

11th ISCA International Conference on Computers and Their Applications 1996

**San Francisco, California, USA
7-9 March 1996**

Editors:

**M.E. Cohen
D.L. Hudson**

ISBN: 978-1-61839-843-7

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (1996) by the International Society for Computers and Their Applications
All rights reserved. Reproduction in any form without the written consent of ISCA is prohibited.

Original ISBN: 1-880843-15-3 (Out of Print)
Reprint ISBN: 978-1-61839-843-7

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact the International Society for Computers and Their Applications
at the address below.

International Society for Computers and Their Applications
975 Walnut Street, Suite 132
Cary, NC 27511-4216

Phone: (919) 467-5559
Fax: (919) 467-3430

isca@ipass.net

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

INTERNATIONAL SOCIETY FOR COMPUTERS AND THEIR APPLICATIONS

11th International Conference on Computers and Their Applications

March 7-9, 1996
Sir Francis Drake Hotel, San Francisco, California USA

TECHNICAL PAPER INDEX

Special Session S1: Robotics And Virtual Reality

1. **A Modular Distributed Computer Architecture for the MMRC Planetary Rover**
Chih-Kang Chao, Robert M. Brown, Ying-Gu Yang, Ta-Yu Yuan, Songjae Lee, Timothy Davis, and Gordon K. Lee
(North Carolina State University) 1
2. **A Teleoperated Mobile Robocrane Testbed for Control Algorithm Verification**
J. Wang, C. Graham, P. Hutapea, E. Setiawan, G. K. Lee (North Carolina State University) 7
3. **Operational Invariants for Images Using Wavelet Basis Functions**
S. Mandayam, L. Udpa, S. S. Udpa, W. Lord (Iowa State University) 11

Session R1: Distributed Systems I

1. **Optimization of GIS Applications via a Distributed Workstation Approach**
Sung Y. Shin, Kevin S. Larson and Dennis Helder (South Dakota State University) 15
2. **A Simulated Annealing Approach to Distributed File and Task Placements**
Po-Jen Chuang and Chi-Wei Cheng (Tamkang University) 19
3. **Choosing an Appropriate Checkpointing and Recovery Algorithm for Distributed Applications**
Shivakant Mishra and Dongliang Wang (University of Wyoming) 24

Special Session S2: Computer-Aided Engineering Education I

1. **Integrating a Sequence of Digital Systems Courses through CAD**
David Jeff Jackson (The University of Alabama) 28
2. **Integration of Computer-Aided Design Software Across the Engineering Curriculum**
Sheryl A. Sorby (Michigan Technological University) 32
3. **Requirements for Communication System Level Simulation Software**
Andrew Rusek (Oakland University) 36

Session R2: Distributed Systems II

- 1. Performance of Multiprocessor Interconnection Networks**
Ghulam M. Chaudhry and Naveed Ahmad (University of Missouri - Columbia) 39
- 2. A New Optimal Algorithm for Data Assignment in Parallel Computation**
Julius Dichter (University of Bridgeport) and Howard Sholl (University of Connecticut) 43
- 3. Using Distributed Active Object Model to Implement TMN Services**
Kleber X. Sampaio de Souza, Ivanil S. Bonatti (UNICAMP) 49

Special Session S3: Computer-Aided Engineering Education II

- 1. Computer Simulations in an Intensive Course on VLSI Interconnections**
Ashok K. Goel (Michigan Technological University) 53
- 2. A Computer-Aided Laboratory Experiment**
S. C. Fok, F. L. Tan (Nanyang Technological University) and C. H. Lim (MND) 57
- 3. Computer-Based RF Engineering Education**
Ghader Razmafrouz and G. R. Branner (University of California, Davis) 61

Special Session S4: Learning from Imperfect Data

- 1. Multiobjective Optimization using Adaptive Fuzzy/Evolutionary Algorithms**
Michael Lee and Henrick Esbensen (University of California) 67
- 2. Learning from Imperfect Examples in Decision Trees**
Cezary Z. Janikow (University of Missouri) 71
- 3. Learning from Uncertain and Imprecise Examples**
B. Bouchon-Meunier and C. Marsala (University of Paris), and M. Ramdani (F.S.T. de Mohammadia) 75
- 4. Database Mining Using Imprecise Concept Formation**
Lawrence J. Mazlack (University of California and University of Cincinnati) 79

Special Session S5: Embedded Systems

- 1. Project Plan: Porting an Assembler in Macro-32 to a C++ Object-Oriented Design**
Paul-Marcel St-Onge and David C. Pheanis (Inter-Tel, Inc.) 83
- 2. An Integrated, Multi-Host, Microprocessor Development Station**
Marvin C. Woodfill and William T. Neumann (Arizona State University) 87
- 3. An Analysis of Functional Partitioning Used within an Autonomous Vehicle Control System**
William T. Neumann and Marvin C. Woodfill (Arizona State University) 91
- 4. A Single-Source Debugger for Multiple Target Processors**
David C. Pheanis and Paul-Marcel St. Onge (Arizona State University) 95

Session R3: Genetic Algorithms and Adaptive Computing I

- 1. Genetic Algorithms for Open Shop Scheduling and Re-scheduling**
Sushil Louis and Zhijie Xu (University of Nevada, Reno) 99
- 2. Combining Genetic Algorithms and Case-Based Reasoning for Structure Design**
Xiaohua Liu and Sushil Louis (University of Nevada, Reno) 103
- 3. Applied Virtual Reality - IGD's VR Development Environment and Applications**
Peter Astheimer (Fraunhofer-Institute for Computer Graphics (IGD)) 107

Session R4: Computer-Aided Design

1. **A CAD System for Design of Handles**
T. K. Lai, K. W. Chan, and S. T. Tan (The University of Hong Kong) 113
2. **Development of a Pre- and Post-Processing Framework for Groundwater Flow Modeling**
Sheryl A. Sorby and Alex Mayer (Michigan Technological University), and Joel G. Johnson (Geraghty & Miller) 118
3. **Computer Aided Design and Development in Engine Technology**
T. Campbell, J. Yang, Z. Ren (Glasgow Caledonian University) 122

Session R5: Genetic Algorithms and Adaptive Computing II

1. **GAMMA: A Genetic Algorithm for Multi-Module Assignment**
Ashraf A. Youssef, Ahmed H. Desoky, Khaled A. Kamel, and Adel S. Elmaghraby (University of Louisville) 127
2. **Using Genetic Algorithms for Scheduling with Multiple Families and Setup Times**
Amit Gupta (University of Wisconsin - Madison), Prasanna D. Jog (DePaul University), and Scott T. Webster (University of Wisconsin - Madison) 131
3. **Genetic Programming in Computable Financial Economics**
Shu-Heng Chen and Chia Hsuan Yeh (National Chengchi University) 135

Session R6: Multimedia

1. **Emerging Multimedia Applications and Market Opportunities**
Morshed U. Chowdhury, Syed M. Rahman and Robert J. Bignall (Monash University) 139
2. **Architectural Evolution of Multimedia Electronic Mail with Conformance to Standards**
KeiNam Tsoi and Syed M. Rahman (Monash University) 143
3. **XShare, An Environment for Sharing X-window Applications**
Mohammed F. Gabre and Chong-wei Xu (Georgia Southern University) 147

Session R7: Intelligent Systems

1. **Knowledge Discovery with the Hong Kong Stock Market**
Lena Sham, Albert Wu and Lorvan Yiu (Hong Kong Polytechnic University) 151
2. **Performance Analysis of a Fast Decision-Making Algorithm for Validity of Disjunctive Normal Forms**
Enmin Song and Wei-Ming Lin (University of Texas at San Antonio) 155
3. **Stability and Control in Remote Robotic Palpation for Medical Telediagnosis**
James M. Thompson (MIT, Massachusetts General Hospital and Harvard Medical School, Boston), Jianjue Hu, Jie Ren, and Thomas Sheridan (MIT) 159

Special Session S6: Biomedical Engineering

1. **Fractal Dimension Analyses of Biological Signals**
Russell Fischer and Metin Akay (Rutgers University) 163
2. **Alignment of Peptides Known to Bind MHC Molecules**
Ronna R. Mallios (University of California, San Francisco) 166
3. **An Object-Oriented Model for Secure, Distributed Biomedical Data Acquisition**
Rex E. Gantenbein (University of Wyoming) 170

Session R8: Verification, Evaluation, and Reliability

1. **Automated Formal Verification for VHDL Designs**
Fuyau Lin and Hsien-cheng Li (Santa Clara University) 174
2. **A New Sparring Architecture of Redundant Disk Arrays**
Satoshi Fukumoto,, Itsuki Hayashi and Naohiro Ishii (Aichi Institute of Technology)
and Toshio Nakagawa (Nagoya Institute of Technology) 178
3. **A Self Redundant Multiprocessor System**
Ghulam M. Chaudhry and M. K. Arshad (University of Missouri - Columbia) 183

Session R9: Object-Oriented Techniques

1. **Object-Oriented Data Flow Testing**
Kuang-Nan Chang, David Chenho Kung and Pei Hsia (The University of Texas at Arlington), Yasufumi Toyoshima and
Cris Chen (Fujitsu Network Transmission Systems, Inc.) 187
2. **A Flexible Class Hierarchy Locking Technique in Object-Oriented Database Systems**
Woochun Jun and Le Gruenwald (University of Oklahoma) 191
3. **Knowledge Discovery for Query Optimization in Object-Oriented Frameworks**
Suk-Chung Yoon (Widener University) and Y. D. Yoo (Vanderbilt University) 197

Session R10: Networks I

1. **Enhancing the FDDI Protocol to Facilitate Fast Interprocess Signalling in Local Area Networks**
Zhenwei Yu (Auburn University) 201
2. **A New Mode for Connectionless Support in ATM Networks**
Zhenwei Yu (Auburn University) 205
3. **Multistage Rotator Graph Networks for ATM Switch**
Seongdong Kim and Karan Watson (Texas A&M University) 209

Session R11: Imaging and Pattern Recognition

1. **A High Performance Image Compression Using Wavelet Transform and Vector Quantization**
Mohamed El-Sharkawy and Christian A. White(Purdue University) 213
2. **A Knowledge-Base Document Analysis System**
M. T. Chong and Anthony S. Fong (City University of Hong Kong) 218
3. **Analysing Structure of Printed Bangla Characters for Computer Recognition**
Syed Mahbubur Rahman (Monash University) and Md. Abul Kashem Mia (Tohoku University) 223

Session R12: Networks II

1. **Recursively Fully-Connected Networks: A Class of High-Performance Low-Degree Interconnection Networks**
Chi-Hsiang Yeh and Behrooz Parhami (University of California) 227
2. **A Network for Control and Data Acquisition for RPV Flight Testing**
Charles E. Hall, Jr. (North Carolina State University) 231
3. **A Multiple Windows Interface for Internet Tools**
Romona Brisco and K. M. George (Oklahoma State University) 235

Special Session S7: Medical Applications I

1. **Computer-Assisted Decision Making in Radiology**
Malcolm F. Anderson (Veterans Affairs Medical Center, Fresno and University of California, San Francisco),
Donna L. Hudson (University of California, San Francisco) and Maurice E. Cohen (University of California,
San Francisco and California State University, Fresno) 239
2. **Fuzzy Processing of Medical Images**
Kathrine Henson-Mack (University of Alabama), Carl Looney (University of Nevada, Reno), and Hui-Chuan Chen
(University of Alabama) 243
3. **Medical Time Series Analysis Using Continuous Chaotic Modeling**
Maurice E. Cohen (California State University, Fresno and University of California, San Francisco) and
Donna L. Hudson (University of California, San Francisco) 247
4. **A Computerized Environment for Decision Support in Plastic Surgery**
G. Tritto, G. Lotito, M. C. Tritto (Tenon Hospital, France) 251

Session R13: Software Applications I

1. **A Computer Architecture with System Attributes on Individual Operands**
Anthony S. Fong (University of Sunderland and City University of Hong Kong) 258
2. **A Flexible Integration Framework for Software Interoperability**
Yimin Bao and Ellis Horowitz (University of Southern California) 262
3. **A New Occupation: Teaching Software Engineering in Industry**
Yves Mayadoux and Veronique Narat (EDF) 268

Special Session S8: Medical Applications II

1. **Use of the Internet to Assist Medical Decision Making**
Hossein Moazamipour and Donna L. Hudson (University of California, San Francisco), Maurice E. Cohen
(University of California, San Francisco and California State University, Fresno), and Malcolm F. Anderson
(University of California, San Francisco and Veterans Affairs Medical Center, Fresno) 272
2. **Fuzzy Analysis of Chromatographic Data**
Samuel E. Hudson (California State University, Bakersfield), Maurice E. Cohen (California State University,
Fresno and University of California, San Francisco) and Donna L. Hudson (University of California, San Francisco) 276
3. **Design Choices in Medical Decision Support Systems**
Donna L. Hudson (University of California, San Francisco) and Maurice E. Cohen (University of California,
San Francisco and California State University, Fresno) 280

Session R14: Software Applications II

1. **Scenario Driven Requirements Specification of Safety-Critical Real-Time Systems**
Jyhjong Lin, David Chenho Kung and Pei Hsia (The University of Texas at Arlington) 284
2. **Reproducible Testing of Concurrent and Distributed Programs**
H. Sohn, David Chenho Kung and Pei Hsia (The University of Texas at Arlington), Y. Toyoshima and C. Chen
(Fujitsu Network Transmission Systems, Inc.) 288
3. **CHILDE-1: A Personal Computer Program for Calculating the Characteristic Impedances
of Linear Device Electrodes**
Ashick K. Goel (Michigan Technological University) 292
4. **Computer Aids for Basic Circuit Theory**
D. Baez-Lopez, J. M. Ramirez, O. Montero and G. Velasco (Universidad de las Americas-Puebla) 296