

2024 IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI 2024)

**Santa Fe, New Mexico, USA
17 – 19 March 2024**



**IEEE Catalog Number: CFP24401-POD
ISBN: 979-8-3503-6012-7**

**Copyright © 2024 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP24401-POD
ISBN (Print-On-Demand):	979-8-3503-6012-7
ISBN (Online):	979-8-3503-6011-0
ISSN:	1550-5782

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) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

IMAGE/VIDEO ANALYSIS AND MODELING I

#1: CRIME DETECTION FROM PRE-CRIME VIDEO ANALYSIS WITH AUGMENTED POSE AND EMOTION INFORMATION	97
<i>Sedat Kilic, Mihran Tuceyan, Indiana University - Purdue University - Indianapolis (IUPUI), United States</i>	
#2: OPTIMIZATION OF SWIM POSE ESTIMATION AND RECOGNITION WITH DATA AUGMENTATION	101
<i>Jonathan Ouyang, Derrick Trinh, Chang Choo, San Jose State University, United States</i>	
#3: ILLUMINATION CORRECTION FOR UNSUPERVISED PERSON RE-IDENTIFICATION	105
<i>Jiaqi Guo, Amy R. Reibman, Edward J. Delp, Purdue University, United States</i>	
#4: ULI-RI: A BENCHMARK FOR PERSON RE-IDENTIFICATION WITH QUANTITATIVE ANNOTATIONS	109
<i>Jiaqi Guo, Amy R. Reibman, Edward J. Delp, Purdue University, United States</i>	
#5: INSTRUCTIONAL ACTIVITY RECOGNITION USING A TRANSFORMER NETWORK WITH MULTI-SEMANTIC ATTENTION	113
<i>Matthew Korban, Peter Youngs, University of Virginia, United States; Jonathan Foster, University at Albany, United States; Scott T. Acton, University of Virginia, United States</i>	

BIOMEDICAL IMAGE ANALYSIS I

#1: SPATIO-FUNCTIONAL PARCELLATION OF RESTING STATE FMRI	1
<i>Harshit Parmar, Brian Nutter, Texas Tech University, United States; Rodney Long, Sameer Antani, National Institutes of Health, United States; Sunanda Mitra, Texas Tech University, United States</i>	
#2: ROBUST INTRA-TRIAL T-SNE BRAIN STATE DETECTION FOR MULTIBAND FMRI DATA	5
<i>Harshit Parmar, Eric Walden, Texas Tech University, United States</i>	
#3: COMPLEXITY MEASURES OF PSYCHOTIC BRAIN ACTIVITY IN THE FMRI SIGNAL	9
<i>Qiang Li, Georgia State University, United States; Masoud Seraji, Georgia State University & University of Texas at Austin, United States; Vince Calhoun, Armin Iraj, Georgia State University, United States</i>	
#4: MARKOV SPATIAL FLOWS IN BOLD FMRI: A NOVEL LENS ON THE BOLD SIGNAL APPLIED TO AN IMAGING STUDY OF SCHIZOPHRENIA	13
<i>Robyn Miller, Victor Vergara, Georgia State University, United States; Erik Erhardt, University of New Mexico, United States; Vince Calhoun, Georgia State University, United States</i>	
#5: MOTION-RESOLVED 4D MRI USING VISION-ASSISTED REFERENCE AUTO-NAVIGATION	17
<i>Victor Murray, Ricardo Otazo, Memorial Sloan Kettering Cancer Center, United States</i>	

REMOTE SENSING AND ANALYSIS I

#1: APPLICATION OF ANOMALOUS CHANGE DETECTION FOR IDENTIFYING CHANGES IN INSAR TIME SERIES	41
<i>Elena Reinisch, Bradley Henderson, Los Alamos National Laboratory, United States</i>	
#3: 2D SPECTRAL REPRESENTATIONS AND AUTOENCODERS FOR HYPERSPECTRAL IMAGERY CLASSIFICATION AND EXPLANABILITY	45
<i>Zigfried Hampel-Arias, Adra Carr, Natalie Klein, Eric Flynn, Los Alamos National Laboratory, United States</i>	

#4: SIMULATION OF UNRESOLVED IMAGERY OF A GEOSYNCHRONOUS SATELLITE WITH DIRSIGTM 49

Hector Erives-Contreras, The University of Texas at El Paso, United States; Michael Gartley, Rochester Institute of Technology, United States; Aryzbe Najera, Miguel Velez-Reyes, The University of Texas at El Paso, United States

DETECTION, ANALYSIS AND INTERPRETATION

#1: RESTORABLE SYNTHESIS: AVERAGE SYNTHETIC SEGMENTATION CONVERGES TO A POLYGON APPROXIMATION OF AN OBJECT CONTOUR IN MEDICAL IMAGES77

Shuyue Guan, Ravi K. Samala, Seyed M. M. Kahaki, Weijie Chen, United States Food and Drug Administration, United States

#2: DETECTION AND TRACKING OF MULTIPLE VEHICLES USING SEMANTIC INFORMATION 81

Ana R. H. Reyna, Alex J. F. Farfán, Gabriel S. Ferrante, Institute of Mathematics and Computer Sciences, University of São Paulo - USP, Brazil; Geraldo P. Rocha Filho, State University of Southwest Bahia- Uesb, Brazil; Luis H. V. Nakamura Nakamura, Rodolfo I. Meneguette, Institute of Mathematics and Computer Sciences, University of São Paulo - USP, Brazil

#3: DETECTION AND SEGMENTATION OF SHAPE-CODED PARTICLES VIA HOUGH TRANSFORMS AND SNAKE ACTIVE CONTOURS 85

Jason Brown, Alyssa Arnheim, Andrea Bertozzi, Dino Di Carlo, University of California, Los Angeles, United States

#4: EVENT-TO-VIDEO CONVERSION FOR OVERHEAD OBJECT DETECTION 89

Darryl Hannan, Pacific Northwest National Laboratory, United States; Ragib Arnab, University of Texas at Dallas, United States; Gavin Parpart, Pacific Northwest National Laboratory, United States; Garrett T. Kenyon, Los Alamos National Laboratory, United States; Edward Kim, Drexel University, United States; Yijing Watkins, Pacific Northwest National Laboratory, United States

#5: MIDWAVE/LONGWAVE DUAL-BAND INFRARED IMPROVES RECALL IN PRE-TRAINED YOLOV4 SMALL OBJECT DETECTION 93

John R. Junger III, Camgian, United States; Guoliang Fan, Oklahoma State University, United States; Joseph P. Havlicek, University of Oklahoma, United States

IMAGE/VIDEO ANALYSIS AND MODELING II

#1: A VISUAL QUALITY ASSESSMENT METHOD FOR RASTER IMAGES IN SCANNED DOCUMENT 117

Justin Yang, Purdue University, United States; Peter Bauer, Todd Harris, HP Inc., United States; Changhyung Lee, Hyeon Seok Seo, HP Printing Korea Co Ltd, Korea (South); Jan P. Allebach, Fengqing Zhu, Purdue University, United States

#2: FROM TOPOLOGICAL SIGNATURES TO TEXTURAL PATTERNS: ENHANCING THE PRECISION OF SAND CLASSIFICATION 121

Ankur Yadav, Ovidiu Daescu, Zachary Sickmann, The University of Texas at Dallas, United States

#3: IMPROVING AGE PREDICTION: UTILIZING LSTM-BASED DYNAMIC FORECASTING FOR DATA AUGMENTATION IN MULTIVARIATE TIME SERIES ANALYSIS 125

Yutong Gao, Charles Ellis, Vince Calhoun, Robyn Miller, Tri-Institutional Center for Translational Research in Neuroimaging and Data Science (TReNDS): Georgia State University, Georgia Institute of Technology, Emory University, Atlanta, Georgia, United States

#4: LOOK OUT FOR DANGEROUS SPIDERS: ARANEAE CLASSIFICATION USING DEEP LEARNING METHODS 134

Zi Deng, Jeffrey Rodriguez, University of Arizona, United States

#5: JOINT DEEP IMAGE RESTORATION AND UNSUPERVISED QUALITY ASSESSMENT 129
Hakan Emre Gedik, Abhinav Kumar Venkataramanan, Alan Conrad Bovik, The University of Texas at Austin, United States

BIOMEDICAL IMAGE ANALYSIS II

#1: COVID-19 PNEUMONIA CHEST X-RAY PATTERN SYNTHESIS BY STABLE DIFFUSION 21
Zhaohui Liang, Zhiyun Xue, Sivaramkrishnan Rajaraman, Sameer Antani, National Library of Medicine, NIH, United States

#2: COMPUTER-BASED DIAGNOSIS OF EARLY SIGNS OF DIABETIC PERIPHERAL NEUROPATHY IN THERMAL VIDEOS OF THE PLANTAR FOOT 25
Peter Soliz, Jeff Wigdahl, Sarah Soliz, Sheraz Saint-Lot, Adhitya Bhandarkar, VisionQuest Biomedical Inc., United States; Elizabeth Duran-Valdez, David Schade, University of New Mexico School of Medicine, United States

#3: STROKE RISK ASSESSMENT THROUGH SPARSE AM-FM DECOMPOSITIONS OF CAROTID PLAQUE ULTRASOUND IMAGES 29
Kyriacos Constantinou, University of Cyprus, Cyprus; Ioannis Constantinou, Istognosis Ltd, Cyprus; Efthymoulos Kyriacou, Christos Loizou, Cyprus University of Technology, Cyprus; Constantinos Pattichis, University of Cyprus and CYENS Centre of Excellence, Cyprus; Andreas Panayides, CYENS Centre of Excellence, Cyprus; Marios Pattichis, University of New Mexico, United States

#4: GENERATION OF SYNTHETIC ECHOCARDIOGRAMS USING VIDEO DIFFUSION MODELS 33
Alexandre Olive Pellicer, Amit Kumar Singh Yadav, Kratika Bhagtani, Ziyue Xiang, Purdue University, United States; Zygmunt Pizlo, Irmina Gradus-Pizlo, University of California-Irvine, United States; Edward J. Delp, Purdue University, United States

#5: DISTRIBUTION OF CONNECTIVITY STRENGTHS ACROSS FUNCTIONAL REGIONS HAS HIGHER ENTROPY IN SCHIZOPHRENIA PATIENTS THAN IN CONTROLS 37
Natalia Maksymchuk, Robyn Miller, Vince Calhoun, Georgia State University, Georgia Institute of Technology and Emory University, United States

MATHEMATICAL AND STATISTICAL MODELS AND METHODS

#1: QUALITY MODELING UNDER A RELAXED NATURAL SCENE STATISTICS MODEL 65
Abhinav Venkataramanan, Alan Bovik, The University of Texas at Austin, United States

#2: A LOW-RANK TENSOR RECONSTRUCTION AND DENOISING METHOD FOR ENHANCING CNN PERFORMANCE 69
Rohin Harikumar, Susan E. Minkoff, The University of Texas at Dallas, United States; Yifei Lou, University of North Carolina at Chapel Hill, United States

#3: UNDERSTANDING NEURAL NETWORK SYSTEMS FOR IMAGE ANALYSIS USING VECTOR SPACES 73
Rebecca Pattichis, University of California, Los Angeles, United States; Marios Pattichis, University of New Mexico, United States

REMOTE SENSING AND ANALYSIS II

#1: EVALUATION OF HYPERSPECTRAL UNMIXING METHODS: A COMPARATIVE STUDY FOR VERY-HIGH SPATIAL RESOLUTION HYPERSPECTRAL IMAGES 53
Ana Cecilia Chavez-Lopez, Miguel Velez-Reyes, The University of Texas at El Paso, United States

#2: 3D IMAGING WITH THE POLARIMETER TO UNIFY THE CORONA AND HELIOSPHERE 57
Ritesh Patel, J. Marcus Hughes, Matthew West, Chris Lowder, Daniel Seaton, Jillian Redfern, Craig DeForest, Ronnie Killough, Southwest Research Institute, United States

#3: TRANSCYCLEGAN: AN APPROACH FOR REMOTE SENSING IMAGE 61
SUPER-RESOLUTION
Lujun Zhai, Yonghui Wang, Suxia Cui, Prairie View A&M University, United States; Yu Zhou, CSAT Solutions LP, United States