11th International Conference on Pattern Recognition Applications and Methods (ICPRAM 2022)

Online
3 - 5 February 2022

Editors:

Maria De Marsico
Gabriella Sanniti di Baja
Ana Fred

ISBN: 978-1-7138-5318-3

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© (2022) by SCITEPRESS – Science and Technology Publications, Lda.
All rights reserved.

Printed with permission by Curran Associates, Inc. (2022)

For permission requests, please contact SCITEPRESS – Science and Technology Publications, Lda.
at the address below.

SCITEPRESS – Science and Technology Publications, Lda.
Avenida de S. Francisco Xavier, Lote 7 Cv. C,
2900-616 Setúbal, Portugal

Phone: +351 265 520 185
Fax: +351 265520 186

info@scitepress.org

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
Email: curran@proceedings.com
Web: www.proceedings.com

CONTENTS

INVITED SPEAKERS

KEYNOTE SPEAKERS

Machine Learning for Medicine and Healthcare 5
Mihaela van der Schaar

Everything Has Been Done, It Is Our Job to Do It One Better in Image Matching and Localisation 7
Krystian Mikolajczyk

Keep on Learning 9
Tinne Tuytelaars

Image and Video Generation: A Deep Learning Approach 11
Nicu Sebe

THEORY AND METHODS

FULL PAPERS

Improving Graph Classification by Means of Linear Combinations of Reduced Graphs 17
Anthony Gillioz and Kaspar Riesen

Neural Network-based Human Motion Smoother 24
Mathias Bastholm, Stella Graßhof and Sami S. Brandt

Reduction of Variance-related Error through Ensembling: Deep Double Descent and Out-of-Distribution Generalization 31
Pavlos Rath-Manakidis, Hlynur Davíð Hlynsson and Laurenz Wiskott

Image Coding by Samples of Counts as an Imitation of the Light Detection by the Retina 41
V. A. Kershner and V. E. Antsiperov

An Ensemble Learning Approach using Decision Fusion for the Recognition of Arabic Handwritten Characters 51
Rihab Dhief, Rabaa Youssef and Amel Benazza

A Step Towards Learning Contraction Kernels for Irregular Image Pyramid 60
Darshan Batavia, Rocio Gonzalez-Diaz and Walter G. Kropatsch

Generative Adversarial Examples for Sequential Text Recognition Models with Artistic Text Style 71
Yanhong Liu, Fengming Cao and Yuqi Zhang

The U-Net based GLOW for Optical-Flow-Free Video Interframe Generation 80
Saem Park, Donghoon Han and Nojun Kwak

An Effective Deep Network for Head Pose Estimation without Keypoints 90
Chien Thai, Viet Tran, Minh Bui, Huong Ninh and Hai Tran

Transformation-Equivariant Representation Learning with Barber-Agakov and InfoNCE Mutual Information Estimation 99
Marshal Arijona Sinaga, T. Basarrudin and Adila Alfa Krisnadhi

iRNN: Integer-only Recurrent Neural Network
Eyyüb Sari, Vanessa Courville and Vahid Partovi Nia 110

Gesture Recognition on a New Multi-Modal Hand Gesture Dataset
Monika Schak and Alexander Gepperth 122

Survival Analysis Algorithms based on Decision Trees with Weighted Log-rank Criteria
Iulii Vasilev, Mikhail Petrovskiy and Igor Mashechkin 132

EuclidNets: Combining Hardware and Architecture Design for Efficient Training and Inference
Mariana Oliveira Prazeres, Xinlin Li, Adam Oberman and Vahid Partovi Nia 141

SHORT PAPERS

Automatic Characteristic Line Drawing Generation using Pix2pix
Kazuki Yanagida, Keiji Gyohten, Hidehiro Ohki and Toshiya Takami 155

Noise in Datasets: What Are the Impacts on Classification Performance?
Rashida Hasan and Cheehung Henry Chu 163

Channel Selection for Motor Imagery Task Classification using Non-linear Separability Measurement
Stuti Chug and Vandana Agarwal 171

Single-step Adversarial Training for Semantic Segmentation
Daniel Wiens and Barbara Hammer 179

Taking Advantage of Typical Testor Algorithms for Computing Non-reducible Descriptors
Manuel S. Lazo-Cortés, José Fco. Martínez-Trinidad, J. Ariel Carrasco-Ochoa, Ventzeslav Valev, Mohammad Amin Shamshiri and Adam Krzyżak 188

A k-Means Algorithm for Clustering with Soft Must-link and Cannot-link Constraints
Philipp Baumann and Dorit S. Hochbaum 195

On Learning-free Detection and Representation of Textline Texture in Digitized Documents
Dominik Hauser, Christoffer Kassens and H. Siegfried Stiehl 203

A Deep Convolutional and Recurrent Approach for Large Vocabulary Arabic Word Recognition
Faten Ziadi, Imen Ben Cheikh and Mohamed Jemni 213

Dynamic Latent Scale for GAN Inversion
Jeongik Cho and Adam Krzyzak 221

1-Attempt 4-Cycle Parallel Thinning Algorithms
Kálmán Palágyi and Gábor Németh 229

DenseHMM: Learning Hidden Markov Models by Learning Dense Representations
Joachim Sicking, Maximilian Pintz, Maram Akila and Tim Wirtz 237

GAMS: Graph Augmentation with Module Swapping
Alessandro Bicciato and Andrea Torsello 249

Automatic Identification of Non-biting Midges (Chironomidae) using Object Detection and Deep Learning Techniques
Jack Hollister, Rodrigo Vega and M. A. Hannan Bin Azhar 256

Relative Position φ-Descriptor Computation for Complex Polygonal Objects
Tyler Laforet and Pascal Matsakis 264

Computing the Variations of Edit Distance for Rooted Labaled Caterpillars 272
Manami Hagihara, Takuya Yoshino and Kouich Hirata

Caterpillar Inclusion: Inclusion Problem for Rooted Labeled Caterpillars 280
Tomoya Miyazaki, Manami Hagihara and Kouich Hirata

Subfield-based Parallel Kernel-thinning Algorithms on the BCC Grid 288
Gábor Karai, Péter Kardos and Kálmán Palágyi

Image-set based Classification using Multiple Pseudo-whitened Mutual Subspace Method 296
Osamu Yamaguchi and Kazuhiro Fukui

An Approach for Parameters Evaluation in Layered Structural Materials based on DFT Analysis of Ultrasonic Signals 307
Aleksandrs Sisojevs, Alexey Tatarinov, Mihails Kovalovs, Olga Krutikova and Anastasija Chaplinska

Improving Usual Naive Bayes Classifier Performances with Neural Naive Bayes based Models 315
Elie Azeraf, Emmanuel Monfrini and Wojciech Pieczynski

Towards an Ensemble Approach for Sensor Data Sensemaking 323
Athanasios Tsitsipas

Instance Selection on CNNs for Alzheimer's Disease Classification from MRI 330
J. A. Castro-Silva, M. N. Moreno-García, Lorena Guachi-Guachi and D. H. Peluffo-Ordóñez

The Influence of Labeling Techniques in Classifying Human Manipulation Movement of Different Speed 338
Sadique Adnan Siddiqui, Lisa Gutzeit and Frank Kirchner

Learning Cross-modal Representations with Multi-relations for Image Captioning 346
Peng Cheng, Tung Le, Teeradaj Racharak, Cao Yiming, Kong Weikun and Minh Le Nguyen

Generative Model for Autoencoders Learning by Image Sampling Representations 354
V. E. Antsiperov

A Step Towards the Explainability of Microarray Data for Cancer Diagnosis with Machine Learning Techniques 362
Adara S. R. Nogueira, Artur J. Ferreira and Mário A. T. Figueiredo

Boosting the Performance of Deep Approaches through Fusion with Handcrafted Features 370
Dimitrios Koutrintzes, Eirini Mathe and Evaggelos Spyrou

APPLICATIONS

FULL PAPERS

Batch Constrained Bayesian Optimization for Ultrasonic Wire Bonding Feed-forward Control Design 383
Michael Hesse, Matthias Hunstig, Julia Timmermann and Ansgar Trächtler

TaylorMade Visual Burr Detection for High-mix Low-volume Production of Non-convex Cylindrical Metal Objects 395
Tashiro Kyosuke, Takeda Koji, Aoki Shogo, Ye Haoming, Hiroki Tomoe and Tanaka Kanji

Nearest-neighbor Search from Large Datasets using Narrow Sketches 401
Naoya Higuchi, Yasunobu Imamura, Vladimir Mic, Takeshi Shinohara, Kouichi Hirata and Tetsuji Kuboyama

PRiDAN: Person Re-identification from Drones with Adaptive Weights and Expanded Neighbourhood 411
Chatchanan Varojpipath and Krystian Mikolajczyk

Towards Cargo Wagons Brake Health Scoring through Image Processing 423
Andres Felipe Posada-Moreno, Thomas Otte, Damir Pehar, Marc Haßler, Holger Bartels, Anas Abdelrazeq and Frank Hees

Condition Monitoring of Rail Infrastructure and Rolling Stock using Acceleration Sensor Data of on-Rail Freight Wagons 432
Thomas Otte, Andres Felipe Posada-Moreno, Fabian Hübenthal, Marc Haßler, Holger Bartels, Anas Abdelrazeq and Frank Hees

Calibration of a Telecentric Structured-light Device for Micrometric 3D Reconstruction 440
Mara Pistellato, Andrea Albarelli and Filippo Bergamasco

Efficient Multi-angle Audio-visual Speech Recognition using Parallel WaveGAN based Scene Classifier 449
Shinnosuke Isobe, Satoshi Tamura, Yuuto Gotoh and Masaki Nose

Boosting Re-identification in the Ultra-running Scenario 461
Miguel Ángel Medina, Javier Lorenzo-Navarro, David Freire-Obregón, Oliverio J. Santana, Daniel Hernández-Sosa and Modesto Castrillón Santana

Sieving Camera Trap Sequences in the Wild 470
Anoushka Banerjee, Dileep Aroor Dinesh and Arnav Bhavsar

On the Statistical Independence of Parametric Representations in Biometric Cryptosystems: Evaluation and Improvement 480
Riccardo Musto, Emanuele Maiorana, Ridvan Salih Kuzu, Gabriel Emile Hine and Patrizio Campisi

A Light Source Calibration Technique for Multi-camera Inspection Devices 488
Mara Pistellato, Mauro Noris, Andrea Albarelli and Filippo Bergamasco

SHORT PAPERS

Real-time Weapon Detection in Videos 497
Ahmed Nazeem, Xinzhu Bei, Ruobing Chen and Shreyas Shrivastava

An Integrated Recurrent Neural Network and Regression Model with Spatial and Climatic Couplings for Vector-borne Disease Dynamics 505
Zhijian Li, Jack Xin and Guofa Zhou

Data Collection and Analysis of Print and Fan Fiction Classification 511
Channing Donaldson and James Pope

A 3D Matching Method to Compare a Scan to Its Reference using 3D Registration and Monte Carlo Metropolis Hastings Optimization for Industrial Inspection Applications 518
Clément Dubosq and Andréa Guerrero

Towards a Low-cost Vision System for Real-time Pavement Condition Assessment 526
Kehinde Olufowobi and Nic Herndon

Object Detection as Campylobacter Bacteria and Phagocytotic Activity of Leukocytes in Gram Stained Smears Images 534
Kyohei Yoshihara and Kouich Hirata

Table-structure Recognition Method Consisting of Plural Neural Network Modules 542
Hiroyuki Aoyagi, Teruhito Kanazawa, Atsuhiro Takasu, Fumito Uwano and Manabu Ohta

Optimization of Sensor Placement for Birds Acoustic Detection in Complex Fields 550
Damien Goetschi, Valère Martin, Richard Baltensperger, Marc Vonlanthen, Donatien Burin des Roziers and Francesco Carrino

Evaluation of Generative Adversarial Network Generated Super Resolution Images for Micro Expression Recognition 560
Pratikshya Sharma, Sonya Coleman, Pratheepan Yogarajah, Laurence Taggart and Pradeepa Samarasinghe

Visual-only Voice Activity Detection using Human Motion in Conference Video 570
Keisuke Yamazaki, Satoshi Tamura, Yuuto Gotoh and Masaki Nose

Exploiting Ontology to Build Bayesian Network 578
Ahmed Mabrouk, Sarra Ben Abbes, Lynda Temal, Ledia Isaj and Philippe Calvez

Explainable Clustering Applied to the Definition of Terrestrial Biomes 586
Mohamed Redha Sidoumou, Alisa Kim, Jeremy Walton, Douglas I. Kelley, Robert J. Parker and Ranjini Swaminathan

Community Detection based on Node Relationship Classification 596
Shunjie Yuan, Hefeng Zeng and Chao Wang

Hybrid Model-based Defect Analysis of Thermoelectric Cooler Components 602
Yu Lu, Weifang Xie and Jianlong Huang

An Open-source Library for Processing of 3D Data from Indoor Scenes 610
José María Martínez-Otzeta, Iñigo Mendialdua, Itsaso Rodríguez-Moreno, Igor Rodriguez and Basilio Sierra

Deep Neural Network for Estimating Value of Quality of Life in Driving Scenes
Shinji Fukui, Naoki Watanabe, Yuji Iwahori, Pittipol Kantavat, Boonserm Kijsirikul, Hiroyuki Takeshita, Yoshitsugu Hayashi and Akihiko Okazaki 616

Towards an Interpretable Spanish Sign Language Recognizer
Itsaso Rodríguez-Moreno, José María Martínez-Otzeta, Izaro Goienetxea and Basilio Sierra 622

Semi-Supervised Cloud Detection with Weakly Labeled RGB Aerial Images using Generative Adversarial Networks
Toon Stuyck, Axel-Jan Rousseau, Mattia Vallerio and Eric Demeester 630

HistShot: A Shot Type Dataset based on Historical Documentation during WWII
Daniel Helm, Florian Kleber and Martin Kampel 636

Cyber Aggression and Cyberbullying Identification on Social Networks
Vincenzo Gattulli, Donato Impedovo, Giuseppe Pirlo and Lucia Sarcinella 644

Compact, Accurate and Low-cost Hand Tracking System based on LEAP Motion Controllers and Raspberry Pi
Giuseppe Placidi, Alessandro Di Matteo, Filippo Mignosi, Matteo Polsinelli and Matteo Spezialetti 652

Effect of Data Augmentation Methods on Face Image Classification Results
Ingrid Hrga and Marina Ivasic-Kos 660

Refined co-SVD Recommender Algorithm: Data Processing and Performance Metrics
Jia Ming Low, Ian K. T. Tan and Chern Hong Lim 668

On the Choice of General Purpose Classifiers in Learned Bloom Filters: An Initial Analysis Within Basic Filters
Giacomo Fumagalli, Davide Raimondi, Raffaele Giancarlo, Dario Malchiodi and Marco Frasca 675

Three-step Approach for Localization, Instance Segmentation and Multi-facet Classification of Individual Logs in Wooden Piles
Christoph Praschl and Gerald Adam Zwettler 683

A New Neural Network Model for Prediction Next Stage of Alzheimer's Disease
Nour Zawawi, Heba Gamal Saber, Mohamed Hashem and Tarek F. Gharib 689

LSU-DS: An Uruguayan Sign Language Public Dataset for Automatic Recognition
Ariel E. Stassi, Marcela Tancredi, Roberto Aguirre, Alvaro Gómez, Bruno Carballido, Andrés Méndez, Sergio Beheregaray, Alejandro Fojo, Víctor Koleszar and Gregory Randall 697

View-invariant 3D Skeleton-based Human Activity Recognition based on Transformer and Spatio-temporal Features
Ahmed Snoun, Tahani Bouchrika and Olfa Jemai 706

Exploring Enterprise Operating Indicator Data by Hierarchical Forecasting and Root Cause Analysis
Yue Pang, Jing Pan, Xiaogang Li, Jianbin Zheng, Tan Sun and Qinxin Li 716

Domain Generalization for Activity Recognition: Learn from Visible, Infer with Thermal
Yannick Zoetgnande and Jean Louis Dillenseger 722

LSTM Network based on Prosodic Features for the Classification of Injunction in French Oral Utterances
Asma Bougrine, Philippe Ravier, Abdenour Hacine-Gharbi and Hanane Ouachour 730

Does Melania Trump Have a Body Double from the Perspective of Automatic Face Verification?
Khawla Mallat, Fabiola Becerra-Riera, Annette Morales-González, Heydi Méndez-Vázquez and Jean-Luc Dugelay 737

Towards a More Reliable and Reproducible Protocol of Source Camera Recognition
Alexandre Berthet, Chiara Galdi and Jean-Luc Dugelay 745

Predicting Depression with Text, Image, and Profile Data from Social Media
N. Ignatiev, I. Smirnov and M. Stankevich 753

Combining Deep Learning Model and Evolutionary Optimization for Parameters Identification of NMR Signal
Ivan Ryzhikov, Ekaterina Nikolskaya and Yrjö Hiltunen 761

AUTHOR INDEX 769