


Fifth Mexican International Conference on

Computer Science

Colima, Mexico
20-24 September 2004

Edited by Ricardo Baeza-Yates, J. Luis Marroquin and Edgar Chávez


IEEE
COMPUTER
SOCIETY

 **IEEE**

2004

Table of Contents

ENC 2004

Foreword.....	ix
Preface	x
Organizing Committee	xi
Sponsors	xii
Program Committee.....	xiii
List of Reviewers.....	xiv
PCS Program Committee	xv
PCS Additional Reviewers	xv

Invited Talks

WebBase: Building a Web Warehouse.....	2
<i>H. Garcia-Molina</i>	
Web Spoofing and Phishing Attacks and Their Prevention	3
<i>A. Herzberg</i>	
New Trends in Robotics and Applications.....	4
<i>J.-C. Latombe</i>	
Neural Networks and Machine Learning: Towards Fully Automated Learning	5
<i>T. Martinez</i>	
Tools and Techniques for Pervasive Usability.....	6
<i>F. Paternò</i>	
The Semantic Web and Knowledge Representation	7
<i>P. Patel-Schneider</i>	

Contributed Papers

Theoretical Computer Science

A Programming Language for Local Computations in Graphs: Computational Completeness.....	12
<i>M. Mosbah and R. Ossamy</i>	
Full Abstraction for Gamma.....	20
<i>F. Quiroz</i>	
An Experimental Comparison of Approximation Algorithms for the Shortest Common Superstring Problem	27
<i>H. Romero, C. Brizuela, and A. Tchernykh</i>	
Checking Global Properties for Local Computations in Graphs with Applications to Invariant Testing	35
<i>M. Mosbah and R. Ossamy</i>	
On the Algorithm of Bertiss for Tree Pattern Matching.....	43
<i>G. Valiente</i>	

Similarity Search in Seismological Signals.....	50
<i>A. Angeles-Yreta, H. Solís-Estrella, V. Landassuri-Moreno, and J. Figueroa-Nazuno,</i>	
A Fairness Study of the Adaptive RIO Active Queue Management Algorithm.....	57
<i>R. Cartas, J. Orozco, J. Incera, and D. Ros</i>	
On the Hardware Design of an Elliptic Curve Cryptosystem.....	64
<i>M. Morales-Sandoval and C. Feregrino-Uribe</i>	

Software Engineering

Identifying Knowledge Management Needs in Software Maintenance Groups: A Qualitative Approach.....	72
<i>O. Rodríguez, A. Martínez, A. Vizcaíno, J. Favela, and M. Piattini</i>	
A UML Sequence Diagram Extension to Handle Multiplicities.....	80
<i>G. Padilla, M. Serrano, and C. de Oca</i>	
Abstract Channels as Connectors for Software Components in Group Communication Services.....	88
<i>J. Fanchon, K. Drira, and S. Hernandez</i>	
An Architecture for Autonomous Normative Agents.....	96
<i>F. y López and A. Márquez</i>	

Evolutionary Computing

Computer Graphics and Image Processing

A Hybrid Approach for Target Detection Using CFAR Algorithm and Image Processing.....	108
<i>S. López-Estrada, R. Cumplido-Parra, and C. Torres-Huitzil</i>	
Dense 3D Surface Acquisition Using Projected Fringe Technique.....	116
<i>C. Díaz and L. Altamirano</i>	

Computer Vision

An Image Resizing Algorithm for Binary Maps.....	126
<i>L. Morales-Manilla, G. Sanchez-Diaz, and R. Soto</i>	
Virtual Campeche: A Web Based Virtual Three-Dimensional Tour.....	133
<i>J. Zara, B. Beneš, and R. Rodarte</i>	
Graph-Based Point Relaxation for 3D Stippling.....	141
<i>O. Pastor and T. Strotthotte</i>	
Robust MPEG-2 SNR Scalable Coding Using Variable End-of-Block.....	151
<i>R. Beltrán and A. Khokhar</i>	

Pattern Recognition and Machine Learning

Private Representative-Based Clustering for Vertically Partitioned Data.....	160
<i>V. Estivill-Castro</i>	
Clustering Gene Expression Data: An Experimental Analysis.....	168
<i>S. Ortiz-Gama, L. Sucar, and A. Rodríguez</i>	
A Method Based on Genetic Algorithms and Fuzzy Logic to Induce Bayesian Networks.....	176
<i>R. Domínguez, M. Morales, N. Ramírez, A. Hernández, and J. Andrade</i>	

Deterring Password Sharing: User Authentication via Fuzzy c-Means Clustering Applied to Keystroke Biometric Data.....	181
<i>S. Mandujano and R. Soto</i>	
Facial Gesture Recognition for Interactive Applications	188
<i>M. Algorri and A. Escobar</i>	
Feature Selection for Visual Gesture Recognition Using Hidden Markov Models	196
<i>J. Montero and L. Sucar</i>	

Human-Computer Interaction

Associative Memory Based Real-Valued Pattern Recall.....	206
<i>H. Sossa, R. Barrón, J. Oropeza, and H. Cortez</i>	
Real-Valued Pattern Classification based on Extended Associative Memory	213
<i>H. Sossa, R. Barrón, and R. Vazquez</i>	
What Kernel Size Separates My Data?.....	220
<i>A. Aguirre, H. Dávila, and M. Vázquez</i>	
Distributed Learning in Intentional BDI Multi-Agent Systems	225
<i>A. Hernández, A. El Fallah-Seghrouchni, and H. Soldano</i>	
Hybrid Self-Learning Fuzzy PD+I Control of Unknown Linear and Nonlinear Systems.....	233
<i>J. Blanco</i>	

Vision and Robotics

A Learning Approach for On Line Object Recognition Tasks.....	242
<i>M. Peña-Cabrera, I. López-Juárez, and R. Ríos-Cabera</i>	
Intelligent Search Method for the Optimal Design of a Clean Room Robot Manipulator.....	249
<i>I. Campos and B. Campos</i>	
Local Estimation Fusion for Tracking Objects under Occlusion	256
<i>J. Enriquez and L. Robles</i>	
Technology of Haptics Interfaces with Purposes of Diagnosis of Patient with Neuropsychological Illnesses	262
<i>O. Domínguez-Ramírez, R. Samperio-Llano, V. López-Morales, M. Rivera-González, M. Pozas-Cárdenas, R. López-Hernández, L. Sanchez-Reyes, J. Suárez-Cansino, G. Nuñez-Esquer, A. Escotto-Córdova, M. Pérez-Mendoza, N. Sánchez-Cortés</i>	
Real-Time Embedded Vision System Development Using AIBO Vision Workshop 2.....	268
<i>N. Lovell</i>	
Development of Local Vision-Based Behaviors for a Robotic Soccer Player	275
<i>A. Salim, O. Fuentes, A. Muñoz</i>	
Sensor-Based Probabilistic Roadmaps for Car-Like Robots.....	282
<i>A. Sánchez and R. Zapata</i>	
Central Action Selection Using Sensor Fusion	289
<i>F. Montes-González and A. Marín-Hernández</i>	

Optimization

Cutting Analysis for MKP.....	298
<i>M. Osorio and E. Hernández</i>	
Culturizing Differential Evolution for Constrained Optimization	304
<i>R. Becerra and C. Coello</i>	

Optimization of Time Series Forecasting by Combination of Models with Evolutionary Heuristic and Error-Correlation Parameters.....	312
<i>E. Bautista-Thompson and J. Figueroa-Nazuno</i>	

Digital Libraries and Information Retrieval

QA on the Web: A Preliminary Study for Spanish Language.....	322
<i>A. Del- Castillo-Escobedo, M. Montes-y-Gómez, and L. Villaseñor-Pineda</i>	
Collaborative Environments for Digital Publishing.....	329
<i>J. Sánchez, Y. Morales, and L. Flores</i>	
Automatic MetaData-Based Development.....	337
<i>G. Padilla and Y. Páez</i>	
Incorporating Security Issues in the Information Systems Design.....	345
<i>R. Villarroel, E. Fernández-Medina, and M. Piattini</i>	
Toward Aspect Oriented Services Coordination for Building Modern Information Systems	353
<i>G. Vangas-Solar, L. García-Bañuelos, and J.-L. Zechinelli-Martini</i>	
Sphere Juggler: Fast Context Retrieval in Support of Working Spheres	361
<i>R. Morteo, V. González, J. Favela, and G. Mark</i>	
Supporting Structured, Semi-Structured and Unstructured Data in Digital Libraries.....	368
<i>J. Sánchez, C. Proal, and F. Maldonado-Naude</i>	

Parallel Computing Systems (Co-located with ENC'04)

Parallel DNA Sequence Assembly.....	378
<i>J. Błazewicz, M. Figlerowicz, P. Jackowiak, D. Janny, D. Jarczyński, M. Kasprzak, M. Nalewaj, B. Nowierski, R. Styszyński, L. Szajkowski, and P. Widera</i>	
Parallel Processor Scheduling Problems with Optimal Due Interval Determination.....	383
<i>A. Janiak and M. Marek</i>	
Comparison of Scheduling Heuristics for Grid Resource Broker.....	388
<i>S. Zhuk, A. Chernykh, A. Avetisyan, S. Gaissaryan, D. Grushin, N. Kuzjurin, A. Pospelov, and A. Shokurov</i>	
A New Cache Approach Based on Graph for Web Servers	393
<i>E. Edi, D. Trystram, and J.-M. Vincent</i>	
Efficient Data Structures and Parallel Algorithms for Association Rules Discovery	399
<i>C. Cérin, J.-S. Gay, G. Le Maec, and M. Koskas</i>	
Continuous Mode Changes in Mechatronic Systems.....	407
<i>K. Ecker, A. Tchernykh, F. Drews, and S. Schomann</i>	
CaLi, Efficient Library for Cache Implementation	415
<i>J. Żola</i>	
Author Index.....	321

FOREWORD

It is with great pleasure that we welcome you to the Fifth Mexican International Conference in Computer Science ENC 2004. The SMCC (Sociedad Mexicana de Ciencias de la Computación) has organized these academic meetings to bring together scientists and students working in all fields of Computer Science from the major research institutions and universities in Mexico, as well as guest institutions from around the world, to share the latest advances in computer science research. This event seeks to promote research exchanges that will benefit our academic community. We are proud to have a high quality technical program, as exemplified by the papers collected in these proceedings, which provides evidence of a maturing computer science community in Mexico. This year we have co-located two events, the '3rd International Conference on Parallel Computing Systems' (PCS'04) and the 'International Conference on Reconfigurable Computing and FPGAs'. The proceedings of the former event are included in this issue. The proceedings of the latter event are published in a separate issue.

In putting together this conference, we have had the pleasure of working with an outstanding group of volunteers who dedicated substantial portions of their already busy schedules to create a superb conference. We thank them all for their hard work on behalf of this conference and applaud the program they have helped create. In particular we would like to thank the hard working group of local sponsors at the Universidad de Colima, led by Juan Contreras-Castillo.

We extend our thanks to our sponsoring SMCC organization, its executive committee for the confidence it has shown on us and their constant advice, and its staff who supported us in innumerable ways.

We extend a special acknowledgment to our sponsoring organizations: Consejo Nacional de Ciencia y Tecnología (CONACyT) and the National Science Foundation (NSF), as well as our corporate sponsors: Sun Microsystems and Microsoft. Their support has helped make this conference possible.

We sincerely hope you find these conference proceedings to be enriching.

Edgar Chávez
ENC'04 General Chair

Jesus Favela
President SMCC

PREFACE

ENC'04 is a symposium in computer science, organized by The Mexican Society of Computer Science (SMCC), in collaboration with several educational and research institutions across the country. The ENC started as a biannual conference gathering researchers, educators and scholars from around the world to present and discuss progresses, challenges and opportunities in Computer Science. This year we shortened the period and began an annual meeting.

The venue for ENC'04 was the city of Colima. Our host was the Universidad de Colima. With the enthusiastic participation of the computer science community, we hope ENC'04 has surpassed the achievements of previous editions of the conference, which were held in Queretaro (1997), Pachuca (1999), Aguascaliente (2001) and Tlaxcala (2003)

With this fifth edition, ENC aimed at continuing to provide a forum in Mexico for presentation and discussion of advances and new research in computer science; strengthening the sense of community among computer science researchers and practitioners in Mexico; as well as reinforcing our academic community's links with the global community through a high-quality international technical program.

The selection of papers followed a strict refereeing process by a renowned international committee. In addition to research papers in all areas of computer science, ENC featured a rich mix of discussion panels, plenary lectures and hands-on tutorials given by international lecturers and instructors invited by each of the Special Interest Groups of SMCC. We received over 200 contributions, and 47 were selected to be presented and published in this proceedings volume.

We also had six internationally renowned scholars as keynote speakers

Ricardo Baeza-Yates, José Luis Marroquín and Edgar Chávez
The editors
Colima, México, September 21 2003.

ORGANIZING COMMITTEE

SMCC

Jesus Favela, *Presidente, CICESE*
Marcelo Mejia, *Vicepresidente, ITAM*

CONFERENCE CHAIR

Edgar Chávez, *U. Michoacana*

PROGRAM COMMITTEE

José Luis Marroquín, *CIMAT*
Ricardo Baeza-Yates, *U. Chile, Chile*

ORGANIZING COMMITTEE

Juan Contreras-Castillo, *U. de Colima*
Lourdes Feria, *U. de Colima*

PUBLICITY

Cuauhtémoc Rivera Loaiza, *U. Michoacana and U. de Chile, Chile*
Luis Villaseñor, *INAOEP*
Diana Caballero, *UDLAP*

WORKSHOPS

Alexander Gelbuck, *CIC*
Miguel Arias, *INAOE*

INVITED SPEAKERS

Sergio Rajsbaum, *UNAM*
Oscar Mayora, *ITESM*

PANELS

Alfredo Sanchez, *UDLAP*

POSTERS

Maria Osorio, *BUAP*
Héctor Pérez, *UASLP Felipe Rolando Menchaca, IPN*

DOCTORAL CONSORTIUM

César Osuna, *IMP*

FINANCES

David Sol, *UDLAP*

TUTORIALS

Rogelio Davila, *ITESM*
Juan Flores, *U. Michoacana*

SPONSORS

Sociedad Mexicana de Ciencias de la Computación

Consejo Nacional de Ciencia y Tecnología

National Science Foundation

Universidad de Colima

Universidad Michoacana de San Nicolás de Hidalgo

Centro de Investigación Científica y de Educación Superior de Ensenada

Centro de Investigación en Matemáticas

DCC, Universidad de Chile

Universidad de las Américas, Puebla

Instituto Tecnológico Autónomo de México

Instituto Tecnológico y de Estudios Superiores de Monterrey

Sun Microsystems

Microsoft

PROGRAM COMMITTEE

Ricardo Baeza-Yates, *U. Chile, Chile (co-chair)*
Karin Becker, *PUC-RS, Brazil*
Jose Blakeley, *Microsoft*
Alex Buchmann, *Technical University of Darmstadt, Germany*
Francisco Cervantes, *ITAM, Mexico*
Edgar Chavez, *U. Michoacana, Mexico*
Paolo Ciaccia, *U. Bologna, Italy*
Carlos Coello, *CINVESTAV, Mexico*
Ulises Cortes, *UPC, Spain*
Dominique Decouchant, *IMAG, France*
Vladimir Estivil Castro, *U. Griffith, Australia*
Klaus Ecker, *TU-Clausthal, Germany*
Martin Farach-Colton, *Rutgers, USA*
Rodolfo Garcia, *UANL, Mexico*
Alexander Gelbukh, *CIC-IPN, Mexico*
Antonio F. Gomez Skarmeta, *U. Murcia, Spain*
Jose Luis Gordillo, *ITESM, Mexico*
Adolfo Guzman Arenas, *CIC-IPN, Mexico*
Arturo Hernandez, *CIMAT, Mexico*
Ela Hunt, *Glasgow, UK*
Alejandro Jaimes, *FujiXerox Nakai Research Center, Japan*
Evangelos Kranakis, *Carleton, Canada*
Aurelio Lopez, *INAOE, Mexico*
Jose Luis Marroquin, *CIMAT, Mexico (co-chair)*
Hanna Oktaba, *UNAM, Mexico*
Sergio Ochoa, *U. Chile, Chile*
Eugenio Oñate, *Spain*
Mario Piatini, *U. Castilla La Mancha, Spain*
Christian Lemaitre, *LANIA, Mexico*
Marcelo Mejia, *ITAM, Mexico*
Carlos Montes de Oca, *CIMAT, Mexico*
Gonzalo Navarro, *U. Chile, Chile*
Sergio Rajsbaum, *UNAM, Mexico*
Jesus Rico Melgoza, *U. Michoacana, Mexico*
Isaac Rudomin, *ITESM, Mexico*
Alfredo Sanchez, *UDLA, Mexico*
Humberto Sossa, *CIC-IPN, Mexico*
Enrique Sucar, *ITESM Cuernavaca, Mexico*
Andrei Tchernykh, *CICESE, Mexico*
Denys Tristram, *IMAG, France*
Jorge Urrutia, *UNAM, Mexico*
Gabriel Valiente, *UPC, Spain*
Santosh Vempala, *MIT, USA*
Alfredo Viola, *U. de la Republica, Uruguay*
Alan Watt, *U. Sheffield, UK*
Roger Z. Rios, *UANL, Mexico*

LIST OF REVIEWERS

Adlemo Anders
Baillot Patrick
Barrera Edmundo
Blois Marcelo
Buckles Bill
Calderón Felix
Calvo Francisco
Collazos César
Cuayáhuatl Heriberto
Diaz Marissa
Fernandez Eduardo
Flores Juan
Galesi Nicola
Garcia Felix
Gilbert Anna
Gokcen Ibrahim
Gonzalez Marco
Hernandez Benjamin
Hidalgo Hugo
Incera Jose
Lemus Cuauhtémoc
Littman Michael
Lozano Antoni
Martínez Gregorio
Martínez Francisco
Millán Erik
Moreira Flavio
Ormeo Emilio
Padilla Gerardo
Romero Leonardo
Ruiz Francisco
Ruiz Hector
Ruiz Pedro
Shokoufandeh Ali
Villarreal César
Villaseñor Luis
Vizcaino Aurora
Von-Borstel Fernando
Zapata Sergio

PCS PROGRAM COMMITTEE

Jacek Blazewicz, *Politechnika Poznanska, Poznan, Poland*
Klaus Ecker, *T. U., Clausthal, Germany*
Jesus Favela, *CICESE, Mexico*
Jean-Luc Gaudiot, *U. California, USA*
Andrei Tchernykh, *CICESE, Mexico*
Denis Trystram, *IMAG, France*
Roman Wyrzykowski, *IMCS, Poland*
Alfredo Goldman, *U. Sao Paulo, Brazil*
Lonnie Welch, *Ohio University, USA*
Gerhard Fohler, *Mardalen University, Sweden*
Claudia Roncancio, *LSR-IMAG, France*
Bruno Raffin, *INRIA Grenoble, France*
Frederic Guinand, *Universite Le Havre, France*
Christophe Cérin, *LARIA, Amiens, France*
Victor Ivannikov, *Institute for System Programming, Russia*

PCS ADDITIONAL REVIEWERS

Avetisyan, Arutyun
Lazarev, Alexander
Salas, Alfredo
Rodríguez, Antonio
Hirales, Adán