

2020 33rd SIBGRAPI Conference on Graphics, Patterns and Images (SIBGRAPI 2020)

**Recife/Porto de Galinhas, Brazil
7-10 November 2020**



**IEEE Catalog Number: CFP20129-POD
ISBN: 978-1-7281-9275-8**

Proceedings

**2020 33rd SIBGRAPI Conference on
Graphics, Patterns and Images**

SIBGRAPI 2020

2020 33rd SIBGRAPI Conference on Graphics, Patterns and Images (SIBGRAPI) **SIBGRAPI 2020**

Table of Contents

Message from the General Chairs	xii
Message from the Program Chairs	xiii
Organizing Committee	xv
Program Committee	xvi
Sponsors	xx

Tutorials

Why are Generative Adversarial Networks so Fascinating and Annoying?	.1
<i>Fabio Augusto Faria (Universidade Federal de São Paulo) and Gustavo Carneiro (The University of Adelaide)</i>	
A Survey on Deep Learning with Noisy Labels: How to Train your Model when you Cannot Trust on the Annotations?	.9
<i>Filipe Rolim Cordeiro (Federal Rural University of Pernambuco, Brazil) and Gustavo Carneiro (University of Adelaide, Australia)</i>	

Session 1: Computer Graphics

SelfieArt: Interactive Multi-Style Transfer for Selfies and Videos with Soft Transitions	.17
<i>Lucas N. Alegre (Universidade Federal do Rio Grande do Sul (UFRGS)) and Manuel M. Oliveira (Universidade Federal do Rio Grande do Sul (UFRGS))</i>	
Real-Time 3D Position-Based Dynamics Simulation for Hydrographic Printing	.23
<i>Leonardo Thomas (Federal University of Bahia), Karl Apaza Agüero (Federal University of Bahia), and Antônio Lopes Apolinário Jr. (Federal University of Bahia)</i>	
Towards a Legion of Virtual Humans: Steering Behaviors and Organic Visualization	.31
<i>André da Silva Antonitsch (Pontifícia Universidade Católica do Rio Grande do Sul), Soraia Raupp Musse (Pontifícia Universidade Católica do Rio Grande do Sul), and Luiz Henrique de Figueiredo (Instituto de Matemática Pura e Aplicada)</i>	

A Bucket LBVH Construction and Traversal Algorithm for Volumetric Sparse Data .39.....	
	<i>I.B. Fernandes (Universidade Federal do Rio Grande do Sul) and Marcelo Walter (Universidade Federal do Rio Grande do Sul)</i>
Screen-Space VPL Propagation for Real-Time Indirect Lighting .46.....	
	<i>Vitor M. Aranha (Federal University of Bahia - UFBA, Brazil), Márcio C.F Macedo (Federal University of Bahia - UFBA, Brazil), and Antonio L. Apolinario Jr. (Federal University of Bahia - UFBA, Brazil)</i>

Session 2: Computer Vision

HTR-Flor: A Deep Learning System for Offline Handwritten Text Recognition .54.....	
	<i>Arthur Flor de Souza Neto (Universidade de Pernambuco, Brazil), Byron Leite Dantas Bezerra (Universidade de Pernambuco, Brazil), Alejandro Héctor Toselli (Universitat Politècnica de València, Spain), and Estanislau Baptista Lima (Universidade de Pernambuco, Brazil)</i>
Faster and Accurate Compressed Video Action Recognition Straight from the Frequency Domain.62	
	<i>Samuel Felipe dos Santos (Universidade Federal de São Paulo - UNIFESP) and Jurandy Almeida (Universidade Federal de São Paulo - UNIFESP)</i>
Counting Vehicle with High-Precision in Brazilian Roads Using YOLOv3 and Deep SORT .69.....	
	<i>Adson M. Santos (University of Pernambuco), Carmelo J. A. Bastos-Filho (University of Pernambuco), Alexandre M. A. Maciel (University of Pernambuco), and Estanislau Lima (University of Pernambuco)</i>
Luminance Ratios for Stable SIFT Keypoint Detection in Challenging Illuminations Scenarios.77.....	
	<i>Lucas Niquele Endrice (Federal University of Technology - Paraná, Brazil) and Hugo Vieira Neto (Federal University of Technology - Paraná, Brazil)</i>
Performance and Error Analysis of Recursive Edge-Aware Gaussian Filters on GPUs .85.....	
	<i>Hermes H. Ferreira (Institute of Mathematics and Statistics - UFRGS, Brazil), Eduardo S. L. Gastal (Institute of Informatics - UFRGS, Brazil), Lucas M. Schnorr (Institute of Informatics - UFRGS, Brazil), and Philippe O. A. Navaux (Institute of Informatics - UFRGS, Brazil)</i>

Session 3: Filtering and Segmentation

A Conservative Sharpening Filter for Interpolated Images .93.....	
	<i>Leonardo Ramos Emmendorfer (Federal University of Rio Grande, Brazil)</i>
Image Denoising using Attention-Residual Convolutional Neural Networks .101.....	
	<i>Rafael Gonçalves Pires (São Paulo State University), Daniel Felipe Silva Santos (São Paulo State University), Claudio Filipi Gonçalves dos Santos (Federal University of São Carlos), Marcos Cleison Silva Santana (São Paulo State University), and João Paulo Papa (São Paulo State University)</i>
Scene Change Detection Using Multiscale Cascade Residual Convolutional Neural Networks .108.	
	<i>Daniel Felipe Silva Santos (São Paulo State University (Unesp)), Rafael Gonçalves Pires (São Paulo State University (Unesp)), Danilo Colombo (Petrobras), and João Paulo Papa (São Paulo State University (Unesp))</i>

Feature Learning from Image Markers for Object Delineation .116.....
*Italo Estilon de Souza (University of Campinas, Brazil), Barbara
Caroline Benato (University of Campinas, Brazil), and Alexandre Xavier
Falcão (University of Campinas, Brazil)*

Session 4: Graphics & Visualization

Regularized Kelvinlet Inversion for Real-Time Image Deformation and Video Time Warping .124..
*Guilherme Gomes Haetinger (Instituto de Informática - UFRGS, Brazil)
and Eduardo S. L. Gastal (Instituto de Informática - UFRGS, Brazil)*

Online Frame-to-Model Pipeline to 3D Reconstruction with Depth Cameras using RGB-D
Information .132.....
*Thiago Dornelles (Institute of Informatics - Federal University of Rio
Grande do Sul, Brazil) and Claudio Rosito Jung (Institute of
Informatics - Federal University of Rio Grande do Sul, Brazil)*

Visual Analysis of Forecasts of Football Match Scores .140.....
*Flavio Fontanella (FGV - Fundação Getúlio Vargas, Brazil), Asla
Medeiros e Sá (FGV - Fundação Getúlio Vargas, Brazil), and Moacyr
Alvoim H. B. da Silva (FGV - Fundação Getúlio Vargas, Brazil)*

Mirante: A Visualization Tool for Analyzing Urban Crimes .148.....
*Germain Garcia-Zanabria (Universidade de São Paulo), Erick Gomez-Nieto
(Universidade de São Paulo), Jaqueline Alvarenga Silveira
(Universidade de São Paulo), Jorge Poco (Fundação Getúlio Vargas),
Marcelo Nery (Universidade de São Paulo), Sergio Adorno (Universidade
de São Paulo), and Luis Gustavo Nonato (Universidade de São Paulo)*

Session 5: Medical & Biomedical Imaging

Automatic Classification of Erythrocytes Using Artificial Neural Networks and Integral
Geometry-Based Functions .156.....
*Yaima Paz-Soto (Universidad de Guántanamo), Silena Herold-Garcia
(Universidad de Oriente), Leandro A. F. Fernandes (Universidade
Federal Fluminense), and Saul Díaz-Matos (Universidad de Oriente)*

A Study on Tooth Segmentation and Numbering Using End-to-End Deep Neural Networks .164...
*Bernardo Silva (Universidade Federal da Bahia, Brazil), Laís Pinheiro
(Universidade Federal da Bahia, Brazil), Luciano Oliveira
(Universidade Federal da Bahia, Brazil), and Matheus Pithon
(Universidade Estadual do Sudoeste da Bahia, Brazil)*

Capturing Pictures from Human Vision Using SSVEP and Lock-in Amplifier .172.....
*Danson Evan Garcia (MannLab Canada, Toronto), Kai Wen Zheng (MannLab
Canada, Toronto), Yi Tao (MannLab Canada, Toronto), Yi Liu (MannLab
Canada, Toronto), and Steve Mann (MannLab Canada, Toronto)*

Detecting Alzheimer's Disease Based on Structural Region Analysis using a 3D Shape Descriptor .180.....	
	<i>Kaue T N Duarte (University of Campinas), David G Gobbi (Calgary Image Processing and Analysis Centre, Departments of Radiology and Clinical Neurosciences, Hotchkiss Brain Institute, University of Calgary), Richard Frayne (Calgary Image Processing and Analysis Centre, Departments of Radiology and Clinical Neurosciences, Hotchkiss Brain Institute, University of Calgary), and Marco A G de Carvalho (University of Campinas)</i>

Session 6: Segmentation, Features & Classification

An Efficient Method for Porosity Properties Extraction of Carbonate Rocks .188.....	
	<i>Victor Gomes Cardoso (Federal University of Pernambuco, Brazil), Edna Natividade da Silva Barros (Federal University of Pernambuco, Brazil), José Antonio Barbosa (Federal University of Pernambuco, Brazil), Antonio Celso Dantas Antonino (Federal University of Pernambuco, Brazil), and Abraão Vila Nova (Federal University of Pernambuco, Brazil)</i>
Multi-level Graph Label Propagation for Image Segmentation .195.....	
	<i>Ivar Vargas Belizario (University of São Paulo, Brazil) and Joao Batista Neto (University of São Paulo, Brazil)</i>
Superpixel Image Classification with Graph Attention Networks .203.....	
	<i>Pedro Henrique da Costa Avelar (Federal University of Rio Grande do Sul; Data Science Brigade, Porto Alegre, Brazil), Anderson Rocha Tavares (Federal University of Rio Grande do Sul), Thiago Lopes Trugillo da Silveira (University of Rio Grande), Cláudio Rosito Jung (Federal University of Rio Grande do Sul), and Luís da Cunha Lamb (Federal University of Rio Grande do Sul)</i>
IDA: Improved Data Augmentation Applied to Salient Object Detection .210.....	
	<i>Daniel Vitor Ruiz (Federal University of Parana), Bruno Alexandre Krinski (Federal University of Parana), and Eduardo Todt (Federal University of Parana)</i>

Session 7: Computer Vision & Applications

Weakly Supervised Character Detection for License Plate Recognition .218.....	
	<i>Luis Felipe Zeni (Universidade Federal do Rio Grande do Sul) and Claudio Jung (Universidade Federal do Rio Grande do Sul)</i>
Training with Synthetic Images for Object Detection and Segmentation in Real Machinery Images .226.....	
	<i>Alonso J. Cerpa Salas (Universidad Católica San Pablo), Graciela Meza-Lovon (Universidad Católica San Pablo), Manuel E. Loaiza Fernández (Universidad Católica San Pablo), and Alberto Raposo (Pontifical Catholic University of Rio de Janeiro)</i>

MyFood: A Food Segmentation and Classification System to Aid Nutritional Monitoring .234.....	
	<i>Charles N. C. Freitas (Universidade Federal Rural de Pernambuco), Filipe Rolim Cordeiro (Universidade Federal Rural de Pernambuco), and Valmir Macario (Universidade Federal Rural de Pernambuco)</i>
A Review on Image Inpainting Techniques and Datasets .240.....	
	<i>David Josué Barrientos Rojas (Universidade de Pernambuco, Brasil), Bruno José Torres Fernandes (Universidade de Pernambuco, Brasil), and Sergio Murilo Maciel Fernandes (Universidade de Pernambuco, Brasil)</i>
Violence Detection and Localization in Surveillance Video .248.....	
	<i>David Gabriel Choqueluque Roman (Universidad Católica San Pablo, Arequipa, Perú) and Guillermo Cámara Chávez (Federal University of Ouro Preto, Ouro Preto, Brazil)</i>

Session 8: Neural Networks & Classifiers

Packet Vision: A Convolutional Neural Network Approach for Network Traffic Classification .256	
	<i>Rodrigo Moreira (Federal University of Viçosa; Federal University of Uberlândia), Larissa Ferreira Rodrigues (Federal University of Viçosa), Pedro Frosi Rosa (Federal University of Uberlândia), Rui Luis Andrade Aguiar (University of Aveiro - Telecommunications Institute (IT), University of Aveiro), and Flávio de Oliveira Silva (Federal University of Uberlândia)</i>
A Comparison of Graph-Based Semi-Supervised Learning for Data Augmentation .264.....	
	<i>Willian Dihanster G. de Oliveira (Federal University of Sao Paulo, Brazil), Otávio A. B. Penatti (Samsung R&D Institute), and Lilian Berton (Federal University of São Paulo)</i>
Evaluating the Emergence of Winning Tickets by Structured Pruning of Convolutional Networks .272.....	
	<i>Whendell F. Magalhães (Universidade Federal de Campina Grande), Jeferson Ferreira (Universidade Federal de Campina Grande), Herman M. Gomes (Universidade Federal de Campina Grande), Leandro B. Marinho (Universidade Federal de Campina Grande), and Plínio Silveira (Hewlett Packard Enterprise, Brazil)</i>
Thermographic Non-Invasive Inspection Modelling of Fertilizer Pipelines Using Neural Networks .280.....	
	<i>Marta Duarte (Federal University of Rio Grande (FURG), Brazil), Victor Coch (Federal University of Rio Grande (FURG), Brazil), Jovania Dias (Federal University of Rio Grande (FURG), Brazil), Silvia Botelho (Federal University of Rio Grande (FURG), Brazil), Nelson Duarte (Federal University of Rio Grande (FURG), Brazil), and Paulo Drews Jr (Federal University of Rio Grande (FURG), Brazil)</i>

Session 9: Pattern Recognition & Applications

ISOMAP-KL: A Parametric Approach for Unsupervised Metric Learning .287.....	
	<i>Alaor Cervoati Neto (Federal University of São Carlos, Brazil) and Alexandre L. M. Levada (Federal University of São Carlos, Brazil)</i>

Using Partial Least Squares in Butterfly Species Identification	295
<i>Alexandre Silva (Universidade do Estado de Minas Gerais), Sincler Meireles (Universidade do Estado de Minas Gerais), and Samira Silva (Universidade do Estado de Minas Gerais)</i>	
Wild Boar Classification by Using a Fusion of Texture Analysis Methods	301
<i>Luís C. Silva Júnior (Universidade Federal de Uberlândia), Maricéia B. S. Pádua (Instituto Estadual de Florestas), Leonardo M. Ogusuku (Instituto Estadual de Florestas), Marcelo K. Albertini (Universidade Federal de Uberlândia), Renato Pimentel (Universidade Federal de Uberlândia), and André R. Backes (Universidade Federal de Uberlândia)</i>	

Session 10: Datasets & Classifiers

Fusion of BLAST and Ensemble of Classifiers for Protein Secondary Structure Prediction	308
<i>Gabriel Bianchin de Oliveira (Institute of Computing, University of Campinas, Campinas, SP, Brazil), Helio Pedrini (Institute of Computing, University of Campinas, Campinas, SP, Brazil), and Zanoni Dias (Institute of Computing, University of Campinas, Campinas, SP, Brazil)</i>	
1-to-N Large Margin Classifier	316
<i>Jaime Rocca Layza (Institute of Computing, University of Campinas, Campinas, SP, Brazil), Helio Pedrini (Institute of Computing, University of Campinas, Campinas, SP, Brazil), and Ricardo da Silva Torres (Norwegian University of Science and Technology (NTNU))</i>	

Session 11: Neural Networks & Classifiers

A Lightweight 2D Pose Machine with Attention Enhancement	324
<i>Luiz Schirmer (PUC-Rio), Djalma Lúcio (PUC-Rio), Alberto Raposo (PUC-Rio), Luiz Velho (IMPA), and Hélio Lopes (PUC-Rio)</i>	
A Study on the Impact of Domain Randomization for Monocular Deep 6DoF Pose Estimation	332
<i>Kelvin Batista da Cunha (Voxar Labs, Centro de Informática, Universidade Federal de Pernambuco), Caio Brito (Voxar Labs, Centro de Informática, Universidade Federal de Pernambuco; Curso Técnico em Informática para Internet, Instituto Federal de Pernambuco, Campus Belo Jardim, Brazil), Lucas Valença (Voxar Labs, Centro de Informática, Universidade Federal de Pernambuco), Francisco Simões (Curso Técnico em Informática para Internet, Instituto Federal de Pernambuco, Campus Belo Jardim; Voxar Labs, Centro de Informática, Universidade Federal de Pernambuco), and Veronica Teichrieb (Voxar Labs, Centro de Informática, Universidade Federal de Pernambuco)</i>	
From Explanations to Feature Selection: Assessing SHAP Values as Feature Selection Mechanism	340
<i>Wilson E. Marcílio-Jr (São Paulo State University (UNESP), Brazil) and Danilo M. Eler (São Paulo State University (UNESP), Brazil)</i>	

Author Index 349.....