10th International Conference on Pattern Recognition Applications and Methods (ICPRAM 2021)

Online 4-6 February 2021

Editors:

Maria De Marsico Gabriella Sanniti di Baja Ana Fred

ISBN: 978-1-7138-4018-3

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© (2021) by SCITEPRESS – Science and Technology Publications, Lda. All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

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

BRIEF CONTENTS

Invited Speakers	IV
Organizing Committees	V
Program Committee	VI
Auxiliary Reviewer	VIII
Selected Papers Book	VIII
Foreword	IX
Contents	XI

CONTENTS

INVITED SPEAKERS

INVITED SI EAKERS	
KEYNOTE SPEAKERS	
Biases, Discrimination, and Fairness in Biometrics and Beyond <i>Julian Fierrez</i>	5
3D Motion Analysis with Event-based Sensors Cornelia Fermüller	7
The Principle of Least Cognitive Action in Vision <i>Marco Gori</i>	ç
THEORY AND METHODS	
FULL PAPERS	
Self-adaptive Norm Update for Faster Gradient-based L2 Adversarial Attacks and Defenses <i>Yanhong Liu and Fengming Cao</i>	15
FLIC: Fast Lidar Image Clustering Frederik Hasecke, Lukas Hahn and Anton Kummert	25
Multi-level Feature Selection for Oriented Object Detection Chen Jiang, Yefan Jiang, Zhangxing Bian, Fan Yang and Siyu Xia	36
Demonstrating the Vulnerability of RGB-D based Face Recognition to GAN-generated Depth-map Injection Valeria Chiesa, Chiara Galdi and Jean-Luc Dugelay	44
MetaBox+: A New Region based Active Learning Method for Semantic Segmentation using Priority Maps Pascal Colling, Lutz Roese-Koerner, Hanno Gottschalk and Matthias Rottmann	51
Speech Recognition using Deep Canonical Correlation Analysis in Noisy Environments Shinnosuke Isobe, Satoshi Tamura and Satoru Hayamizu	63
Capsule Networks with Intersection over Union Loss for Binary Image Segmentation Floris Van Beers	71
Generalized Dilation Structures in Convolutional Neural Networks Gavneet Singh Chadha, Jan Niclas Reimann and Andreas Schwung	79
Exploring Motion Boundaries in an End-to-End Network for Vision-based Parkinson's Severity Assessment Amirhossein Dadashzadeh, Alan Whone, Michal Rolinski and Majid Mirmehdi	89
Improved HTM Spatial Pooler with Homeostatic Plasticity Control Damir Dobric, Andreas Pech, Bogdan Ghita and Thomas Wennekers	98

Converting Image Labels to Meaningful and Information-rich Embeddings Savvas Karatsiolis and Andreas Kamilaris

107

Exploring Slow Feature Analysis for Extracting Generative Latent Factors Max Menne, Merlin Schüler and Laurenz Wiskott	120
SHORT PAPERS	
State Tracking in the Presence of Heavy-tailed Observations <i>Yaman Kindap</i>	135
Indextron Alexei Mikhailov and Mikhail Karavay	143
Active Output Selection Strategies for Multiple Learning Regression Models Adrian Prochaska, Julien Pillas and Bernard Bäker	150
Continuous Driver Activity Recognition from Short Isolated Action Sequences Patrick Weyers and Anton Kummert	158
Empirical Evaluation on Utilizing CNN-features for Seismic Patch Classification Chun-Xia Zhang, Xiao-Li Wei and Sang-Woon Kim	166
Task Specific Image Enhancement for Improving the Accuracy of CNNs Norbert Mitschke, Yunou Ji and Michael Heizmann	174
Improving the Grid-based Clustering by Identifying Cluster Center Nodes and Boundary Nodes Adaptively Yaru Li, Yue Xi and Yonggang Lu	182
Revisiting the Deformable Convolution by Visualization Yuqi Zhang, Yuyang Xie, Linfeng Luo and Fengming Cao	190
Interpreting Convolutional Networks Trained on Textual Data Reza Marzban and Christopher Crick	196
An ALPR System-based Deep Networks for the Detection and Recognition Mouad Bensouilah, Mohamed Nadjib Zennir and Mokhtar Taffar	204
Synergy Conformal Prediction for Regression Niharika Gauraha and Ola Spjuth	212
Automated Machine Learning for Wind Farms Location Olivier Parisot and Thomas Tamisier	222
Lifting Sequence Length Limitations of NLP Models using Autoencoders Reza Marzban and Christopher Crick	228
Optimization of Image Embeddings for Few Shot Learning Arvind Srinivasan, Aprameya Bharadwaj, Manasa Sathyan and S. Natarajan	236
A Comparison of Few-shot Classification of Human Movement Trajectories Lisa Gutzeit	243
Reduced Precision Strategies for Deep Learning: A High Energy Physics Generative Adversarial Network Use Case Florian Rehm, Sofia Vallecorsa, Vikram Saletore, Hans Pabst, Adel Chaibi, Valeriu Codreanu, Kerstin Borras and Dirk Krücker	251

Few-Shot Class Incremental Learning with Generative Feature Replay Abhilash Reddy Shankarampeta and Koichiro Yamauchi	259
Seam Carving for Image Classification Privacy James Pope and Mark Terwilliger	268
Domain Shift in Capsule Networks Rajath S., Sumukh Aithal K. and S. Natarajan	275
Web based Object Annotation Tool using a Triplet-ReID Sorting Approach Afonso Costa, André L. Ferreira and João M. Fernandes	279
Surface EMG Signal Classification for Parkinson's Disease using WCC Descriptor and ANN Classifier Hichem Bengacemi, Abdenour Hacine-Gharbi, Philippe Ravier, Karim Abed-Meraim and Olivier Buttelli	287
Predicting Malware Attacks using Machine Learning and AutoAI Mark Sokolov and Nic Herndon	295
Knowledge Acquisition on Team Management Aimed at Automation with Use of the System of Organizational Terms <i>Olaf Flak</i>	302
Locating Datacenter Link Faults with a Directed Graph Convolutional Neural Network Michael P. Kenning, Jingjing Deng, Michael Edwards and Xianghua Xie	312
Opinion Mining using TRC Techniques Nirach Romyen, Sureeporn Nualnim, Maleerat Maliyaem, Pudsadee Boonrawd, Kanchana Viriyapant and Tongpool Heeptaisong	321
Symbolic Translation of Time Series using Piecewise N-gram Similarity Voting Siegfried Delannoy, Émilie Poisson Caillault, André Bigand and Kevin Rousseeuw	327
Discrete Wavelet based Features for PCG Signal Classification using Hidden Markov Models Rima Touahria, Abdenour Hacine-Gharbi and Philippe Ravier	334
New Maximum Similarity Method for Object Identification in Photon Counting Imaging V. E. Antsiperov	341
SIGRNN: Synthetic Minority Instances Generation in Imbalanced Datasets using a Recurrent Neural Network Reda Al-Bahrani, Dipendra Jha, Qiao Kang, Sunwoo Lee, Zijiang Yang, Wei-Keng Liao, Ankit Agrawal and Alok Choudhary	349
A Spatial-temporal Graph based Hybrid Infectious Disease Model with Application to COVID-19 Yunling Zheng, Zhijian Li, Jack Xin and Guofa Zhou	357
On the Improvement of Feature Selection Techniques: The Fitness Filter Artur J. Ferreira and Mário A. T. Figueiredo	365

APPLICATIONS

FULL PAPERS

Movement Control with Vehicle-to-Vehicle Communication by using End-to-End Deep Learning for Autonomous Driving Zelin Zhang and Jun Ohya	377
Flexcoder: Practical Program Synthesis with Flexible Input Lengths and Expressive Lambda Functions Bálint Gyarmathy, Bálint Mucsányi, Ádám Czapp, Dávid Szilágyi and Balázs Pintér	386
Single Stage Class Agnostic Common Object Detection: A Simple Baseline Chuong H. Nguyen, Thuy C. Nguyen, Anh H. Vo and Yamazaki Masayuki	396
TrajNet: An Efficient and Effective Neural Network for Vehicle Trajectory Classification Jiyong Oh, Kil-Taek Lim and Yun-Su Chung	408
Video Camera Identification from Sensor Pattern Noise with a Constrained ConvNet Derrick Timmerman, Guru Swaroop Bennabhaktula, Enrique Alegre and George Azzopardi	417
Weakly Supervised Gleason Grading of Prostate Cancer Slides using Graph Neural Network Nan Jiang, Yaqing Hou, Dongsheng Zhou, Pengfei Wang, Jianxin Zhang and Qiang Zhang	426
A Blended Attention-CTC Network Architecture for Amharic Text-image Recognition Birhanu Hailu Belay, Tewodros Habtegebrial, Marcus Liwicki, Gebeyehu Belay and Didier Stricker	435
Multimodal Sentiment Analysis on Video Streams using Lightweight Deep Neural Networks Atitaya Yakaew, Matthew N. Dailey and Teeradaj Racharak	442
Active Region Detection in Multi-spectral Solar Images Majedaldein Almahasneh, Adeline Paiement, Xianghua Xie and Jean Aboudarham	452
SHORT PAPERS	
Estimating the Probability Density Function of New Fabrics for Fabric Anomaly Detection Oliver Rippel, Maximilian Müller, Andreas Münkel, Thomas Gries and Dorit Merhof	463
Garment Detection in Catwalk Videos Qi Dang, Heydar Maboudi Afkham and Oskar Juhlin	471
Object Tracking using Correction Filter Method with Adaptive Feature Selection Xiang Zhang, Yonggang Lu and Jiani Liu	480
Upgraded W-Net with Attention Gates and Its Application in Unsupervised 3D Liver Segmentation Dhanunjaya Mitta, Soumick Chatterjee, Oliver Speck and Andreas Nürnberger	488
Data Fusion of Histological and Immunohistochemical Image Data for Breast Cancer Diagnostics using Transfer Learning Pranita Pradhan, Katharina Köhler, Shuxia Guo, Olga Rosin, Jürgen Popp, Axel Niendorf and Thomas Wilhelm Bocklitz	495
Enhancing Phase Mapping for High-throughput X-ray Diffraction Experiments using Fuzzy Clustering Dipendra Jha, K. V. L. V. Narayanachari, Ruifeng Zhang, Denis T. Keane, Wei-keng Liao, Alok Choudhary, Yip-Wah Chung, Michael J. Bedzyk and Ankit Agrawal	507

An Empirical Study on Machine Learning Models for Potato Leaf Disease Classification using RGB Images Soma Ghosh, Renu Rameshan and Dileep A. D.	515
Outlier Detection in Network Traffic Monitoring Marcin Michalak, Łukasz Wawrowski, Marek Sikora, Rafał Kurianowicz, Artur Kozłowski and Andrzej Białas	523
Quantitative Method for Evaluating the Coordination between Sprinting Motions using Joint Coordinates Obtained from the Videos and Cross-correlations Masato Sabanai, Chanjin Seo, Hiroyuki Ogata and Jun Ohya	531
Deep Learning based Model Identification System Exploits the Modular Structure of a Bio-inspired Posture Control Model for Humans and Humanoids <i>Vittorio Lippi</i>	540
Common Topic Identification in Online Maltese News Portal Comments Samuel Zammit, Fiona Sammut and David Suda	548
Data Scarcity: Methods to Improve the Quality of Text Classification Ingo Glaser, Shabnam Sadegharmaki, Basil Komboz and Florian Matthes	556
Automated Detection of COVID-19 from CT Scans using Convolutional Neural Networks Rohit Lokwani, Ashrika Gaikwad, Viraj Kulkarni, Anirudha Pant and Amit Kharat	565
Automatic Diagnosis of COPD in Lung CT Images based on Multi-View DCNN Yin Bao, Yasseen Al Makady and Sasan Mahmoodi	571
The Importance of Models in Data Analysis with Small Human Movement Datasets: Inspirations from Neurorobotics Applied to Posture Control of Humanoids and Humans Vittorio Lippi, Christoph Maurer and Thomas Mergner	579
Applying Automated Machine Learning to Improve Budget Estimates for a Naval Fleet Maintenance Facility Cheryl Eisler and Mikayla Holmes	586
Individual Action and Group Activity Recognition in Soccer Videos from a Static Panoramic Camera Beerend Gerats, Henri Bouma, Wouter Uijens, Gwenn Englebienne and Luuk Spreeuwers	594
Time-First Tracking: An Efficient Multiple-Object Tracking Architecture for Dynamic Surveillance Environments Joachim Lohn-Jaramillo, Khari-Elijah Jarrett, Laura Ray, Richard Granger and Elijah Bowen	602
Object Detection and Text Recognition in Large-scale Technical Drawings Trang M. Nguyen, Long Van Pham, Chien Chu Nguyen and Vinh Van Nguyen	612
Graph Convolution Networks for Cell Segmentation Sachin Bahade, Michael Edwards and Xianghua Xie	620
Experimental Application of a Japanese Historical Document Image Synthesis Method to Text Line Segmentation Naoto Inuzuka and Tetsuya Suzuki	628
A High Accuracy Text Detection Model of Newly Constructing and Training Strategies Kha Cong Nguyen and Ryosuke Odate	635

AUTHOR INDEX 643