Editors: N. Mastorakis, V. Mladenov, Z. Bojkovic

# New Aspects of Signal Processing, Computational Geometry & Artificial Vision

10th WSEAS International Conference on Signal Processing, Computational Geometry and Artificial Vision (ISCGAV '10)

Taipei, Taiwan, August 20-22, 2010

ISSN: 1792-4618
ISBN: 978-960-474-217-2

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World Scientific and Engineering Academy and Society

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**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

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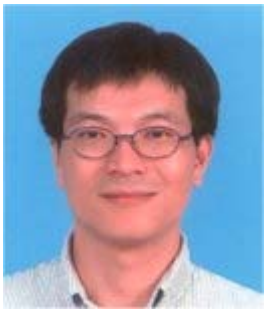
## Plenary Lecture 1

# Impulse Noise Removal with Polynomial Interpolators



**Associate Professor Cheng-Hsiung Hsieh**
Department of Computer Science and Information Engineering
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**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.

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