

17th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISIGRAPP 2022)

Volume 4: VISAPP

Online
6 - 8 February 2022

Part 1 of 2

Editors:

**Giovanni Maria Farinella
Petia Radeva
Kadi Bouatouch**

ISBN: 978-1-7138-5314-5

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

Wearable Human Augmentation <i>Roope Raisamo</i>	5
Reducing Brain-computer Interaction Training Time with Embodied Virtual Avatar <i>Filip Škola and Fotis Liarokapis</i>	7
The Risky Business of Visualizing Known Unknowns for Decision Making with Maps <i>Sara Irina Fabrikant</i>	19
Neural Implicit Representations for 3D Vision and Beyond <i>Andreas Geiger</i>	21

IMAGE AND VIDEO FORMATION, PREPROCESSING AND ANALYSIS

FULL PAPERS

Flexible Table Recognition and Semantic Interpretation System <i>Marcin Namysl, Alexander M. Esser, Sven Behnke and Joachim Köhler</i>	27
Non-local Matching of Superpixel-based Deep Features for Color Transfer <i>Hernan Carrillo, Michaël Clément and Aurélie Bugeau</i>	38
Object Detector Differences When using Synthetic and Real Training Data <i>Martin Georg Ljungqvist, Otto Nordander, Arvid Mildner, Tony Liu and Pierre Nugues</i>	48
Application of GAN for Reducing Data Imbalance under Limited Dataset <i>Gaurav Adke</i>	60
Video-based Detection and Tracking with Improved Re-Identification Association for Pigs and Laying Hens in Farms <i>Qinghua Guo, Yue Sun, Lan Min, Arjen van Putten, Egbert Frank Knol, Bram Visser, T. Bas Rodenburg, J. Elizabeth Bolhuis, Piter Bijma and Peter H. N. de With</i>	69
MA-ResNet50: A General Encoder Network for Video Segmentation <i>Xiaotian Liu, Lei Yang, Xiaoyu Zhang and Xiaohui Duan</i>	79
Identification of Planarian Individuals by Spot Patterns in Texture <i>Nikita Lomov, Kharlampiy Tiras and Leonid Mestetskiy</i>	87
DAEs for Linear Inverse Problems: Improved Recovery with Provable Guarantees <i>Jasjeet Dhaliwal and Kyle Hambrook</i>	97
MinMax-CAM: Improving Focus of CAM-based Visualization Techniques in Multi-label Problems <i>Lucas David, Helio Pedrini and Zanoni Dias</i>	106
Specularity, Shadow, and Occlusion Removal from Image Sequences using Deep Residual Sets <i>Monika Kwiatkowski and Olaf Hellwich</i>	118

Perceptual Loss based Approach for Analogue Film Restoration <i>Daniela Ivanova, Jan Paul Siebert and John Williamson</i>	126
UAV-ReID: A Benchmark on Unmanned Aerial Vehicle Re-identification in Video Imagery <i>Daniel Organisciak, Matthew Poyser, Aishah Alsehim, Shanfeng Hu, Brian K. S. Isaac-Medina, Toby P. Breckon and Hubert P. H. Shum</i>	136
Syncrack: Improving Pavement and Concrete Crack Detection through Synthetic Data Generation <i>Rodrigo Rill-García, Eva Dokladalova and Petr Dokládál</i>	147
LiDAR Dataset Distillation within Bayesian Active Learning Framework Understanding the Effect of Data Augmentation <i>Anh Ngoc Phuong Duong, Alexandre Almin, Léo Lemarié and B. Ravi Kiran</i>	159
Evaluation of Deep Learning based 3D-Point-Cloud Processing Techniques for Semantic Segmentation of Neuromorphic Vision Sensor Event-streams <i>Tobias Bolten, Felix Lentzen, Regina Pohle-Fröhlich and Klaus D. Tönnies</i>	168
Beyond Global Average Pooling: Alternative Feature Aggregations for Weakly Supervised Localization <i>Matthias Körschens, Paul Bodesheim and Joachim Denzler</i>	180
Single-view 3D Body and Cloth Reconstruction under Complex Poses <i>Nicolas Ugrinovic, Albert Pumarola, Alberto Sanfeliu and Francesc Moreno-Noguer</i>	192
Deep Depth Completion of Low-cost Sensor Indoor RGB-D using Euclidean Distance-based Weighted Loss and Edge-aware Refinement <i>Augusto R. Castro, Valdir Grassi Jr. and Moacir A. Ponti</i>	204
A Comprehensive Study of Vision Transformers on Dense Prediction Tasks <i>Kishaan Jeeveswaran, Senthilkumar Kathiresan, Arnav Varma, Omar Magdy, Bahram Zonooz and Elahe Arani</i>	213
Unsupervised Image Decomposition with Phase-Correlation Networks <i>Angel Villar-Corrales and Sven Behnke</i>	224
Road Scene Analysis: A Study of Polarimetric and Color-based Features under Various Adverse Weather Conditions <i>Rachel Blin, Samia Ainouz, Stéphane Canu and Fabrice Meriaudeau</i>	236
Event Data Downscaling for Embedded Computer Vision <i>Amélie Gruel, Jean Martinet, Teresa Serrano-Gotarredona and Bernabé Linares-Barranco</i>	245
SHORT PAPERS	
A Real-time 3D Surround View Pipeline for Embedded Devices <i>Onur Eker, Burak Ercan, Berkant Bayraktar and Murat Bal</i>	257
What Matters for Out-of-Distribution Detectors using Pre-trained CNN? <i>Dong-Hee Kim, Jaeyoon Lee and Ki-Seok Chung</i>	264
Hybrid Method for Rapid Development of Efficient and Robust Models for In-row Crop Segmentation <i>Paweł Majewski and Jacek Reiner</i>	274
Analysis of the Future Potential of Autoencoders in Industrial Defect Detection <i>Sarah Schneider, Doris Antensteiner, Daniel Soukup and Matthias Scheutz</i>	282

Segmentation Improves 3D Object Classification in Graph Convolutional Networks <i>Clara Holzhüter, Florian Teich and Florentin Wörgötter</i>	290
Evaluation of a Local Descriptor for HDR Images <i>Artur Santos Nascimento, Welerson Augusto Lino de Jesus Melo, Beatriz Trinchão Andrade and Daniel Oliveira Dantas</i>	299
AAEGAN Loss Optimizations Supporting Data Augmentation on Cerebral Organoid Bright-field Images <i>Clara Brémont Martin, Camille Simon Chane, Cédric Clouchoux and Aymeric Histace</i>	307
ERQA: Edge-restoration Quality Assessment for Video Super-Resolution <i>Anastasia Kirillova, Eugene Lyapustin, Anastasia Antsiferova and Dmitry Vatolin</i>	315
Deep Learning-based Anomaly Detection on X-Ray Images of Fuel Cell Electrodes <i>Simon B. Jensen, Thomas B. Moeslund and Søren J. Andreasen</i>	323
Deep Video Frame Rate Up-conversion Network using Feature-based Progressive Residue Refinement <i>Jinglei Shi, Xiaoran Jiang and Christine Guillemot</i>	331
FisheyeSuperPoint: Keypoint Detection and Description Network for Fisheye Images <i>Anna Konrad, Ciarán Eising, Ganesh Sistu, John McDonald, Rudi Villing and Senthil Yogamani</i>	340
Continuous Perception for Classifying Shapes and Weights of Garments for Robotic Vision Applications <i>Li Duan and Gerardo Aragon-Camarasa</i>	348
Colour Augmentation for Improved Semi-supervised Semantic Segmentation <i>Geoff French and Michal Mackiewicz</i>	356
Physics based Motion Estimation to Improve Video Compression <i>James McCullough, Naseer Al-Jawad and Tuan Nguyen</i>	364
Aerial to Street View Image Translation using Cascaded Conditional GANs <i>Kshitij Singh, Alexia Briassouli and Mirela Popa</i>	372
Visual Analysis of Deep Learning Methods for Industrial Vacuum Metalized Film Product <i>Thiago Moura da Rocha Bastos, Luiz Stragevitch and Cleber Zanchettin</i>	380
Presenting a Novel Pipeline for Performance Comparison of V-PCC and G-PCC Point Cloud Compression Methods on Datasets with Varying Properties <i>Albert Christensen, Daniel Lehotský, Mathias Poulsen and Thomas Moeslund</i>	387
SPD Siamese Neural Network for Skeleton-based Hand Gesture Recognition <i>Mohamed Sanim Akremi, Rim Slama and Hedi Tabia</i>	394
CLOSED: A Dashboard for 3D Point Cloud Segmentation Analysis using Deep Learning <i>Thanasis Zoumpekas, Guillem Molina, Anna Puig and Maria Salamó</i>	403
Automatic Transcription System for Nutritional Information Charts of Spanish Food Products <i>José Manuel Fuentes, Roberto Paredes, Elena Fulladosa, María del Mar Giró and Anna Claret</i>	411
MdVRNet: Deep Video Restoration under Multiple Distortions <i>Claudio Rota and Marco Buzzelli</i>	419

3GAN: A Three-GAN-based Approach for Image Inpainting Applied to the Reconstruction of Occluded Parts of Building Walls <i>Benedikt Kottler, Ludwig List, Dimitri Bulatov and Martin Weinmann</i>	427
Estimating Perceived Comfort in Virtual Humans based on Spatial and Spectral Entropy <i>Greice Pinho Dal Molin, Victor Flávio de Andrade Araujo and Soraia Raupp Musse</i>	436
Monte-Carlo Convolutions on Foveated Images <i>George Killick, Gerardo Aragon-Camarasa and J. Paul Siebert</i>	444
Towards Full-to-Empty Room Generation with Structure-aware Feature Encoding and Soft Semantic Region-adaptive Normalization <i>Vasileios Gkitsas, Nikolaos Zioulis, Vladimiros Sterzentsenko, Alexandros Doumanoglou and Dimitrios Zarpalas</i>	452
Mask R-CNN Applied to Quasi-particle Segmentation from the Hybrid Pelletized Sinter (HPS) Process <i>Natália F. De C. Meira, Mateus C. Silva, Andrea G. C. Bianchi, Cláudio B. Vieira, Alinne Souza, Efre Ribeiro, Roberto O. Junior and Ricardo A. R. Oliveira</i>	462
Mitigating the Zero Biased Steering Angles in Self-driving Simulator Datasets <i>Muhammad Ammar Khan, Khawaja Ghulam Alamdar, Aiman Junaid and Muhammad Farhan</i>	470
Image Prefiltering in DeepFake Detection <i>Szymon Motloch, Mateusz Szczygielski and Grzegorz Sarwas</i>	476
Learn by Guessing: Multi-step Pseudo-label Refinement for Person Re-Identification <i>Tiago de C. G. Pereira and Teofilo E. de Campos</i>	484
Can Super Resolution Improve Human Pose Estimation in Low Resolution Scenarios? <i>Peter Hardy, Srinandan Dasmahapatra and Hansung Kim</i>	494
Wavelet Transform for the Analysis of Convolutional Neural Networks in Texture Recognition <i>Joao Batista Florindo</i>	502
U-Net-based DFU Tissue Segmentation and Registration on Uncontrolled Dermoscopic Images <i>Yanexis Toledo, Leandro A. F. Fernandes, Silena Herold-Garcia and Alexis P. Quesada</i>	510
Blind Projection-based 3D Point Cloud Quality Assessment Method using a Convolutional Neural Network <i>Salima Bourbia, Ayoub Karine, Aladine Chetouani and Mohammed El Hassouni</i>	518
DeTracker: A Joint Detection and Tracking Framework <i>Juan Diego Gonzales Zuniga, Ujjwal and François Bremond</i>	526
Automatic Estimation of Anthropometric Human Body Measurements <i>Dana Škorvánková, Adam Riečický and Martin Madaras</i>	537
Towards Deep Learning-based 6D Bin Pose Estimation in 3D Scan <i>Lukáš Gajdošech, Viktor Kocur, Martin Stuchlík, Lukáš Hudec and Martin Madaras</i>	545
Smartphone based Finger-Photo Verification using Siamese Network <i>Jag Mohan Singh, Ahmad S. Madhun, Ahmed Mohammed Kedir and Raghavendra Ramachandra</i>	553

ADAS Classifier for Driver Monitoring and Driving Qualification using Both Internal and External Vehicle Data <i>Rafael Alceste Berri, Diego Renan Bruno, Eduardo Borges, Giancarlo Lucca and Fernando Santos Osorio</i>	560
DLDFD: Recurrence Free 2D Convolution Approach for Deep Fake Detection <i>Jag Mohan Singh and Raghavendra Ramachandra</i>	568
An Initial Study in Wood Tomographic Image Classification using the SVM and CNN Techniques <i>Antonio Alberto Pereira Junior and Marco Antonio Garcia de Carvalho</i>	575
Can We Use Neural Regularization to Solve Depth Super-resolution? <i>Milena Gazdieva, Oleg Voynov, Alexey Artemov, Youyi Zheng, Luiz Velho and Evgeny Burnaev</i>	582
Robust Underwater Visual Graph SLAM using a Simanese Neural Network and Robust Image Matching <i>Antoni Burguera</i>	591
Recovering High Intensity Images from Sequential Low Light Images <i>Masahiro Hayashi, Fumihiko Sakaue, Jun Sato, Yoshiteru Koreeda, Masakatsu Higashikubo and Hidenori Yamamoto</i>	599
AutoCNN-MSCD: An Autodesigned CNN Framework for Detecting Multi-skin Cancer Diseases over Dermoscopic Images <i>Robert Brodin, Palawat Busaranuvong and Chun-Kit Ngan</i>	607
From Explanations to Segmentation: Using Explainable AI for Image Segmentation <i>Clemens Seibold, Johannes Künzel, Anna Hilsmann and Peter Eisert</i>	616
Underwater Image Enhancement by the Retinex Inspired Contrast Enhancer STRESS <i>Michela Lecca</i>	627
Multi-Image Super-Resolution for Thermal Images <i>Rafael E. Rivadeneira, Angel D. Sappa and Boris X. Vintimilla</i>	635
Deep Learning based Object Detection and Tracking for Maritime Situational Awareness <i>Rihab Lahouli, Geert De Cubber, Benoît Pairet, Charles Hamesse, Timothée Fréville and Rob Haelterman</i>	643
Improving the Efficiency of Autoencoders for Visual Defect Detection with Orientation Normalization <i>Richárd Rádli and László Czúni</i>	651
Generating High Resolution Depth Image from Low Resolution LiDAR Data using RGB Image <i>Kento Yamakawa, Fumihiko Sakaue and Jun Sato</i>	659
Variational Temporal Optical Flow for Multi-exposure Video <i>Onofre Martorell and Antoni Buades</i>	666
Enhanced 3D Point Cloud Object Detection with Iterative Sampling and Clustering Algorithms <i>Shane Ward and Hossein Malekmohamadi</i>	674
NEMA: 6-DoF Pose Estimation Dataset for Deep Learning <i>Philippe Pérez de San Roman, Pascal Desbarats, Jean-Philippe Domenger and Axel Buendia</i>	682
Detection and Identification of Threat Potential of Ships using Satellite Images and AIS Data <i>Akash Kumar, Aayush Sugandhi and Yamuna Prasad</i>	691

Classification and Analysis of Liverwort Sperm by Integration-Net <i>Haruki Fujii, Naoki Minamino, Takashi Ueda, Yohei Kondo and Kazuhiro Hotta</i>	699
Image Quality Assessment using Deep Features for Object Detection <i>Poonam Beniwal, Pranav Mantini and Shishir K. Shah</i>	706
Spectral Absorption from Two-view Hyperspectral Images <i>Kenta Kageyama, Ryo Kawahara and Takahiro Okabe</i>	715
Melanoma Recognition <i>Michal Haindl and Pavel Žid</i>	722
LiDAR-camera Calibration in an Uniaxial 1-DoF Sensor System <i>Tamás Tófalvi, Bandó Kovács, Levente Hajder and Tekla Tóth</i>	730
MOBILE AND EGOCENTRIC VISION FOR HUMANS AND ROBOTS	
FULL PAPERS	
3D Map Generation with Shape and Appearance Information <i>Taro Yamada and Shuichi Enokida</i>	743
Hardware-oriented Algorithm for Human Detection using GMM-MRCoHOG Features <i>Ryogo Takemoto, Yuya Nagamine, Kazuki Yoshihiro, Masatoshi Shibata, Hideo Yamada, Yuichiro Tanaka, Shuichi Enokida and Hakaru Tamukoh</i>	749
Transformers in Self-Supervised Monocular Depth Estimation with Unknown Camera Intrinsic <i>Arnav Varma, Hemang Chawla, Bahram Zonooz and Elahe Arani</i>	758
3D Hand and Object Pose Estimation for Real-time Human-robot Interaction <i>Chaitanya Bandi, Hannes Kisner and Urike Thomas</i>	770
SparseDet: Towards End-to-End 3D Object Detection <i>Jianhong Han, Zhaoyi Wan, Zhe Liu, Jie Feng and Bingfeng Zhou</i>	781
SHORT PAPERS	
Category-level Part-based 3D Object Non-rigid Registration <i>Diego Rodriguez, Florian Huber and Sven Behnke</i>	795
Efficient Semantic Mapping in Dynamic Environments <i>Christian Hofmann, Mathias Fichtner, Markus Lieret and Jörg Franke</i>	803
NeuralQAAD: An Efficient Differentiable Framework for Compressing High Resolution Consistent Point Clouds Datasets <i>Nicolas Wagner and Ulrich Schwanecke</i>	811
Tracking 3D Deformable Objects in Real Time <i>Tiago Silva, Luís Magalhães, Manuel Ferreira, Salik Ram Khanal and Jorge Silva</i>	823
Human Detection and Gesture Recognition for the Navigation of Unmanned Aircraft <i>Markus Lieret, Maximilian Hübner, Christian Hofmann and Jörg Franke</i>	831
Multi-stage RGB-based Transfer Learning Pipeline for Hand Activity Recognition <i>Yasser Boutaleb, Catherine Soladie, Nam-Duong Duong, Jérôme Royan and Renaud Seguiet</i>	839

3D Object Recognition using Time of Flight Camera with Embedded GPU on Mobile Robots 849
Benjamin Kelényi, Szilárd Molnár and Levente Tamás

APPLICATIONS AND SERVICES

FULL PAPERS

Cervical Spine Range of Motion Measurement Utilizing Image Analysis 861
Kana Matsuo, Koji Fujita, Takafumi Koyama, Shingo Morishita and Yuta Sugiura

Semi-supervised Surface Anomaly Detection of Composite Wind Turbine Blades from Drone Imagery 868
Jack W. Barker, Neelanjan Bhowmik and Toby P. Breckon

Camera Pose Estimation using Human Head Pose Estimation 877
Robert Fischer, Michael Hödlmoser and Margrit Gelautz

Counting or Localizing? Evaluating Cell Counting and Detection in Microscopy Images 887
Luca Ciampi, Fabio Carrara, Giuseppe Amato and Claudio Gennaro

SHORT PAPERS

Detecting Corruption in Real Video Game Graphics using Deep Convolutional Neural Networks 901
Matthieu Chan Chee, Vinay Pandit and Max Kiehn

Color-Light Multi Cascade Network for Single Image Depth Prediction on One Perspective Artifact Images 909
Aufaclav Zatu Kusuma Frisky, Simon Brenner, Sebastian Zambanini and Robert Sablatnig

Altering Facial Expression based on Textual Emotion 917
Mohammad Imrul Jubair, Md. Masud Rana, Md. Amir Hamza, Mohsena Ashraf, Fahim Ahsan Khan and Ahnaf Tahseen Prince

Deep Features Extraction for Endoscopic Image Matching 925
Houda Chaabouni-Chouayakh, Manel Farhat and Achraf Ben-Hamadou

Ensemble Clustering for Histopathological Images Segmentation using Convolutional Autoencoders 933
Ilias Rmouque, Maxime Devanne, Jonathan Weber, Germain Forestier and Cédric Wemmert

Automated Video Edition for Synchronized Mobile Recordings of Concerts 941
Albert Jiménez, Lluís Gómez and Joan Llobera

Distributed Deep Learning for Multi-Label Chest Radiography Classification 949
Maram Mahmoud A. Monshi, Josiah Poon and Vera Chung

Identification of over One Thousand Individual Wild Humpback Whales using Fluke Photos 957
Takashi Yoshikawa, Masami Hida, Chonho Lee, Haruna Okabe, Nozomi Kobayashi, Sachie Ozawa, Hideo Saito, Masaki Kan, Susumu Date and Shinji Shimojo

17K-Graffiti: Spatial and Crime Data Assessments in São Paulo City 968
Bahram Lavi, Eric K. Tokuda, Felipe Moreno-Vera, Luis Gustavo Nonato, Claudio T. Silva and Jorge Poco

Classification of Histopathological Images of Penile Cancer using DenseNet and Transfer Learning <i>Marcos Gabriel Mendes Lauande, Amanda Mara Teles, Leandro Lima da Silva, Caio Eduardo Falcão Matos, Geraldo Braz Júnior, Anselmo Cardoso de Paiva, João Dallyson Sousa de Almeida, Rui Miguel Gil da Costa Oliveira, Haissa Oliveira Brito, Ana Gisélia Nascimento, Ana Clea Feitosa Pestana, Ana Paula Silva Azevedo dos Santos and Fernanda Ferreira Lopes</i>	976
Semantic Risk-aware Costmaps for Robots in Industrial Applications using Deep Learning on Abstracted Safety Classes from Synthetic Data <i>Thomas Weber, Michael Danner, Bo Zhang, Matthias Rättsch and Andreas Zell</i>	984
Graph-based Shot Type Classification in Large Historical Film Archives <i>Daniel Helm, Florian Kleber and Martin Kampel</i>	991
Detecting Anomalies Reliably in Long-term Surveillance Systems <i>Jinsong Liu, Ivan Nikolov, Mark P. Philipsen and Thomas B. Moeslund</i>	999
Study of LiDAR Segmentation and Model's Uncertainty using Transformer for Different Pre-trainings <i>Mohammed Hassoubah, Ibrahim Sobh and Mohamed Elhelw</i>	1010

AUTHOR INDEX