

2019 16th Conference on Computer and Robot Vision (CRV 2019)

**Kingston, Quebec, Canada
29 – 31 May 2019**



**IEEE Catalog Number: CFP19347-POD
ISBN: 978-1-7281-1839-0**

**Copyright © 2019 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:	CFP19347-POD
ISBN (Print-On-Demand):	978-1-7281-1839-0
ISBN (Online):	978-1-7281-1838-3

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

2019 16th Conference on Computer and Robot Vision (CRV) **CRV 2019**

Table of Contents

Welcome	ix
Bienvenue	xi
Conference Organization	xiii
Program Committee	xiv

Machine Learning Fundamentals I

Decoupling Spatial Pattern and its Movement Via Complex Factorization Over Orthogonal Filter Pairs	.1
<i>Yanyan Mu (McGill University), Roussos Dimitrakopoulos (McGill University), and Frank Ferrie (McGill University)</i>	
Intriguing Properties of Randomly Weighted Networks: Generalizing While Learning Next to Nothing	.9
<i>Amir Rosenfeld (York University) and John K. Tsotsos (York University)</i>	

Machine Learning Fundamentals II

Resource-Aware Optimization of DNNs for Embedded Applications	.17
<i>Alexander Frickenstein (BMW Group), Christian Unger (Bmw Group), and Walter Stechele (Technical University Munich)</i>	
Direct Fitting of Gaussian Mixture Models	.25
<i>Leonid Keselman (Carnegie Mellon University) and Martial Hebert (Carnegie Mellon University)</i>	

Applied Machine Learning I

Rectification of Camera-Captured Document Images with Mixed Contents and Varied Layouts	.33
<i>Alexander Burden (University of Victoria), Melissa Cote (University of Victoria), and Alexandra Branzan Albu (University of Victoria)</i>	
On Building Classification from Remote Sensor Imagery Using Deep Neural Networks and the Relation Between Classification and Reconstruction Accuracy Using Border Localization as Proxy	.41
<i>Bodhiswatta Chatterjee (Concordia University) and Charalambos Poullis (Concordia University)</i>	

Human Action Prediction

- STAR-Net: Action Recognition using Spatio-Temporal Activation Reprojection .49.....
William McNally (University of Waterloo), Alexander Wong (University of Waterloo), and John McPhee (University of Waterloo)
- Human Motion Prediction Via Pattern Completion in Latent Representation Space .57.....
Yi Tian Xu (McGill University), Yaqiao Li (McGill University), and David Meger (McGill University)

Adversarial Machine Learning

- Adversarially Learned Abnormal Trajectory Classifier .65.....
Pankaj Roy (Polytechnique Montréal - LITIV) and Guillaume-Alexandre Bilodeau (Polytechnique Montréal - LITIV)
- Hierarchically-Fused Generative Adversarial Network for Text to Realistic Image Synthesis .73.....
Xin Huang (Memorial University of Newfoundland), Mingjie Wang (Memorial University of Newfoundland), and Minglun Gong (Memorial University of Newfoundland)

Applied Machine Learning II

- Active Vision in the Era of Convolutional Neural Networks .81.....
Dimitrios Gallos (McGill University) and Frank Ferrie (McGill University)
- Apparent Age Estimation with Relational Networks .89.....
Eu Wern Teh (University of Guelph; Vector Institute) and Graham Taylor (University of Guelph; Vector Institute)

Localization

- Towards Direct Localization for Visual Teach and Repeat .97.....
Mona Gridseth (University of Toronto) and Timothy Barfoot (University of Toronto)
- Point Me In The Right Direction: Improving Visual Localization on UAVs with Active Gimbal Camera Pointing .105.....
Bhavik Patel (University of Toronto Institute for Aerospace Studies), Michael Warren (University of Toronto Institute for Aerospace Studies), and Angela Schoellig (University of Toronto Institute for Aerospace Studies)

Mapping

- Mapless Online Detection of Dynamic Objects in 3D Lidar .113.....
David Yoon (University of Toronto), Tim Tang (University of Toronto), and Timothy Barfoot (University of Toronto)

Network Uncertainty Informed Semantic Feature Selection for Visual SLAM .121.....
Pranav Ganti (University of Waterloo) and Steven Waslander (University of Toronto)

Posters

Generative Adversarial Networks Using Adaptive Convolution .129.....
Nhat M. Nguyen (University of Alberta) and Nilanjan Ray (University of Alberta)

Instance Segmentation Based Semantic Matting for Compositing Applications .135.....
Guangqing Hu (McGill University) and James Clark (McGill University)

Robust Facial Alignment with Internal Denoising Auto-Encoder .143.....
Decky Aspandi (Pompeu Fabra University), Oriol Martinez (Pompeu Fabra University), Federico Sukno (Pompeu Fabra University), and Xavier Binefa (Pompeu Fabra University)

HandSeg: An Automatically Labeled Dataset for Hand Segmentation from Depth Images .151.....
Abhishake Kumar Bojja (University of Victoria), Franziska Mueller (MPI Informatics), Sri Raghu Malireddi (University of Victoria), Markus Oberweger (TU Graz), Vincent Lepetit (TU Graz), Christian Theobalt (MPI Informatics), Kwang Moo Yi (University of Victoria), and Andrea Tagliasacchi (University of Victoria)

Automated Acquisition of Anisotropic Friction .159.....
Keno Dreßel (University of Copenhagen), Kenny Erleben (University of Copenhagen), Paul Kry (McGill University), and Sheldon Andrews (École de Technologie Supérieure)

Traffic Risk Assessment: A Two-Stream Approach Using Dynamic-Attention .166.....
Gary-Patrick Corcoran (McGill University) and James Clark (McGill University)

Commodifying Pointing in HRI: Simple and Fast Pointing Gesture Detection from RGB-D Images .174.....
Bitá Azari (Simon Fraser University), Angelica Lim (Simon Fraser University), and Richard Vaughan (Simon Fraser University)

Two-Stream Action Recognition in Ice Hockey using Player Pose Sequences and Optical Flows .181.....
Kanav Vats (University of Waterloo), Helmut Neher (University of Waterloo), David A. Clausi (University of Waterloo), and John Zelek (University of Waterloo)

Automatic Temporally Coherent Video Colorization .189.....
Harrish Thasarathan (University of Ontario Institute of Technology), Kamyar Nazeri (University of Ontario Institute of Technology), and Mehran Ebrahimi (University of Ontario Institute of Technology)

Investigating Trust Factors in Human-Robot Shared Control: Implicit Gender Bias Around Robot Voice .195...
Alex Wong (McGill University), Anqi Xu (Element AI), and Gregory Dudek (McGill University)

Pose-Projected Action Recognition Hourglass Network (PARHN) in Soccer .201.....
Mehrnaz Fani (University of Waterloo), Kanav Vats (University of Waterloo), Christopher Dulhanty (University of Waterloo), David A. Clausi (University of Waterloo), and John Zelek (University of Waterloo)

aUToTrack: A Lightweight Object Detection and Tracking System for the SAE AutoDrive Challenge .209.....
Keenan Burnett (University of Toronto), Sepehr Samavi (University of Toronto), Steven Waslander (University of Toronto), Timothy Barfoot (University of Toronto), and Angela Schoellig (University of Toronto)

Author Index 217