CONTENTS

Preface
Hariton Costin

Full text

This volume is dedicated to the 30-th anniversary of the establishment of the Research Institute of Computer Science of the Iasi Branch of the Romanian Academy (http://iit.academiaromana-is.ro/), former the Institute of Computer Technique ‑ Iasi Branch.

top

Review of Recent Results on ECG Compression and Classification
Liviu Goras and Monica Fira

In this paper several recent results on ECG signals compression and classification with particular emphasis on compressed sensing are reviewed. The discussion covers aspects regarding data acquisition, segmentation, preprocessing, feature extraction, reconstruction, classification and quality evaluation based on a new quality score defined in this communication..

Key words: Signal theory, compression, approximation algorithms, linear programming

2010 Mathematics Subject Classification: 94A12, 90C05, 68P30.

top

Implementation Non-Ideality Influence on the Nonlinear Dynamics of Chaotic Generators
Carmen Grigoraş and Victor Grigoraş

The present contribution analyzes the influence of a type of algebraic nonlinearity in the circuit implementation of the Rossler system, on the nonlinear dynamics of this chaotic generator. The analogue multiplier, imposed by the nonlinearity in the Rossler state equations, is implemented using a bipolar junction transistor Gilbert cell. Its nonlinear input-output characteristic is reviewed, the modification of the system state equations due to this nonlinearity is presented and in depth simulations, highlighting its influence on the nonlinear dynamics of the Rossler system, are performed.

Key words: chaos generators, analog multipliers, Gilbert cell, nonlinear dynamics
2010 Mathematics Subject Classification: 68M99, 68W35.

top

Iris Identification Based on Optimized LAB Histograms Applied to Iris Partitions
Adrian Ciobanu, Mihaela Luca, Ioan Păvăloi and Tudor Barbu

A method for iris identification based on local color distribution is proposed. Color feature vectors are extracted from high quality iris images, manually segmented from the database of 384 eye images produced by the Palacký University, Olomouc (UPOL), Czech Republic. The feature vectors are based on optimized LAB histograms that are applied to particularly selected iris partitions. The minimum distance classifier is used to identify irises of the same person and results for three different LAB histogram configurations and four different iris partitioning configurations are presented. They show the great potential of this method for iris identification.

Key words: iris identification, optimized LAB histograms, color features.

2010 Mathematics Subject Classification: 68T10, 68U10.

top

A Review on Printed Music Recognition System Developed in Institute of Computer Science Iasi

Dan Gâlea, Florin Rotaru, Silviu-Ioan Bejinariu, Mihai Bulea, Dan Murgu, Simona Pescaru, Vasile Apopei, Mihaela Murgu, Irina Rusu

[Full text]

This paper presents recognizing complex printed music symbols techniques developed in our institute some time ago. The mentioned methods were part of a larger application for printed music scores recognition. Presented are the techniques for detection and removal of staff lines and measure bars, detection and recognition of note heads, stems and beams from a digitized image.

Key words: musical symbols recognition, staff lines detection, symbol classification, musical information reconstruction.

2010 Mathematics Subject Classification: 68T10, 68U10.

top

Generalized Projective Transformations

Cornelia-Livia Bejan and Georgeta Ciobănaşu

[Full text]

As a generalization of the notion of a "straight line" to a manifold endowed with a linear connection, a geodesic is well known defined as a curve whose tangent vectors remain parallel if they are transported along it. Geodesics are very important in general relativity, since they describe the motion of inertial test particles. From the view point of differential equations, a geodesic is a solution of a second order ordinary differential equation. In the present paper we go further, on a manifold endowed both with a linear connection and a vector field ξ. Here we introduce and study a notion which generalizes the geodesic, called ξ-geodesic, meaning a curve whose tangent vectors, transported along it, remain in the subspace generated by ξ and the speed. A possible application is in robotics.

Key words: geodesics, ξ-geodesics, generalized projective transformations, linear connection.

2010 Mathematics Subject Classification: 53C22, 58E10.

top

On the Development of the Fraenkel-Mostowski Set Theory

Andrei Alexandru and Gabriel Ciobanu

[Full text]

The Fraenkel-Mostowski set theory is an axiomatic set theory which provides a mathematical model for names in syntax. We present an overview of applications of the Fraenkel-Mostowski set theory in computer science emphasizing our personal contributions in this topic. We also present the possibilities of rephrasing mathematics according to the Fraenkel-Mostowski axioms, and the development of another set theory (the Extended Fraenkel-Mostowski set theory) obtained by replacing a strong axiom in the Fraenkel-Mostowski set theory with a weaker one.

Key words: nominal set, finitely supported structure, Fraenkel-Mostowski set theory.

2010 Mathematics Subject Classification: 03E25, 03E30, 08A70.

top

Extending Timed Mobility With Probabilities and Real-Time
Bogdan Aman, Gabriel Ciobanu and Armand Rotaru

TIMO (Timed Mobility) is a relatively new process algebra, designed for describing certain aspects of process communication and migration between explicit locations. Timing constraints over migration and communication actions are used to coordinate processes in time and space. Starting from TIMO, we review two of its most recent extensions, namely PTIMO, which adds a probabilistic component, and RTIMO, which replaces discrete time with real-time.

Key words: timed mobility, probabilities, real-time.
2010 Mathematics Subject Classification: 68Q85, 68Q87.

Implementing the Romanian Accusative Clitic Pronouns in Fluid Construction Grammars
Liviu Ciortuz and Vlad Saveluc

The aim of this paper is to present a set of *core properties* of the accusative clitic pronouns in Romanian and an *implementation* in the framework of the Fluid Construction Grammars (FCG), as a system that parses and produces — starting from a given semantic description — sentences, based on the stated properties.

Key words: parsing, generation, Fluid Construction Grammars, clitic pronouns.

2010 Mathematics Subject Classification: 68T50.