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Editorial
Embedded Vision System

Dietmar Dietrich[1] and Heinrich Garn[2]

[1] *Institute of Computer Technology, Faculty of Electrical Engineering and Information Technology, Vienna University of Technology, 1040 Vienna, Austria*
[2] *Smart Systems Division, Austrian Research Centers GmbH (ARC), 1220 Vienna, Austria*

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Video surveillance and machine vision systems are attracting growing academic and industrial interests.

The market for digital CCTV systems is constantly growing because of terror attacks, crime, vandalism, and violence in public and also in business domains. The turnover for CCTV products for video surveillance is estimated to grow by 10% per year in Europe and by 13% per year worldwide, reaching 3.8 billion US$ in Europe and 10.6 billion US$ by 2008.

In the machine vision market, the annual growth in turnover in vision systems has been 7%–15% over the last few years. In the smart-vision segment, an annual growth of as much as 20% is predicted within the next 4 years. Innovation and technological lead of an enterprise were identified as the key impulses for this growth.

Vision systems are still skeptically perceived by potential users. More than 50% view vision systems are too expensive or complex in setup and use. All this shows that embedded vision systems have a high potential for innovative product development and represent the major future growth factor in the imaging industry.

There are numerous technical challenges that researchers and engineers are working on all around the world. We are proud to present a selection of excellent scientific papers about recent innovations in this special issue of the EURASIP Journal on Embedded Systems. About 60% of the submitted papers have been accepted. The emphasis is on tools, architectures, and methodologies for implementing computer vision in field-programmable logic arrays (FPGAs) and digital signal processors (DSP):

(i) a tool for automatic generation of the memory management implementation for spatial and temporal real-time video processing systems targeting field-programmable logic arrays;
(ii) a software library for image processing algorithms for an embedded system;
(iii) a high-level optimization methodology for implementing the convolutional face finder algorithm for real-time applications on mobile phones;
(iv) an adaptive and predictive FPGA embedded architecture for vision systems dedicated to image analysis;
(v) a design methodology for mapping computer-vision algorithms onto an FPGA through the use of coarse-grain reconfigurable dataflow graphs;
(vi) a novel FPGA-based architecture dedicated to active vision;
(vii) design considerations for a scalable high-performance vision system, like partitioning of image processing algorithms between hardware and software;
(viii) methods for processing local binary patterns with a massively parallel hardware, especially with cellular nonlinear network universal machine.

In addition, some dedicated solutions are presented:

(i) a reuseable FPGA building block for backward warping and interpolation of arbitrary-shaped image regions;
(ii) a high-speed smart camera based on a CMOS sensor with embedded processing;
(iii) a custom FPGA-based circuit board designed to support research in the development of algorithms for image-directed navigation and control;
(iv) a distributed surveillance system based on network-enabled smart cameras for probabilistic tracking;
(v) autonomous multicamera tracking on embedded smart cameras;
(vi) an embedded multilane traffic data acquisition system based on an asynchronous temporal contrast vision sensor.

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Dietmar Dietrich
Heinrich Garn

EURASIP Book Series on Signal Processing and Communications

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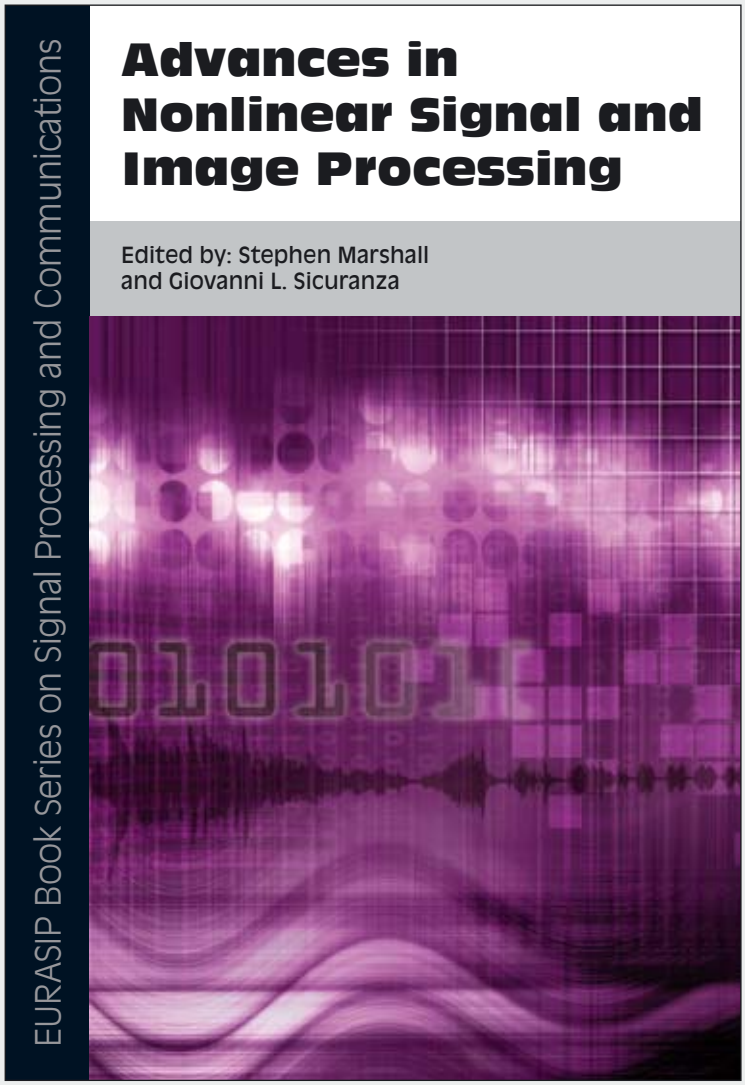

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The interest in nonlinear methods in signal processing is steadily increasing, since nowadays the advances in computational capacities make it possible to implement sophisticated nonlinear processing techniques which in turn allow remarkable improvements with respect to standard and well-consolidated linear processing approaches.

The aim of the book is to present a review of emerging new areas of interest involving nonlinear signal and image processing theories, techniques, and tools.

More than 30 leading researchers have contributed to this book covering the major topics relevant to nonlinear signal processing. These topics include recent theoretical contributions in different areas of digital filtering and a number of applications in genomics, speech analysis and synthesis, communication system, active noise control, digital watermarking, feature extraction, texture analysis, and color image processing.

The book is intended as a reference for recent advances and new applications of theories, techniques, and tools in the area of nonlinear signal processing. The target audience are graduate students and practitioners working on modern signal processing applications.

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