive Timer-Based Handoff Scheme for Wireless Mobile Communications  
*Yung-Fa Huang, Fu-Bin Gao, Hui-Chao Hsu*  
46

Potential Bio-Disease Tracking and Tracing Algorithm Based on RFID System  
*Chau-Chen Wu, Ming-Shen Jian, Ta Yuan Chou*  
52

A Secure Fire Truck Communication Protocol for VANET  
*Chin-Ling Chen, Chun-Hsin Chang*  
58

Automatic Detection of Epileptic Spike Using Fuzzy ARTMAP Neural Network  
*Ali Farrokhi, Nemat Talebi, Fatemeh Safari*  
64

Facial Feature Extraction for Application Program  
*Ha-Sung Koo, Ho-Geun Song*  
67

A Shape Descriptor for Real Time 3D Foot Pose Estimation  
*Ho-Geun Song, Ha-Sung Koo*  
71

Locating Radar Echo Centers in Coherent Radar Imaging Based on Grey Clustering Algorithm  
*Cheng-Hsiung Hsieh, Pei-Wen Chen, Yen-Huang Li, Jenn-Shyong Chen*  
76

Remove Speckle of SAR Images by Directional Smoothing of Wavelet Coefficients  
*Ashkan Masoomi, Mahmood Godratiyan*  
81
Traffic Signal Control for Isolated Intersections Based on Fuzzy Neural Network and Genetic Algorithm
Tahere Royani, Javad Haddadnia, Mohammad Alipoor

A New Prediction Algorithm: Flexible Switch for Combining LMS and RBF Adaptive Filters (CLMF)
M. Reza Pooshideh, Javad Haddadnia, Tahere Royani

Image Scrambling Degree Evaluation Algorithm Based on Grey Relation Analysis
Zhou Wengang, Tan Yongjie

Impact of ECFA on Trend of Exchange Rate between NTD and RMB Based on Grey Prediction Model
Chien-Chih Tu, An-Pin Chen

A Hybrid System for Detection of Masses in Digitized Mammograms
N. Riyahi Alam, F. Younesi

Development of Wu-Ma Test of the Van Hiele Levels of Geometrical Thinking Based on Grey Relational Analysis
Der-Bang Wu, Hsiu-Lan Ma

Supervision of Dynamic Systems by Bond Graph and External Models
Abderrahmene Sallami, Nadia Zanzouri, Mekki Ksouri, Belkacem Ould Bouamama

Modeling and Simulation of a Column Industrial Robot Type Used in Mounting Processes
Paul Ciprian Patic, Lucia Pascale, Florin Popa, Mihaita Ardeleanu

IPTV-VOD Program Recommendation System Using Single-Scaled Hybrid Filtering
Kyusik Park, Jongmu Choi, Donghee Lee

Concept Diagram on the Cognition Diagnosis of Statistics Learning for University Students
Meng-Xian Tsai, Yuan-Horng Lin

Performance Measurements System of the Scaled Active Steering Railway Vehicle Using the Telemetry Systems
Min-Soo Kim, Hyun-Moo Hur, Joon-Hyuk Park, Won-Hee You

Forecasting IPO Price Using GA and ANN Simulation
Shi-Hao Chou, Yen-Sen Ni, William T. Lin

Frequency Analysis of the Vibration of Tread Brake Dynamometer for the High Speed Train
Min-Soo Kim, Jeong-Guk Kim, Byeong-Choon Goo, Nam-Po Kim

Performance Measurement Systems of the Scaled Active Steering Railway Vehicle Using the Telemetry Systems
Min-Soo Kim, Hyun-Moo Hur, Joon-Hyuk Park, Won-Hee You

Reaction-Diffusion Systems in Pattern Formation and Pattern Recognition Processes
Atsushi Nomura, Makoto Ichikawa, Koichi Okada, Hidetoshi Miike, Tatsunari Sakurai

Authors Index
Plenary Lecture 1

Impulse Noise Removal with Polynomial Interpolators

Associate Professor Cheng-Hsiung Hsieh
Department of Computer Science and Information Engineering
Chaoyang University of Technology
Taiwan
E-mail: chhsieh@cyut.edu.tw

Abstract: This plenary speech presents an impulse noise removal approach which employs boundary discriminative noise detection with boundary resetting (BDNDBR) and polynomial interpolators. In the proposed approach, two stages are involved: noise detection and noise replacement. The noise detection performed by the BDNDBR is to identify a noisy pixel in an image. If a pixel is noise-free, then keep it intact. Or replace it with uncorrupted neighborhood pixels through the polynomial interpolators. Note that miss detection happens in the well-known BDND scheme when the noise density is high. The miss detection is even worse for cases with unbalanced noisy density where the portions for salt noise and pepper noise are different. To avoid the miss detection, a boundary resetting scheme is incorporated into the BDND. By this doing, the problem of miss detection in the BDND is prevented. In the noise replacement stage, two polynomial interpolators are adaptively selected to replace a noisy pixel according to the noise density. In the cases with higher noise density, a zero-order polynomial interpolator called adaptive nearest neighbor interpolator (ANNI) is used while a first-order polynomial interpolator called adaptive linear interpolator (ALI) is employed for the cases with lower noise density. Several examples are provided to justify the proposed BDNDBR, ANNI, and ALI. Moreover, the proposed noise removal approach is compared with other reported approaches as well.

Brief Biography of the Speaker:
Cheng-Hsiung Hsieh received his B.S. degree in Electronic Engineering from National Taiwan Institute of Technology, Taiwan, in 1989. In 1995, he earned the M.S. degree from the Department of Electrical Engineering of Tennessee Technological University, USA. He obtained his Ph.D. degree in Electrical Engineering from the University of Texas at Arlington, USA, in 1997. Currently, he is an associate professor at Department of Computer Science and Information Engineering in Chaoyang University of Technology, Taiwan. Since 1998, he has developed several grey models and other schemes applied to image, video, and speech signal processing. Those studies have been published in journals and conferences. Currently, his research interests are on image restoration, image enhancement, image enlargement, error concealment, and image/video coding.
### Authors Index

<table>
<thead>
<tr>
<th>Authors</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alam, N. R.</td>
<td>106</td>
</tr>
<tr>
<td>Alipoor, M.</td>
<td>87</td>
</tr>
<tr>
<td>Ardeleanu, M.</td>
<td>122</td>
</tr>
<tr>
<td>Bouamama, B. O.</td>
<td>115</td>
</tr>
<tr>
<td>Chang, C.-H.</td>
<td>58</td>
</tr>
<tr>
<td>Chang, H.-W.</td>
<td>29, 40</td>
</tr>
<tr>
<td>Chen, A.-P.</td>
<td>102</td>
</tr>
<tr>
<td>Chen, C.-L.</td>
<td>58</td>
</tr>
<tr>
<td>Chen, C.-Y.</td>
<td>35</td>
</tr>
<tr>
<td>Chen, J.-S.</td>
<td>76</td>
</tr>
<tr>
<td>Chen, P.-W.</td>
<td>76</td>
</tr>
<tr>
<td>Chiang, C.-M.</td>
<td>23</td>
</tr>
<tr>
<td>Choi, J.</td>
<td>128</td>
</tr>
<tr>
<td>Chou, S.-H.</td>
<td>145</td>
</tr>
<tr>
<td>Chou, T. Y.</td>
<td>52</td>
</tr>
<tr>
<td>Farrokhhi, A.</td>
<td>64</td>
</tr>
<tr>
<td>Gao, F.-B.</td>
<td>46</td>
</tr>
<tr>
<td>Godratianian, M.</td>
<td>81</td>
</tr>
<tr>
<td>Goo, B.-C.</td>
<td>151</td>
</tr>
<tr>
<td>Haddadnia, J.</td>
<td>87, 92</td>
</tr>
<tr>
<td>Heydari, Z.</td>
<td>17</td>
</tr>
<tr>
<td>Hsieh, C.-H.</td>
<td>76</td>
</tr>
<tr>
<td>Hsu, H.-C.</td>
<td>46</td>
</tr>
<tr>
<td>Huang, Y.-F.</td>
<td>46</td>
</tr>
<tr>
<td>Hur, H.-M.</td>
<td>140, 156</td>
</tr>
<tr>
<td>Ichikawa, M.</td>
<td>161</td>
</tr>
<tr>
<td>Jian, M.-S.</td>
<td>52</td>
</tr>
<tr>
<td>Kim, J.-G.</td>
<td>151</td>
</tr>
<tr>
<td>Kim, M.-S.</td>
<td>140, 151, 156</td>
</tr>
<tr>
<td>Kim, N.-P.</td>
<td>151</td>
</tr>
<tr>
<td>Koo, H.-S.</td>
<td>67, 71</td>
</tr>
<tr>
<td>Ksouri, M.</td>
<td>115</td>
</tr>
<tr>
<td>Kumar, A.</td>
<td>13</td>
</tr>
<tr>
<td>Lee, D.</td>
<td>128</td>
</tr>
<tr>
<td>Li, T.-K.</td>
<td>40</td>
</tr>
<tr>
<td>Li, Y.-H.</td>
<td>76</td>
</tr>
<tr>
<td>Lin, W. T.</td>
<td>145</td>
</tr>
<tr>
<td>Lin, Y.-H.</td>
<td>134</td>
</tr>
<tr>
<td>Lin. H.-J.</td>
<td>23, 35</td>
</tr>
<tr>
<td>Lu, C.-W.</td>
<td>23</td>
</tr>
<tr>
<td>Ma, H.-L.</td>
<td>110</td>
</tr>
<tr>
<td>Masoomi, A.</td>
<td>17, 81</td>
</tr>
<tr>
<td>Miike, H.</td>
<td>161</td>
</tr>
<tr>
<td>Negrat, A. M.</td>
<td>13</td>
</tr>
<tr>
<td>Ni, Y.-S.</td>
<td>145</td>
</tr>
<tr>
<td>Nomura, A.</td>
<td>161</td>
</tr>
<tr>
<td>Okada, K.</td>
<td>161</td>
</tr>
<tr>
<td>Park, J.-H.</td>
<td>140, 156</td>
</tr>
<tr>
<td>Park, K.</td>
<td>128</td>
</tr>
<tr>
<td>Pascale, L.</td>
<td>122</td>
</tr>
<tr>
<td>Patic, P. C.</td>
<td>122</td>
</tr>
<tr>
<td>Pooshideh, M. R.</td>
<td>92</td>
</tr>
<tr>
<td>Popa, F.</td>
<td>122</td>
</tr>
<tr>
<td>Royani, T.</td>
<td>87, 92</td>
</tr>
<tr>
<td>Safari, F.</td>
<td>64</td>
</tr>
<tr>
<td>Sakurai, T.</td>
<td>161</td>
</tr>
<tr>
<td>Sallami, A.</td>
<td>115</td>
</tr>
<tr>
<td>Shih, C.-Y.</td>
<td>40</td>
</tr>
<tr>
<td>Song, H.-G.</td>
<td>67, 71</td>
</tr>
<tr>
<td>Talebi, N.</td>
<td>64</td>
</tr>
<tr>
<td>Tsai, M.-X.</td>
<td>134</td>
</tr>
<tr>
<td>Tu, C.-C.</td>
<td>102</td>
</tr>
<tr>
<td>Wengang, Z.</td>
<td>98</td>
</tr>
<tr>
<td>Wu, C.-C.</td>
<td>52</td>
</tr>
<tr>
<td>Wu, D.-B.</td>
<td>110</td>
</tr>
<tr>
<td>Yen, S.-H.</td>
<td>29, 40</td>
</tr>
<tr>
<td>Yongjie, T.</td>
<td>98</td>
</tr>
<tr>
<td>You, W.-H.</td>
<td>140, 156</td>
</tr>
<tr>
<td>Younesi, F.</td>
<td>106</td>
</tr>
<tr>
<td>Zanzouri, N.</td>
<td>115</td>
</tr>
</tbody>
</table>