

2017 IEEE International Conference on Computer Vision (ICCV 2017)

**Venice, Italy
22 - 29 October 2017**

Pages 1-744



**IEEE Catalog Number: CFP17198-POD
ISBN: 978-1-5386-1033-6**

**Copyright © 2017 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:	CFP17198-POD
ISBN (Print-On-Demand):	978-1-5386-1033-6
ISBN (Online):	978-1-5386-1032-9
ISSN:	1550-5499

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

2017 IEEE International Conference on Computer Vision

ICCV 2017

Table of Contents

Message from the General Chairs	xliii
Message from the Program Chairs.....	xliv
Organizing Committee	xlviii
Area Chairs	xliv
2017 Outstanding and Emergency Reviewers.....	l

3D Vision & Video Analysis

Oral Session 1

Globally-Optimal Inlier Set Maximisation for Simultaneous Camera Pose and Feature Correspondence	1
<i>Dylan Campbell, Lars Petersson, Laurent Kneip, and Hongdong Li</i>	
Robust Pseudo Random Fields for Light-Field Stereo Matching	11
<i>Chao-Tsung Huang</i>	
A Lightweight Approach for On-the-Fly Reflectance Estimation	20
<i>Kihwan Kim, Jinwei Gu, Stephen Tyree, Pavlo Molchanov, Matthias Nießner, and Jan Kautz</i>	
Distributed Very Large Scale Bundle Adjustment by Global Camera Consensus	29
<i>Runze Zhang, Siyu Zhu, Tian Fang, and Long Quan</i>	
Practical Projective Structure from Motion (P2SfM)	39
<i>Ludovic Magerand and Alessio Del Bue</i>	

Spotlight Session 1

Anticipating Daily Intention Using On-wrist Motion Triggered Sensing	48
<i>Tz-Ying Wu, Ting-An Chien, Cheng-Sheng Chan, Chan-Wei Hu, and Min Sun</i>	
Rethinking Reprojection: Closing the Loop for Pose-Aware Shape Reconstruction from a Single Image	57
<i>Rui Zhu, Hamed Kiani Galoogahi, Chaoyang Wang, and Simon Lucey</i>	
End-to-End Learning of Geometry and Context for Deep Stereo Regression	66
<i>Alex Kendall, Hayk Martirosyan, Saumitro Dasgupta, and Peter Henry</i>	

Using Sparse Elimination for Solving Minimal Problems in Computer Vision	76
<i>Janne Heikkilä</i>	
High-Resolution Shape Completion Using Deep Neural Networks for Global Structure and Local Geometry Inference	85
<i>Xiaoguang Han, Zhen Li, Haibin Huang, Evangelos Kalogerakis, and Yizhou Yu</i>	
Temporal Tessellation: A Unified Approach for Video Analysis	94
<i>Dotan Kaufman, Gil Levi, Tal Hassner, and Lior Wolf</i>	
Learning Policies for Adaptive Tracking with Deep Feature Cascades	105
<i>Chen Huang, Simon Lucey, and Deva Ramanan</i>	
Temporal Shape Super-Resolution by Intra-frame Motion Encoding Using High-fps Structured Light	115
<i>Yuki Shiba, Satoshi Ono, Ryo Furukawa, Shinsaku Hiura, and Hiroshi Kawasaki</i>	
Poster 1	
Real-Time Monocular Pose Estimation of 3D Objects Using Temporally Consistent Local Color Histograms	124
<i>Henning Tjaden, Ulrich Schwanecke, and Elmar Schömer</i>	
CAD Priors for Accurate and Flexible Instance Reconstruction	133
<i>Tolga Birdal and Slobodan Ilic</i>	
Colored Point Cloud Registration Revisited	143
<i>Jaesik Park, Qian-Yi Zhou, and Vladlen Koltun</i>	
Learning Compact Geometric Features	153
<i>Marc Houry, Qian-Yi Zhou, and Vladlen Koltun</i>	
Joint Layout Estimation and Global Multi-view Registration for Indoor Reconstruction	162
<i>Jeong-Kyun Lee, Jaewon Yea, Min-Gyu Park, and Kuk-Jin Yoon</i>	
A Geometric Framework for Statistical Analysis of Trajectories with Distinct Temporal Spans	172
<i>Rudrasis Chakraborty, Vikas Singh, Nagesh Adluru, and Baba C. Vemuri</i>	
An Optimal Transportation Based Univariate Neuroimaging Index	182
<i>Liang Mi, Wen Zhang, Junwei Zhang, Yonghui Fan, Dhruvan Goradia, Kewei Chen, Eric M. Reiman, Xianfeng Gu, and Yalin Wang</i>	
S ³ FD: Single Shot Scale-Invariant Face Detector	192
<i>Shifeng Zhang, Xiangyu Zhu, Zhen Lei, Hailin Shi, Xiaobo Wang, and Stan Z. Li</i>	
Amulet: Aggregating Multi-level Convolutional Features for Salient Object Detection	202
<i>Pingping Zhang, Dong Wang, Huchuan Lu, Hongyu Wang, and Xiang Ruan</i>	
Learning Uncertain Convolutional Features for Accurate Saliency Detection	212
<i>Pingping Zhang, Dong Wang, Huchuan Lu, Hongyu Wang, and Baocai Yin</i>	
Zero-Order Reverse Filtering	222
<i>Xin Tao, Chao Zhou, Xiaoyong Shen, Jue Wang, and Jiaya Jia</i>	
Learning Blind Motion Deblurring	231
<i>Patrick Wieschollek, Michael Hirsch, Bernhard Schölkopf, and Hendrik P.A. Lensch</i>	

Joint Adaptive Sparsity and Low-Rankness on the Fly: An Online Tensor Reconstruction Scheme for Video Denoising	241
<i>Bihan Wen, Yanjun Li, Luke Pfister, and Yoram Bresler</i>	
Learning to Super-Resolve Blurry Face and Text Images	251
<i>Xiangyu Xu, Deqing Sun, Jinshan Pan, Yujin Zhang, Hanspeter Pfister, and Ming-Hsuan Yang</i>	
Video Frame Interpolation via Adaptive Separable Convolution	261
<i>Simon Niklaus, Long Mai, and Feng Liu</i>	
Deep Occlusion Reasoning for Multi-camera Multi-target Detection	271
<i>Pierre Baqué, Francois Fleuret, and Pascal Fua</i>	
Encouraging LSTMs to Anticipate Actions Very Early	280
<i>Mohammad Sadegh Aliakbarian, Fatemeh Sadat Saleh, Mathieu Salzmann, Basura Fernando, Lars Petersson, and Lars Andersson</i>	
PathTrack: Fast Trajectory Annotation with Path Supervision	290
<i>Santiago Manen, Michael Gygli, Dengxin Dai, and Luc Van Gool</i>	
Tracking the Untrackable: Learning to Track Multiple Cues with Long-Term Dependencies	300
<i>Amir Sadeghian, Alexandre Alahi, and Silvio Savarese</i>	
MirrorFlow: Exploiting Symmetries in Joint Optical Flow and Occlusion Estimation	312
<i>Junhwa Hur and Stefan Roth</i>	
Tracking as Online Decision-Making: Learning a Policy from Streaming Videos with Reinforcement Learning	322
<i>James Supancic III and Deva Ramanan</i>	
Non-convex Rank/Sparsity Regularization and Local Minima	332
<i>Carl Olsson, Marcus Carlsson, Fredrik Andersson, and Viktor Larsson</i>	
A Revisit of Sparse Coding Based Anomaly Detection in Stacked RNN Framework	341
<i>Weixin Luo, Wen Liu, and Shenghua Gao</i>	
HydraPlus-Net: Attentive Deep Features for Pedestrian Analysis	350
<i>Xihui Liu, Haiyu Zhao, Maoqing Tian, Lu Sheng, Jing Shao, Shuai Yi, Junjie Yan, and Xiaogang Wang</i>	
No Fuss Distance Metric Learning Using Proxies	360
<i>Yair Movshovitz-Attias, Alexander Toshev, Thomas K. Leung, Sergey Ioffe, and Saurabh Singh</i>	
Benchmarking and Error Diagnosis in Multi-instance Pose Estimation	369
<i>Matteo Ruggero Ronchi and Pietro Perona</i>	
Orientation Invariant Feature Embedding and Spatial Temporal Regularization for Vehicle Re-identification	379
<i>Zhongdao Wang, Luming Tang, Xihui Liu, Zhuliang Yao, Shuai Yi, Jing Shao, Junjie Yan, Shengjin Wang, Hongsheng Li, and Xiaogang Wang</i>	
Fashion Forward: Forecasting Visual Style in Fashion	388
<i>Ziad Al-Halah, Rainer Stiefelhagen, and Kristen Grauman</i>	

Towards 3D Human Pose Estimation in the Wild: A Weakly-Supervised Approach	398
<i>Xingyi Zhou, Qixing Huang, Xiao Sun, Xiangyang Xue, and Yichen Wei</i>	
Flow-Guided Feature Aggregation for Video Object Detection	408
<i>Xizhou Zhu, Yujie Wang, Jifeng Dai, Lu Yuan, and Yichen Wei</i>	
Reasoning About Fine-Grained Attribute Phrases Using Reference Games	418
<i>Jong-Chyi Su, Chenyun Wu, Huaizu Jiang, and Subhansu Maji</i>	
DeNet: Scalable Real-Time Object Detection with Directed Sparse Sampling	428
<i>Lachlan Tychsen-Smith and Lars Petersson</i>	
MIHash: Online Hashing with Mutual Information	437
<i>Fatih Cakir, Kun He, Sarah Adel Bargal, and Stan Sclaroff</i>	
SafetyNet: Detecting and Rejecting Adversarial Examples Robustly	446
<i>Jiajun Lu, Theerasit Issaranon, and David Forsyth</i>	
Recurrent Models for Situation Recognition	455
<i>Arun Mallya and Svetlana Lazebnik</i>	
Multi-label Image Recognition by Recurrently Discovering Attentional Regions	464
<i>Zhouxia Wang, Tianshui Chen, Guanbin Li, Ruijia Xu, and Liang Lin</i>	
Deep Determinantal Point Process for Large-Scale Multi-label Classification	473
<i>Pengtao Xie, Ruslan Salakhutdinov, Luntian Mou, and Eric P. Xing</i>	
Visual Semantic Planning Using Deep Successor Representations	483
<i>Yuke Zhu, Daniel Gordon, Eric Kolve, Dieter Fox, Li Fei-Fei, Abhinav Gupta, Roozbeh Mottaghi, and Ali Farhadi</i>	
Neural Person Search Machines	493
<i>Hao Liu, Jiashi Feng, Zequn Jie, Karlekar Jayashree, Bo Zhao, Meibin Qi, Jianguo Jiang, and Shuicheng Yan</i>	
DualNet: Learn Complementary Features for Image Recognition	502
<i>Saihui Hou, Xu Liu, and Zilei Wang</i>	
Higher-Order Integration of Hierarchical Convolutional Activations for Fine-Grained Visual Categorization	511
<i>Sijia Cai, Wangmeng Zuo, and Lei Zhang</i>	
Show, Adapt and Tell: Adversarial Training of Cross-Domain Image Captioner	521
<i>Tseng-Hung Chen, Yuan-Hong Liao, Ching-Yao Chuang, Wan-Ting Hsu, Jianlong Fu, and Min Sun</i>	
Attribute Recognition by Joint Recurrent Learning of Context and Correlation	531
<i>Jingya Wang, Xiatian Zhu, Shaogang Gong, and Wei Li</i>	
VegFru: A Domain-Specific Dataset for Fine-Grained Visual Categorization	541
<i>Saihui Hou, Yushan Feng, and Zilei Wang</i>	
Increasing CNN Robustness to Occlusions by Reducing Filter Support	550
<i>Elad Osherov and Michael Lindenbaum</i>	
Exploiting Multi-grain Ranking Constraints for Precisely Searching Visually-similar Vehicles	562
<i>Ke Yan, Yonghong Tian, Yaowei Wang, Wei Zeng, and Tiejun Huang</i>	

Recurrent Scale Approximation for Object Detection in CNN	571
<i>Yu Liu, Hongyang Li, Junjie Yan, Fangyin Wei, Xiaogang Wang, and Xiaoou Tang</i>	
Embedding 3D Geometric Features for Rigid Object Part Segmentation	580
<i>Yafei Song, Xiaowu Chen, Jia Li, and Qinqing Zhao</i>	
Towards Context-Aware Interaction Recognition for Visual Relationship Detection	589
<i>Bohan Zhuang, Lingqiao Liu, Chunhua Shen, and Ian Reid</i>	
When Unsupervised Domain Adaptation Meets Tensor Representations	599
<i>Hao Lu, Lei Zhang, Zhiguo Cao, Wei Wei, Ke Xian, Chunhua Shen, and Anton van den Hengel</i>	
Look, Listen and Learn	609
<i>Relja Arandjelovic and Andrew Zisserman</i>	
Grad-CAM: Visual Explanations from Deep Networks via Gradient-Based Localization	618
<i>Ramprasaath R. Selvaraju, Michael Cogswell, Abhishek Das, Ramakrishna Vedantam, Devi Parikh, and Dhruv Batra</i>	
Image-Based Localization Using LSTMs for Structured Feature Correlation	627
<i>F. Walch, C. Hazirbas, L. Leal-Taixé, T. Sattler, S. Hilsenbeck, and D. Cremers</i>	
Personalized Image Aesthetics	638
<i>Jian Ren, Xiaohui Shen, Zhe Lin, Radomír Mech, and David J. Foran</i>	
Predicting Deeper into the Future of Semantic Segmentation	648
<i>Pauline Luc, Natalia Neverova, Camille Couprie, Jakob Verbeek, and Yann LeCun</i>	
Coordinating Filters for Faster Deep Neural Networks	658
<i>Wei Wen, Cong Xu, Chunpeng Wu, Yandan Wang, Yiran Chen, and Hai Li</i>	
Unsupervised Representation Learning by Sorting Sequences	667
<i>Hsin-Ying Lee, Jia-Bin Huang, Maneesh Singh, and Ming-Hsuan Yang</i>	
A Read-Write Memory Network for Movie Story Understanding	677
<i>Seil Na, Sangho Lee, Jisung Kim, and Gunhee Kim</i>	
SegFlow: Joint Learning for Video Object Segmentation and Optical Flow	686
<i>Jingchun Cheng, Yi-Hsuan Tsai, Shengjin Wang, and Ming-Hsuan Yang</i>	
Unsupervised Action Discovery and Localization in Videos	696
<i>Khurram Soomro and Mubarak Shah</i>	
Dense-Captioning Events in Videos	706
<i>Ranjay Krishna, Kenji Hata, Frederic Ren, Li Fei-Fei, and Juan Carlos Niebles</i>	
Learning Long-Term Dependencies for Action Recognition with a Biologically-Inspired Deep Network	716
<i>Yemin Shi, Yonghong Tian, Yaowei Wang, Wei Zeng, and Tiejun Huang</i>	
Compressive Quantization for Fast Object Instance Search in Videos	726
<i>Tan Yu, Zhenzhen Wang, and Junsong Yuan</i>	
Complex Event Detection by Identifying Reliable Shots from Untrimmed Videos	736
<i>Hehe Fan, Xiaojun Chang, De Cheng, Yi Yang, Dong Xu, and Alexander G. Hauptmann</i>	
Deep Direct Regression for Multi-oriented Scene Text Detection	745
<i>Wenhao He, Xu-Yao Zhang, Fei Yin, and Cheng-Lin Liu</i>	

Recognition I

Oral Session 2

Open Set Domain Adaptation	754
<i>Pau Panareda Busto and Juergen Gall</i>	
Deformable Convolutional Networks	764
<i>Jifeng Dai, Haozhi Qi, Yuwen Xiong, Yi Li, Guodong Zhang, Han Hu, and Yichen Wei</i>	
Ensemble Diffusion for Retrieval	774
<i>Song Bai, Zhichao Zhou, Jingdong Wang, Xiang Bai, Longin Jan Latecki, and Qi Tian</i>	
FoveaNet: Perspective-Aware Urban Scene Parsing	784
<i>Xin Li, Zequn Jie, Wei Wang, Changsong Liu, Jimei Yang, Xiaohui Shen, Zhe Lin, Qiang Chen, Shuicheng Yan, and Jiashi Feng</i>	
Beyond Planar Symmetry: Modeling Human Perception of Reflection and Rotation Symmetries in the Wild	793
<i>Christopher Funk and Yanxi Liu</i>	

Spotlight Session 2

Learning to Reason: End-to-End Module Networks for Visual Question Answering	804
<i>Ronghang Hu, Jacob Andreas, Marcus Rohrbach, Trevor Darrell, and Kate Saenko</i>	
Hard-Aware Deeply Cascaded Embedding	814
<i>Yuhui Yuan, Kuiyuan Yang, and Chao Zhang</i>	
Query-Guided Regression Network with Context Policy for Phrase Grounding	824
<i>Kan Chen, Rama Kovvuri, and Ram Nevatia</i>	
SuBiC: A Supervised, Structured Binary Code for Image Search	833
<i>Himalaya Jain, Joaquin Zepeda, Patrick Pérez, and Rémi Gribonval</i>	
Revisiting Unreasonable Effectiveness of Data in Deep Learning Era	843
<i>Chen Sun, Abhinav Shrivastava, Saurabh Singh, and Abhinav Gupta</i>	
A Generative Model of People in Clothing	853
<i>Christoph Lassner, Gerard Pons-Moll, and Peter V. Gehler</i>	
Escape from Cells: Deep Kd-Networks for the Recognition of 3D Point Cloud Models	863
<i>Roman Klokov and Victor Lempitsky</i>	
Improved Image Captioning via Policy Gradient optimization of SPIDER	873
<i>Siqi Liu, Zhenhai Zhu, Ning Ye, Sergio Guadarrama, and Kevin Murphy</i>	

Poster Session 2

Rolling Shutter Correction in Manhattan World	882
<i>Pulak Purkait, Christopher Zach, and Ales Leonardis</i>	
Local-to-Global Point Cloud Registration Using a Dictionary of Viewpoint Descriptors	891
<i>David Avidar, David Malah, and Meir Barzohar</i>	

3D-PRNN: Generating Shape Primitives with Recurrent Neural Networks	900
<i>Chuhang Zou, Ersin Yumer, Jimei Yang, Duygu Ceylan, and Derek Hoiem</i>	
BodyFusion: Real-Time Capture of Human Motion and Surface Geometry Using a Single Depth Camera	910
<i>Tao Yu, Kaiwen Guo, Feng Xu, Yuan Dong, Zhaoqi Su, Jianhui Zhao, Jianguo Li, Qionghai Dai, and Yebin Liu</i>	
Quasiconvex Plane Sweep for Triangulation with Outliers	920
<i>Qianggong Zhang, Tat-Jun Chin, and David Suter</i>	
“Maximizing Rigidity” Revisited: A Convex Programming Approach for Generic 3D Shape Reconstruction from Multiple Perspective Views	929
<i>Pan Ji, Hongdong Li, Yuchao Dai, and Ian Reid</i>	
Surface Registration via Foliation	938
<i>Xiaopeng Zheng, Chengfeng Wen, Na Lei, Ming Ma, and Xianfeng Gu</i>	
Rolling-Shutter-Aware Differential SfM and Image Rectification	948
<i>Bingbing Zhuang, Loong-Fah Cheong, and Gim Hee Lee</i>	
Corner-Based Geometric Calibration of Multi-focus Plenoptic Cameras	957
<i>Sotiris Nousias, Francois Chadebecq, Jonas Pichat, Pearse Keane, Sebastien Ourselin, and Christos Bergeles</i>	
Focal Track: Depth and Accommodation with Oscillating Lens Deformation	966
<i>Qi Guo, Emma Alexander, and Todd Zickler</i>	
Reconfiguring the Imaging Pipeline for Computer Vision	975
<i>Mark Buckler, Suren Jayasuriya, and Adrian Sampson</i>	
Catadioptric HyperSpectral Light Field Imaging	985
<i>Yujia Xue, Kang Zhu, Qiang Fu, Xilin Chen, and Jingyi Yu</i>	
Cross-View Asymmetric Metric Learning for Unsupervised Person Re-Identification	994
<i>Hong-Xing Yu, Ancong Wu, and Wei-Shi Zheng</i>	
Real Time Eye Gaze Tracking with 3D Deformable Eye-Face Model	1003
<i>Kang Wang and Qiang Ji</i>	
Ensemble Deep Learning for Skeleton-Based Action Recognition Using Temporal Sliding LSTM Networks	1012
<i>Inwoong Lee, Doyoung Kim, Seoungyoon Kang, and Sanghoon Lee</i>	
How Far are We from Solving the 2D & 3D Face Alignment Problem? (and a Dataset of 230,000 3D Facial Landmarks)	1021
<i>Adrian Bulat and Georgios Tzimiropoulos</i>	
Large Pose 3D Face Reconstruction from a Single Image via Direct Volumetric CNN Regression	1031
<i>Aaron S. Jackson, Adrian Bulat, Vasileios Argyriou, and Georgios Tzimiropoulos</i>	
RankIQA: Learning from Rankings for No-Reference Image Quality Assessment	1040
<i>Xialei Liu, Joost van de Weijer, and Andrew D. Bagdanov</i>	

Look, Perceive and Segment: Finding the Salient Objects in Images via Two-stream Fixation-Semantic CNNs	1050
<i>Xiaowu Chen, Anlin Zheng, Jia Li, and Feng Lu</i>	
Delving into Salient Object Subitizing and Detection	1059
<i>Shengfeng He, Jianbo Jiao, Xiaodan Zhang, Guoqiang Han, and Rynson W.H. Lau</i>	
Visual Relationship Detection with Internal and External Linguistic Knowledge Distillation	1068
<i>Ruichi Yu, Ang Li, Vlad I. Morariu, and Larry S. Davis</i>	
Learning Discriminative Data Fitting Functions for Blind Image Deblurring	1077
<i>Jinshan Pan, Jiangxin Dong, Yu-Wing Tai, Zhixun Su, and Ming-Hsuan Yang</i>	
Video Deblurring via Semantic Segmentation and Pixel-Wise Non-linear Kernel	1086
<i>Wenqi Ren, Jinshan Pan, Xiaochun Cao, and Ming-Hsuan Yang</i>	
On-demand Learning for Deep Image Restoration	1095
<i>Ruohan Gao and Kristen Grauman</i>	
Multi-channel Weighted Nuclear Norm Minimization for Real Color Image Denoising	1105
<i>Jun Xu, Lei Zhang, David Zhang, and Xiangchu Feng</i>	
Coherent Online Video Style Transfer	1114
<i>Dongdong Chen, Jing Liao, Lu Yuan, Nenghai Yu, and Gang Hua</i>	
SHaPE: A Novel Graph Theoretic Algorithm for Making Consensus-Based Decisions in Person Re-identification Systems	1124
<i>Arko Barman and Shishir K. Shah</i>	
Need for Speed: A Benchmark for Higher Frame Rate Object Tracking	1134
<i>Hamed Kiani Galoogahi, Ashton Fagg, Chen Huang, Deva Ramanan, and Simon Lucey</i>	
Learning Background-Aware Correlation Filters for Visual Tracking	1144
<i>Hamed Kiani Galoogahi, Ashton Fagg, and Simon Lucey</i>	
Robust Object Tracking Based on Temporal and Spatial Deep Networks	1153
<i>Zhu Teng, Junliang Xing, Qiang Wang, Congyan Lang, Songhe Feng, and Yi Jin</i>	
Real-Time Hand Tracking under Occlusion from an Egocentric RGB-D Sensor	1163
<i>Franziska Mueller, Dushyant Mehta, Oleksandr Sotnychenko, Srinath Sridhar, Dan Casas, and Christian Theobalt</i>	
Predicting Human Activities Using Stochastic Grammar	1173
<i>Siyuan Qi, Siyuan Huang, Ping Wei, and Song-Chun Zhu</i>	
ProbFlow: Joint Optical Flow and Uncertainty Estimation	1182
<i>Anne S. Wannenwetsch, Margret Keuper, and Stefan Roth</i>	
Sublabel-Accurate Discretization of Nonconvex Free-Discontinuity Problems	1192
<i>Thomas Möllenhoff and Daniel Cremers</i>	
DeepContext: Context-Encoding Neural Pathways for 3D Holistic Scene Understanding	1201
<i>Yinda Zhang, Mingru Bai, Pushmeet Kohli, Shahram Izadi, and Jianxiong Xiao</i>	
BAM! The Behance Artistic Media Dataset for Recognition Beyond Photography	1211
<i>Michael J. Wilber, Chen Fang, Hailin Jin, Aaron Hertzmann, John Collomosse, and Serge Belongie</i>	

Adversarial PoseNet: A Structure-Aware Convolutional Network for Human Pose Estimation	1221
<i>Yu Chen, Chunhua Shen, Xiu-Shen Wei, Lingqiao Liu, and Jian Yang</i>	
An Empirical Study of Language CNN for Image Captioning	1231
<i>Jiuxiang Gu, Gang Wang, Jianfei Cai, and Tsuhan Chen</i>	
Attributes2Classname: A Discriminative Model for Attribute-Based Unsupervised Zero-Shot Learning	1241
<i>Berkan Demirel, Ramazan Gokberk Cinbis, and Nazli Ikizler-Cinbis</i>	
Areas of Attention for Image Captioning	1251
<i>Marco Pedersoli, Thomas Lucas, Cordelia Schmid, and Jakob Verbeek</i>	
Generative Modeling of Audible Shapes for Object Perception	1260
<i>Zhoutong Zhang, Jiajun Wu, Qiuqia Li, Zhengjia Huang, James Traer, Josh H. McDermott, Joshua B. Tenenbaum, and William T. Freeman</i>	
Scene Graph Generation from Objects, Phrases and Region Captions	1270
<i>Yikang Li, Wanli Ouyang, Bolei Zhou, Kun Wang, and Xiaogang Wang</i>	
Recurrent Multimodal Interaction for Referring Image Segmentation	1280
<i>Chenxi Liu, Zhe Lin, Xiaohui Shen, Jimei Yang, Xin Lu, and Alan Yuille</i>	
Learning Feature Pyramids for Human Pose Estimation	1290
<i>Wei Yang, Shuang Li, Wanli Ouyang, Hongsheng Li, and Xiaogang Wang</i>	
Structured Attentions for Visual Question Answering	1300
<i>Chen Zhu, Yanpeng Zhao, Shuaiyi Huang, Kewei Tu, and Yi Ma</i>	
Cut, Paste and Learn: Surprisingly Easy Synthesis for Instance Detection	1310
<i>Debidatta Dwibedi, Ishan Misra, and Martial Hebert</i>	
Cascaded Feature Network for Semantic Segmentation of RGB-D Images	1320
<i>Di Lin, Guangyong Chen, Daniel Cohen-Or, Pheng-Ann Heng, and Hui Huang</i>	
Encoder Based Lifelong Learning	1329
<i>Amal Rannen, Rahaf Aljundi, Matthew B. Blaschko, and Tinne Tuytelaars</i>	
Transitive Invariance for Self-Supervised Visual Representation Learning	1338
<i>Xiaolong Wang, Kaiming He, and Abhinav Gupta</i>	
Weakly Supervised Learning of Deep Metrics for Stereo Reconstruction	1348
<i>Stepan Tulyakov, Anton Ivanov, and Francois Fleuret</i>	
Fine-Grained Recognition in the Wild: A Multi-task Domain Adaptation Approach	1358
<i>Timnit Gebru, Judy Hoffman, and Li Fei-Fei</i>	
SORT: Second-Order Response Transform for Visual Recognition	1368
<i>Yan Wang, Lingxi Xie, Chenxi Liu, Siyuan Qiao, Ya Zhang, Wenjun Zhang, Qi Tian, and Alan Yuille</i>	
Adversarial Examples for Semantic Segmentation and Object Detection	1378
<i>Cihang Xie, Jianyu Wang, Zhishuai Zhang, Yuyin Zhou, Lingxi Xie, and Alan Yuille</i>	
Genetic CNN	1388
<i>Lingxi Xie and Alan Yuille</i>	

Channel Pruning for Accelerating Very Deep Neural Networks	1398
<i>Yihui He, Xiangyu Zhang, and Jian Sun</i>	
Infinite Latent Feature Selection: A Probabilistic Latent Graph-Based Ranking Approach	1407
<i>Giorgio Roffo, Simone Melzi, Umberto Castellani, and Alessandro Vinciarelli</i>	
Video Fill In the Blank Using LR/RL LSTMs with Spatial-Temporal Attentions	1416
<i>Amir Mazaheri, Dong Zhang, and Mubarak Shah</i>	
Primary Video Object Segmentation via Complementary CNNs and Neighborhood Reversible Flow	1426
<i>Jia Li, Anlin Zheng, Xiaowu Chen, and Bin Zhou</i>	
Attentive Semantic Video Generation Using Captions	1435
<i>Tanya Marwah, Gaurav Mittal, and Vineeth N. Balasubramanian</i>	
Following Gaze in Video	1444
<i>Adrià Recasens, Carl Vondrick, Aditya Khosla, and Antonio Torralba</i>	
Adaptive RNN Tree for Large-Scale Human Action Recognition	1453
<i>Wenbo Li, Longyin Wen, Ming-Ching Chang, Ser Nam Lim, and Siwei Lyu</i>	
Spatio-Temporal Person Retrieval via Natural Language Queries	1462
<i>Masataka Yamaguchi, Kuniaki Saito, Yoshitaka Ushiku, and Tatsuya Harada</i>	
Automatic Spatially-Aware Fashion Concept Discovery	1472
<i>Xintong Han, Zuxuan Wu, Phoenix X. Huang, Xiao Zhang, Menglong Zhu, Yuan Li, Yang Zhao, and Larry S. Davis</i>	
ChromaTag: A Colored Marker and Fast Detection Algorithm	1481
<i>Joseph DeGol, Timothy Bretl, and Derek Hoiem</i>	
Adversarial Image Perturbation for Privacy Protection A Game Theory Perspective	1491
<i>Seong Joon Oh, Mario Fritz, and Bernt Schiele</i>	
WeText: Scene Text Detection under Weak Supervision	1501
<i>Shangxuan Tian, Shijian Lu, and Chongshou Li</i>	

Vision for X

Oral Session 3

Arbitrary Style Transfer in Real-Time with Adaptive Instance Normalization	1510
<i>Xun Huang and Serge Belongie</i>	
Photographic Image Synthesis with Cascaded Refinement Networks	1520
<i>Qifeng Chen and Vladlen Koltun</i>	
SSD-6D: Making RGB-Based 3D Detection and 6D Pose Estimation Great Again	1530
<i>Wadim Kehl, Fabian Manhardt, Federico Tombari, Slobodan Ilic, and Nassir Navab</i>	
Unsupervised Creation of Parameterized Avatars	1539
<i>Lior Wolf, Yaniv Taigman, and Adam Polyak</i>	
Learning for Active 3D Mapping	1548
<i>Karel Zimmermann, Tomáš Petříček, Vojtěch Šalanský, and Tomáš Svoboda</i>	

Poster Session 3

Toward Perceptually-Consistent Stereo: A Scanline Study	1557
<i>Jialiang Wang, Daniel Glasner, and Todd Zickler</i>	
Surface Normals in the Wild	1566
<i>Weifeng Chen, Donglai Xiang, and Jia Deng</i>	
Unsupervised Learning of Stereo Matching	1576
<i>Chao Zhou, Hong Zhang, Xiaoyong Shen, and Jiaya Jia</i>	
Unrestricted Facial Geometry Reconstruction Using Image-to-Image Translation	1585
<i>Matan Sela, Elad Richardson, and Ron Kimmel</i>	
Learned Multi-patch Similarity	1595
<i>Wilfried Hartmann, Silvano Galliani, Michal Havlena, Luc Van Gool, and Konrad Schindler</i>	
Click Here: Human-Localized Keypoints as Guidance for Viewpoint Estimation	1604
<i>Ryan Szeto and Jason J. Corso</i>	
Unsupervised Adaptation for Deep Stereo	1614
<i>Alessio Tonioni, Matteo Poggi, Stefano Mattoccia, and Luigi Di Stefano</i>	
Composite Focus Measure for High Quality Depth Maps	1623
<i>Parikshit Sakurikar and P. J. Narayanan</i>	
Reconstruction-Based Disentanglement for Pose-Invariant Face Recognition	1632
<i>Xi Peng, Xiang Yu, Kihyuk Sohn, Dimitris N. Metaxas, and Manmohan Chandraker</i>	
Recurrent 3D-2D Dual Learning for Large-Pose Facial Landmark Detection	1642
<i>Shengtao Xiao, Jiashi Feng, Luoqi Liu, Xuecheng Nie, Wei Wang, Shuicheng Yan, and Ashraf Kassim</i>	
Anchored Regression Networks Applied to Age Estimation and Super Resolution	1652
<i>Eirikur Agustsson, Radu Timofte, and Luc Van Gool</i>	
Infant Footprint Recognition	1662
<i>Eryun Liu</i>	
Self-Paced Kernel Estimation for Robust Blind Image Deblurring	1670
<i>Dong Gong, Mingkui Tan, Yanning Zhang, Anton van den Hengel, and Qinfeng Shi</i>	
Super-Trajectory for Video Segmentation	1680
<i>Wenguan Wang, Jianbing Shen, Jianwen Xie, and Fatih Porikli</i>	
Be Your Own Prada: Fashion Synthesis with Structural Coherence	1689
<i>Shizhan Zhu, Sanja Fidler, Raquel Urtasun, Dahua Lin, and Chen Change Loy</i>	
Wavelet-SRNet: A Wavelet-Based CNN for Multi-scale Face Super Resolution	1698
<i>Huaibo Huang, Ran He, Zhenan Sun, and Tieniu Tan</i>	
Learning Gaze Transitions from Depth to Improve Video Saliency Estimation	1707
<i>George Leifman, Dmitry Rudoy, Tristan Swedish, Eduardo Bayro-Corrochano, and Ramesh Raskar</i>	
Joint Convolutional Analysis and Synthesis Sparse Representation for Single Image Layer Separation	1717
<i>Shuhang Gu, Deyu Meng, Wangmeng Zuo, and Lei Zhang</i>	

Modelling the Scene Dependent Imaging in Cameras with a Deep Neural Network	1726
<i>Seonghyeon Nam and Seon Joo Kim</i>	
Transformed Low-Rank Model for Line Pattern Noise Removal	1735
<i>Yi Chang, Luxin Yan, and Sheng Zhong</i>	
Weakly Supervised Manifold Learning for Dense Semantic Object Correspondence	1744
<i>Utkarsh Gaur and B. S. Manjunath</i>	
PanNet: A Deep Network Architecture for Pan-Sharpener	1753
<i>Junfeng Yang, Xueyang Fu, Yuwen Hu, Yue Huang, Xinghao Ding, and John Paisley</i>	
Dual Motion GAN for Future-Flow Embedded Video Prediction	1762
<i>Xiaodan Liang, Lisa Lee, Wei Dai, and Eric P. Xing</i>	
Online Robust Image Alignment via Subspace Learning from Gradient Orientations	1771
<i>Qingqing Zheng, Yi Wang, and Pheng Ann Heng</i>	
Learning Dynamic Siamese Network for Visual Object Tracking	1781
<i>Qing Guo, Wei Feng, Ce Zhou, Rui Huang, Liang Wan, and Song Wang</i>	
High Order Tensor Formulation for Convolutional Sparse Coding	1790
<i>Adel Bibi and Bernard Ghanem</i>	
Learning Proximal Operators: Using Denoising Networks for Regularizing Inverse Imaging Problems	1799
<i>Tim Meinhardt, Michael Moeller, Caner Hazirbas, and Daniel Cremers</i>	
ScaleNet: Guiding Object Proposal Generation in Supermarkets and Beyond	1809
<i>Siyuan Qiao, Wei Shen, Weichao Qiu, Chenxi Liu, and Alan Yuille</i>	
Temporal Dynamic Graph LSTM for Action-Driven Video Object Detection	1819
<i>Yuan Yuan, Xiaodan Liang, Xiaolong Wang, Dit-Yan Yeung, and Abhinav Gupta</i>	
VQS: Linking Segmentations to Questions and Answers for Supervised Attention in VQA and Question-Focused Semantic Segmentation	1829
<i>Chuang Gan, Yandong Li, Haoxiang Li, Chen Sun, and Boqing Gong</i>	
Multi-modal Factorized Bilinear Pooling with Co-attention Learning for Visual Question Answering	1839
<i>Zhou Yu, Jun Yu, Jianping Fan, and Dacheng Tao</i>	
SCNet: Learning Semantic Correspondence	1849
<i>Kai Han, Rafael S. Rezende, Bumsub Ham, Kwan-Yee K. Wong, Minsu Cho, Cordelia Schmid, and Jean Ponce</i>	
Soft Proposal Networks for Weakly Supervised Object Localization	1859
<i>Yi Zhu, Yanzhao Zhou, Qixiang Ye, Qiang Qiu, and Jianbin Jiao</i>	
Class Rectification Hard Mining for Imbalanced Deep Learning	1869
<i>Qi Dong, Shaogang Gong, and Xiatian Zhu</i>	
Generating High-Quality Crowd Density Maps Using Contextual Pyramid CNNs	1879
<i>Vishwanath A. Sindagi and Vishal M. Patel</i>	
See the Glass Half Full: Reasoning About Liquid Containers, Their Volume and Content	1889
<i>Roozbeh Mottaghi, Connor Schenck, Dieter Fox, and Ali Farhadi</i>	

Hierarchical Multimodal LSTM for Dense Visual-Semantic Embedding	1899
<i>Zhenxing Niu, Mo Zhou, Le Wang, Xinbo Gao, and Gang Hua</i>	
Identity-Aware Textual-Visual Matching with Latent Co-attention	1908
<i>Shuang Li, Tong Xiao, Hongsheng Li, Wei Yang, and Xiaogang Wang</i>	
Learning Deep Neural Networks for Vehicle Re-ID with Visual-spatio-Temporal Path Proposals	1918
<i>Yantao Shen, Tong Xiao, Hongsheng Li, Shuai Yi, and Xiaogang Wang</i>	
Learning from Noisy Labels with Distillation	1928
<i>Yuncheng Li, Jianchao Yang, Yale Song, Liangliang Cao, Jiebo Luo, and Li-Jia Li</i>	
DSOD: Learning Deeply Supervised Object Detectors from Scratch	1937
<i>Zhiqiang Shen, Zhuang Liu, Jianguo Li, Yu-Gang Jiang, Yurong Chen, and Xiangyang Xue</i>	
Phrase Localization and Visual Relationship Detection with Comprehensive Image-Language Cues	1946
<i>Bryan A. Plummer, Arun Mallya, Christopher M. Cervantes, Julia Hockenmaier, and Svetlana Lazebnik</i>	
Chained Cascade Network for Object Detection	1956
<i>Wanli Ouyang, Kun Wang, Xin Zhu, and Xiaogang Wang</i>	
VPGNet: Vanishing Point Guided Network for Lane and Road Marking Detection and Recognition	1965
<i>Seokju Lee, Junsik Kim, Jae Shin Yoon, Seunghak Shin, Oleksandr Bailo, Namil Kim, Tae-Hee Lee, Hyun Seok Hong, Seung-Hoon Han, and In So Kweon</i>	
Unsupervised Learning of Important Objects from First-Person Videos	1974
<i>Gedas Bertasius, Hyun Soo Park, Stella X. Yu, and Jianbo Shi</i>	
An Analysis of Visual Question Answering Algorithms	1983
<i>Kushal Kafle and Christopher Kanan</i>	
A Two Stream Siamese Convolutional Neural Network for Person Re-identification	1992
<i>Dahjung Chung, Khalid Tahboub, and Edward J. Delp</i>	
Joint Learning of Object and Action Detectors	2001
<i>Vicky Kalogeiton, Philippe Weinzaepfel, Vittorio Ferrari, and Cordelia Schmid</i>	
No More Discrimination: Cross City Adaptation of Road Scene Segmenters	2011
<i>Yi-Hsin Chen, Wei-Yu Chen, Yu-Ting Chen, Bo-Cheng Tsai, Yu-Chiang Frank Wang, and Min Sun</i>	
Open Vocabulary Scene Parsing	2021
<i>Hang Zhao, Xavier Puig, Bolei Zhou, Sanja Fidler, and Antonio Torralba</i>	
Learned Watershed: End-to-End Learning of Seeded Segmentation	2030
<i>Steffen Wolf, Lukas Schott, Ullrich Köthe, and Fred Hamprecht</i>	
Curriculum Domain Adaptation for Semantic Segmentation of Urban Scenes	2039
<i>Yang Zhang, Philip David, and Boqing Gong</i>	
Scale-Adaptive Convolutions for Scene Parsing	2050
<i>Rui Zhang, Sheng Tang, Yongdong Zhang, Jintao Li, and Shuicheng Yan</i>	

Privacy-Preserving Visual Learning Using Doubly Permuted Homomorphic Encryption	2059
<i>Ryo Yonetani, Vishnu Naresh Boddeti, Kris M. Kitani, and Yoichi Sato</i>	
Multi-task Self-Supervised Visual Learning	2070
<i>Carl Doersch and Andrew Zisserman</i>	
A Self-Balanced Min-Cut Algorithm for Image Clustering	2080
<i>Xiaojun Chen, Joshua Zhexue Haung, Feiping Nie, Renjie Chen, and Qingyao Wu</i>	
Is Second-Order Information Helpful for Large-Scale Visual Recognition?	2089
<i>Peihua Li, Jiangtao Xie, Qilong Wang, and Wangmeng Zuo</i>	
Factorized Bilinear Models for Image Recognition	2098
<i>Yanghao Li, Naiyan Wang, Jiaying Liu, and Xiaodi Hou</i>	
Octree Generating Networks: Efficient Convolutional Architectures for High-resolution 3D Outputs	2107
<i>Maxim Tatarchenko, Alexey Dosovitskiy, and Thomas Brox</i>	
Truncating Wide Networks Using Binary Tree Architectures	2116
<i>Yan Zhangy, Mete Ozayy, Shuohao Li, and Takayuki Okatani</i>	
Bringing Background into the Foreground: Making All Classes Equal in Weakly-Supervised Video Semantic Segmentation	2125
<i>Fatemeh Sadat Saleh, Mohammad Sadegh Aliakbarian, Mathieu Salzmann, Lars Petersson, and Jose M. Alvarez</i>	
View Adaptive Recurrent Neural Networks for High Performance Human Action Recognition from Skeleton Data	2136
<i>Pengfei Zhang, Cuiling Lan, Junliang Xing, Wenjun Zeng, Jianru Xue, and Nanning Zheng</i>	
Joint Discovery of Object States and Manipulation Actions	2146
<i>Jean-Baptiste Alayrac, Josef Sivic, Ivan Laptev, and Simon Lacoste-Julien</i>	
What Actions are Needed for Understanding Human Actions in Videos?	2156
<i>Gunnar A. Sigurdsson, Olga Russakovsky, and Abhinav Gupta</i>	
Lattice Long Short-Term Memory for Human Action Recognition	2166
<i>Lin Sun, Kui Jia, Kevin Chen, Dit Yan Yeung, Bertram E. Shi, and Silvio Savarese</i>	
Common Action Discovery and Localization in Unconstrained Videos	2176
<i>Jiong Yang and Junsong Yuan</i>	
Pixel-Level Matching for Video Object Segmentation Using Convolutional Neural Networks	2186
<i>Jae Shin Yoon, Francois Rameau, Junsik Kim, Seokju Lee, Seunghak Shin, and In So Kweon</i>	
Am I a Baller? Basketball Performance Assessment from First-Person Videos	2196
<i>Gedas Bertasius, Hyun Soo Park, Stella X. Yu, and Jianbo Shi</i>	
Deep Cropping via Attention Box Prediction and Aesthetics Assessment	2205
<i>Wenguan Wang and Jianbing Shen</i>	
Raster-to-Vector: Revisiting Floorplan Transformation	2214
<i>Chen Liu, Jiajun Wu, Pushmeet Kohli, and Yasutaka Furukawa</i>	

Deep TextSpotter: An End-to-End Trainable Scene Text Localization and Recognition Framework	2223
<i>Michal Buřta, Lukáš Neumann, and Jiri Matas</i>	

Vision for X & Computational Photography

Spotlight Session 3

Playing for Benchmarks	2232
<i>Stephan R. Richter, Zeeshan Hayder, and Vladlen Koltun</i>	
Unpaired Image-to-Image Translation Using Cycle-Consistent Adversarial Networks	2242
<i>Jun-Yan Zhu, Taesung Park, Phillip Isola, and Alexei A. Efros</i>	
GANs for Biological Image Synthesis	2252
<i>Anton Osokin, Anatole Chessel, Rafael E. Carazo Salas, and Federico Vaggi</i>	
Learning to Synthesize a 4D RGBD Light Field from a Single Image	2262
<i>Pratul P. Srinivasan, Tongzhou Wang, Ashwin Sreelal, Ravi Ramamoorthi, and Ren Ng</i>	
Neural EPI-Volume Networks for Shape from Light Field	2271
<i>Stefan Heber, Wei Yu, and Thomas Pock</i>	
Material Editing Using a Physically Based Rendering Network	2280
<i>Guilin Liu, Duygu Ceylan, Ersin Yumer, Jimei Yang, and Jyh-Ming Lien</i>	
Turning Corners into Cameras: Principles and Methods	2289
<i>Katherine L. Bouman, Vickie Ye, Adam B. Yedidia, Frédo Durand, Gregory W. Wornell, Antonio Torralba, and William T. Freeman</i>	
Linear Differential Constraints for Photo-Polarimetric Height Estimation	2298
<i>Silvia Tozza, William A. P. Smith, Dizhong Zhu, Ravi Ramamoorthi, and Edwin R. Hancock</i>	

Poster Session 4

Polynomial Solvers for Saturated Ideals	2307
<i>Viktor Larsson, Kalle Åström, and Magnus Oskarsson</i>	
Shape Inpainting Using 3D Generative Adversarial Network and Recurrent Convolutional Networks	2317
<i>Weiyue Wang, Qiangui Huang, Suyu You, Chao Yang, and Ulrich Neumann</i>	
SurfaceNet: An End-to-End 3D Neural Network for Multiview Stereopsis	2326
<i>Mengqi Ji, Juergen Gall, Haitian Zheng, Yebin Liu, and Lu Fang</i>	
Making Minimal Solvers for Absolute Pose Estimation Compact and Robust	2335
<i>Viktor Larsson, Zuzana Kukelova, and Yinqiang Zheng</i>	
3D Surface Detail Enhancement from a Single Normal Map	2344
<i>Wuyuan Xie, Miaohui Wang, Xianbiao Qi, and Lei Zhang</i>	
RMPE: Regional Multi-person Pose Estimation	2353
<i>Hao-Shu Fang, Shuqin Xie, Yu-Wing Tai, and Cewu Lu</i>	
Online Video Object Detection Using Association LSTM	2363
<i>Yongyi Lu, Cewu Lu, and Chi-Keung Tang</i>	

PolyFit: Polygonal Surface Reconstruction from Point Clouds	2372
<i>Liangliang Nan and Peter Wonka</i>	
Progressive Large Scale-Invariant Image Matching in Scale Space	2381
<i>Lei Zhou, Siyu Zhu, Tianwei Shen, Jinglu Wang, Tian Fang, and Long Quan</i>	
Efficient Global 2D-3D Matching for Camera Localization in a Large-Scale 3D Map	2391
<i>Liu Liu, Hongdong Li, and Yuchao Dai</i>	
Multi-view Non-rigid Refinement and Normal Selection for High Quality 3D Reconstruction	2401
<i>Sk. Mohammadul Haque and Venu Madhav Govindu</i>	
Multi-stage Multi-recursive-input Fully Convolutional Networks for Neuronal Boundary Detection	2410
<i>Wei Shen, Bin Wang, Yuan Jiang, Yan Wang, and Alan Yuille</i>	
Depth and Image Restoration from Light Field in a Scattering Medium	2420
<i>Jiandong Tian, Zak Murez, Tong Cui, Zhen Zhang, David Kriegman, and Ravi Ramamoorthi</i>	
Video Reflection Removal Through Spatio-Temporal Optimization	2430
<i>Ajay Nandoriya, Mohamed Elgharib, Changil Kim, Mohamed Hefeeda, and Wojciech Matusik</i>	
Efficient Online Local Metric Adaptation via Negative Samples for Person Re-identification	2439
<i>Jiahuan Zhou, Pei Yu, Wei Tang, and Ying Wu</i>	
Stepwise Metric Promotion for Unsupervised Video Person Re-identification	2448
<i>Zimo Liu, Dong Wang, and Huchuan Lu</i>	
Beyond Face Rotation: Global and Local Perception GAN for Photorealistic and Identity Preserving Frontal View Synthesis	2458
<i>Rui Huang, Shu Zhang, Tianyu Li, and Ran He</i>	
Group Re-identification via Unsupervised Transfer of Sparse Features Encoding	2468
<i>Giuseppe Lisanti, Niki Martinel, Alberto Del Bimbo, and Gian Luca Foresti</i>	
Visual Transformation Aided Contrastive Learning for Video-Based Kinship Verification	2478
<i>Hamdi Dibeklioglu</i>	
Decoder Network over Lightweight Reconstructed Feature for Fast Semantic Style Transfer	2488
<i>Ming Lu, Hao Zhao, Anbang Yao, Feng Xu, Yurong Chen, and Li Zhang</i>	
Blind Image Deblurring with Outlier Handling	2497
<i>Jiangxin Dong, Jinshan Pan, Zhixun Su, and Ming-Hsuan Yang</i>	
Paying Attention to Descriptions Generated by Image Captioning Models	2506
<i>Hamed R. Tavakoliy, Rakshith Shetty, Ali Borji, and Jorma Laaksonen</i>	
Fast Image Processing with Fully-Convolutional Networks	2516
<i>Qifeng Chen, Jia Xu, Vladlen Koltun, and Intel Labs</i>	
Robust Video Super-Resolution with Learned Temporal Dynamics	2526
<i>Ding Liu, Zhaowen Wang, Yuchen Fan, Xianming Liu, Zhangyang Wang, Shiyu Chang, and Thomas Huang</i>	

Should We Encode Rain Streaks in Video as Deterministic or Stochastic?	2535
<i>Wei Wei, Lixuan Yi, Qi Xie, Qian Zhao, Deyu Meng, and Zongben Xu</i>	
Joint Bi-layer Optimization for Single-Image Rain Streak Removal	2545
<i>Lei Zhu, Chi-Wing Fu, Dani Lischinski, and Pheng-Ann Heng</i>	
Low-Dimensionality Calibration through Local Anisotropic Scaling for Robust Hand Model Personalization	2554
<i>Edoardo Remelli, Anastasia Tkach, Andrea Tagliasacchi, and Mark Pauly</i>	
Non-Markovian Globally Consistent Multi-object Tracking	2563
<i>Andrii Maksai, Xinchao Wang, François Fleuret, and Pascal Fua</i>	
CREST: Convolutional Residual Learning for Visual Tracking	2574
<i>Yibing Song, Chao Ma, Lijun Gong, Jiawei Zhang, Rynson W.H. Lau, and Ming-Hsuan Yang</i>	
Volumetric Flow Estimation for Incompressible Fluids Using the Stationary Stokes Equations	2584
<i>Katrin Lasinger, Christoph Vogel, and Konrad Schindler</i>	
Bounding Boxes, Segmentations and Object Coordinates: How Important is Recognition for 3D Scene Flow Estimation in Autonomous Driving Scenarios?	2593
<i>Aseem Behl, Omid Hosseini Jafari, Siva Karthik Mustikovela, Hassan Abu Alhajja, Carsten Rother, and Andreas Geiger</i>	
Performance Guaranteed Network Acceleration via High-Order Residual Quantization	2603
<i>Zefan Li, Bingbing Ni, Wenjun Zhang, Xiaokang Yang, and Wen Gao</i>	
Deep Metric Learning with Angular Loss	2612
<i>Jian Wang, Feng Zhou, Shilei Wen, Xiao Liu, and Yuanqing Lin</i>	
Compositional Human Pose Regression	2621
<i>Xiao Sun, Jiayang Shang, Shuang Liang, and Yichen Wei</i>	
MUTAN: Multimodal Tucker Fusion for Visual Question Answering	2631
<i>Hedi Ben-younes, Remi Cadene, Matthieu Cord, and Nicolas Thome</i>	
Revisiting IM2GPS in the Deep Learning Era	2640
<i>Nam Vo, Nathan Jacobs, and James Hays</i>	
Scene Parsing with Global Context Embedding	2650
<i>Wei-Chih Hung, Yi-Hsuan Tsai, Xiaohui Shen, Zhe Lin, Kalyan Sunkavalli, Xin Lu, and Ming-Hsuan Yang</i>	
A Simple Yet Effective Baseline for 3d Human Pose Estimation	2659
<i>Julieta Martinez, Rayat Hossain, Javier Romero, and James J. Little</i>	
Dual-Glance Model for Deciphering Social Relationships	2669
<i>Junnan Li, Yongkang Wong, Qi Zhao, and Mohan S. Kankanhalli</i>	
Sketching with Style: Visual Search with Sketches and Aesthetic Context	2679
<i>John Collomosse, Tu Bui, Michael Wilber, Chen Fang, and Hailin Jin</i>	
Point Set Registration with Global-Local Correspondence and Transformation Estimation	2688
<i>Su Zhang, Yang Yang, Kun Yang, Yi Luo, and Sim Heng Ong</i>	

SceneNet RGB-D: Can 5M Synthetic Images Beat Generic ImageNet Pre-training on Indoor Segmentation?	2697
<i>John McCormac, Ankur Handa, Stefan Leutenegger, and Andrew J. Davison</i>	
A Unified Model for Near and Remote Sensing	2707
<i>Scott Workman, Menghua Zhai, David J. Crandall, and Nathan Jacobs</i>	
Directionally Convolutional Networks for 3D Shape Segmentation	2717
<i>Haotian Xu, Ming Dong, and Zichun Zhong</i>	
AMAT: Medial Axis Transform for Natural Images	2727
<i>Stavros Tsogkas and Sven Dickinson</i>	
Deep Dual Learning for Semantic Image Segmentation	2737
<i>Ping Luo, Guangrun Wang, Liang Lin, and Xiaogang Wang</i>	
Regional Interactive Image Segmentation Networks	2746
<i>JunHao Liew, Yunchao Wei, Wei Xiong, Sim-Heng Ong, and Jiashi Feng</i>	
Learning Efficient Convolutional Networks through Network Slimming	2755
<i>Zhuang Liu, Jianguo Li, Zhiqiang Shen, Gao Huang, Shoumeng Yan, and Changshui Zhang</i>	
CVAE-GAN: Fine-Grained Image Generation through Asymmetric Training	2764
<i>Jianmin Bao, Dong Chen, Fang Wen, Houqiang Li, and Gang Hua</i>	
Universal Adversarial Perturbations Against Semantic Image Segmentation	2774
<i>Jan Hendrik Metzen, Mummadi Chaithanya Kumar, Thomas Brox, and Volker Fischer</i>	
Associative Domain Adaptation	2784
<i>Philip Haeusser, Thomas Frerix, Alexander Mordvintsev, and Daniel Cremers</i>	
Introspective Neural Networks for Generative Modeling	2793
<i>Justin Lazarow, Long Jin, and Zhuowen Tu</i>	
Towards a Unified Compositional Model for Visual Pattern Modeling	2803
<i>Wei Tang, Pei Yu, Jiahuan Zhou, and Ying Wu</i>	
Least Squares Generative Adversarial Networks	2813
<i>Xudong Mao, Qing Li, Haoran Xie, Raymond Y.K. Lau, Zhen Wang, and Stephen Paul Smolley</i>	
Centered Weight Normalization in Accelerating Training of Deep Neural Networks	2822
<i>Lei Huang, Xianglong Liu, Yang Liu, Bo Lang, and Dacheng Tao</i>	
Deep Growing Learning	2831
<i>Guangcong Wang, Xiaohua Xie, Jianhuang Lai, and Jiaxuan Zhuo</i>	
Smart Mining for Deep Metric Learning	2840
<i>Ben Harwood, Vijay Kumar B. G, Gustavo Carneiro, Ian Reid, and Tom Drummond</i>	
Temporal Generative Adversarial Nets with Singular Value Clipping	2849
<i>Masaki Saito, Eiichi Matsumoto, and Shunta Saito</i>	
Sampling Matters in Deep Embedding Learning	2859
<i>R. Manmatha, Chao-Yuan Wu, Alexander J. Smola, and Philipp Krähenbühl</i>	
DualGAN: Unsupervised Dual Learning for Image-to-Image Translation	2868
<i>Zili Yi, Hao Zhang, Ping Tan, and Minglun Gong</i>	

Learning View-Invariant Features for Person Identification in Temporally Synchronized Videos Taken by Wearable Cameras	2877
<i>Kang Zheng, Xiaochuan Fan, Yuewei Lin, Hao Guo, Hongkai Yu, Dazhou Guo, and Song Wang</i>	
MarioQA: Answering Questions by Watching Gameplay Videos	2886
<i>Jonghwan Mun, Paul Hongsuck Seo, Ilchae Jung, and Bohyung Han</i>	
SBGAR: Semantics Based Group Activity Recognition	2895
<i>Xin Li and Mooi Choo Chuah</i>	
Trespassing the Boundaries: Labeling Temporal Bounds for Object Interactions in Egocentric Video	2905
<i>Davide Moltisanti, Michael Wray, Walterio Mayol-Cuevas, and Dima Damen</i>	
Unmasking the Abnormal Events in Video	2914
<i>Radu Tudor Ionescu, Sorina Smeureanu, Bogdan Alexe, and Marius Popescu</i>	
Chained Multi-stream Networks Exploiting Pose, Motion, and Appearance for Action Classification and Detection	2923
<i>Mohammadreza Zolfaghari, Gabriel L. Oliveira, Nima Sedaghat, and Thomas Brox</i>	
Temporal Action Detection with Structured Segment Networks	2933
<i>Yue Zhao, Yuanjun Xiong, Limin Wang, Zhirong Wu, Xiaoou Tang, and Dahua Lin</i>	
Jointly Recognizing Object Fluents and Tasks in Egocentric Videos	2943
<i>Yang Liu, Ping Wei, and Song-Chun Zhu</i>	
Transferring Objects: Joint Inference of Container and Human Pose	2952
<i>Hanqing Wang, Wei Liang, and Lap-Fai Yu</i>	
Interpretable Learning for Self-Driving Cars by Visualizing Causal Attention	2961
<i>Jinkyu Kim and John Canny</i>	

Recognition 2

Oral Session 4

Learning Cooperative Visual Dialog Agents with Deep Reinforcement Learning	2970
<i>Abhishek Das, Satwik Kottur, José M. F. Moura, Stefan Lee, and Dhruv Batra</i>	
Mask R-CNN	2980
<i>Kaiming He, Georgia Gkioxari, Piotr Dollár, and Ross Girshick</i>	
Towards Diverse and Natural Image Descriptions via a Conditional GAN	2989
<i>Bo Dai, Sanja Fidler, Raquel Urtasun, and Dahua Lin</i>	
Focal Loss for Dense Object Detection	2999
<i>Tsung-Yi Lin, Priya Goyal, Ross Girshick, Kaiming He, and Piotr Dollár</i>	
Inferring and Executing Programs for Visual Reasoning	3008
<i>Justin Johnson, Bharath Hariharan, Laurens van der Maaten, Judy Hoffman, Li Fei-Fei, C. Lawrence Zitnick, and Ross Girshick</i>	

Spotlight Session 4

Visual Forecasting by Imitating Dynamics in Natural Sequences	3018
<i>Kuo-Hao Zeng, William B. Shen, De-An Huang, Min Sun, and Juan Carlos Niebles</i>	
TorontoCity: Seeing the World with a Million Eyes	3028
<i>Shenlong Wang, Min Bai, Gellert Mattyus, Hang Chu, Wenjie Luo, Bin Yang, Justin Liang, Joel Cheverie, Sanja Fidler, and Raquel Urtasun</i>	
Low-Shot Visual Recognition by Shrinking and Hallucinating Features	3037
<i>Bharath Hariharan and Ross Girshick</i>	
A Coarse-Fine Network for Keypoint Localization	3047
<i>Shaoli Huang, Mingming Gong, and Dacheng Tao</i>	
Detect to Track and Track to Detect	3057
<i>Christoph Feichtenhofer, Axel Pinz, and Andrew Zisserman</i>	
Single Shot Text Detector with Regional Attention	3066
<i>Pan He, Weilin Huang, Tong He, Qile Zhu, Yu Qiao, and Xiaolin Li</i>	
SubUNets: End-to-End Hand Shape and Continuous Sign Language Recognition	3075
<i>Necati Cihan Camgoz, Simon Hadfield, Oscar Koller, and Richard Bowden</i>	
A Spatiotemporal Oriented Energy Network for Dynamic Texture Recognition	3085
<i>Isma Hadji and Richard P. Wildes</i>	

Poster Session 5

Probabilistic Structure from Motion with Objects (PSfMO)	3094
<i>Paul Gay, Vaibhav Bansal, Cosimo Rubino, and Alessio Del Bue</i>	
A 3D Morphable Model of Craniofacial Shape and Texture Variation	3104
<i>Hang Dai, Nick Pears, William Smith, and Christian Duncan</i>	
Multi-view Dynamic Shape Refinement Using Local Temporal Integration	3113
<i>Vincent Leroy, Jean-Sebastien Franco, and Edmond Boyer</i>	
Learning Hand Articulations by Hallucinating Heat Distribution	3123
<i>Chiho Choi, Sangpil Kim, and Karthik Ramani</i>	
Intrinsic3D: High-Quality 3D Reconstruction by Joint Appearance and Geometry Optimization with Spatially-Varying Lighting	3133
<i>Robert Maier, Kihwan Kim, Daniel Cremers, Jan Kautz, and Matthias Nießner</i>	
Robust Hand Pose Estimation during the Interaction with an Unknown Object	3142
<i>Chiho Choi, Sang Ho Yoon, Chin-Ning Chen, and Karthik Ramani</i>	
Detailed Surface Geometry and Albedo Recovery from RGB-D Video under Natural Illumination	3152
<i>Xinxin Zuo, Sen Wang, Jiangbin Zheng, and Ruigang Yang</i>	
Monocular Free-Head 3D Gaze Tracking with Deep Learning and Geometry Constraints	3162
<i>Haoping Deng and Wangjiang Zhu</i>	

Filter Selection for Hyperspectral Estimation	3172
<i>Boaz Arad and Ohad Ben-Shahar</i>	
A Microfacet-Based Reflectance Model for Photometric Stereo with Highly Specular Surfaces	3181
<i>Lixiong Chen, Yinqiang Zheng, Boxin Shi, Art Subpa-Asa, and Imari Sato</i>	
Detecting Faces Using Inside Cascaded Contextual CNN	3190
<i>Kaipeng Zhang, Zhanpeng Zhang, Hao Wang, Zhifeng Li, Yu Qiao, and Wei Liu</i>	
A Novel Space-Time Representation on the Positive Semidefinite Cone for Facial Expression Recognition	3199
<i>Anis Kacem, Mohamed Daoudi, Boulbaba Ben Amor, and Juan Carlos Alvarez-Paiva</i>	
DeepCoder: Semi-Parametric Variational Autoencoders for Automatic Facial Action Coding	3209
<i>Dieu Linh Tran, Robert Walecki, Ognjen (Oggi) Rudovic, Stefanos Eleftheriadis, Bjorn Schuller, and Maja Pantic</i>	
Pose-Invariant Face Alignment with a Single CNN	3219
<i>Amin Jourabloo, Mao Ye, Xiaoming Liu, and Liu Ren</i>	
Unsupervised Learning of Object Landmarks by Factorized Spatial Embeddings	3229
<i>James Thewlis, Hakan Bilen, and Andrea Vedaldi</i>	
Deeply-Learned Part-Aligned Representations for Person Re-identification	3239
<i>Liming Zhao, Xi Li, Yueting Zhuang, and Jingdong Wang</i>	
Semantic Line Detection and Its Applications	3249
<i>Jun-Tae Lee, Han-UI Kim, Chul Lee, and Chang-Su Kim</i>	
A Generic Deep Architecture for Single Image Reflection Removal and Image Smoothing	3258
<i>Qingnan Fan, Jialong Yang, Gang Hua, Baoquan Chen, and David Wipf</i>	
Revisiting Cross-Channel Information Transfer for Chromatic Aberration Correction	3268
<i>Tiancheng Sun, Yifan Peng, and Wolfgang Heidrich</i>	
High-Quality Correspondence and Segmentation Estimation for Dual-Lens Smart-Phone Portraits	3277
<i>Xiaoyong Shen, Hongyun Gao, Xin Tao, Chao Zhou, and Jiaya Jia</i>	
Learning Visual Attention to Identify People with Autism Spectrum Disorder	3287
<i>Ming Jiang and Qi Zhao</i>	
DSLR-Quality Photos on Mobile Devices with Deep Convolutional Networks	3297
<i>Andrey Ignatov, Nikolay Kobyshev, Radu Timofte, Kenneth Vanhoey, and Luc Van Gool</i>	
Non-uniform Blind Deblurring by Reblurring	3306
<i>Yuval Bahat, Netalee Efrat, and Michal Irani</i>	
Misalignment-Robust Joint Filter for Cross-Modal Image Pairs	3315
<i>Takashi Shibata, Masayuki Tanaka, and Masatoshi Okutomi</i>	
Low-Rank Tensor Completion: A Pseudo-Bayesian Learning Approach	3325
<i>Wei Chen and Nan Song</i>	

DeepCD: Learning Deep Complementary Descriptors for Patch Representations	3334
<i>Tsun-Yi Yang, Jo-Han Hsu, Yen-Yu Lin, and Yung-Yu Chuang</i>	
Beyond Standard Benchmarks: Parameterizing Performance Evaluation in Visual Object Tracking	3343
<i>Luka Cehovin Zajc, Alan Lukežič, Aleš Leonardis, and Matej Kristan</i>	
The Pose Knows: Video Forecasting by Generating Pose Futures	3352
<i>Jacob Walker, Kenneth Marino, Abhinav Gupta, and Martial Hebert</i>	
What will Happen Next? Forecasting Player Moves in Sports Videos	3362
<i>Panna Felsen, Pulkit Agrawal, and Jitendra Malik</i>	
Robust Kronecker-Decomposable Component Analysis for Low-Rank Modeling	3372
<i>Mehdi Bahri, Yannis Panagakis, and Stefanos Zafeiriou</i>	
Recurrent Topic-Transition GAN for Visual Paragraph Generation	3382
<i>Xiaodan Liang, Zhiting Hu, Hao Zhang, Chuang Gan, and Eric P. Xing</i>	
A Two-Streamed Network for Estimating Fine-Scaled Depth Maps from Single RGB Images	3392
<i>Jun Li, Reinhard Klein, and Angela Yao</i>	
Weakly Supervised Object Localization Using Things and Stuff Transfer	3401
<i>Miaoqing Shi, Holger Caesar, and Vittorio Ferrari</i>	
Single Image Action Recognition Using Semantic Body Part Actions	3411
<i>Zhichen Zhao, Huimin Ma, and Shaodi You</i>	
Incremental Learning of Object Detectors without Catastrophic Forgetting	3420
<i>Konstantin Shmelkov, Cordelia Schmid, and Karteek Alahari</i>	
Generative Adversarial Networks Conditioned by Brain Signals	3430
<i>S. Palazzo, C. Spampinato, I. Kavasidis, D. Giordano, and M. Shah</i>	
Learning to Disambiguate by Asking Discriminative Questions	3439
<i>Yining Li, Chen Huang, Xiaoou Tang, and Chen Change Loy</i>	
Interpretable Explanations of Black Boxes by Meaningful Perturbation	3449
<i>Ruth C. Fong and Andrea Vedaldi</i>	
DeepRoadMapper: Extracting Road Topology from Aerial Images	3458
<i>Gellért Mátyus, Wenjie Luo, and Raquel Urtasun</i>	
Monocular 3D Human Pose Estimation by Predicting Depth on Joints	3467
<i>Bruce Xiaohan Nie, Ping Wei, and Song-Chun Zhu</i>	
Large-Scale Image Retrieval with Attentive Deep Local Features	3476
<i>Hyeonwoo Noh, Andre Araujo, Jack Sim, Tobias Weyand, and Bohyung Han</i>	
Deep Globally Constrained MRFs for Human Pose Estimation	3486
<i>Ioannis Marras, Petar Palasek, and Ioannis Patras</i>	
Predicting Visual Exemplars of Unseen Classes for Zero-Shot Learning	3496
<i>Soravit Changpinyo, Wei-Lun Chao, and Fei Sha</i>	
Multi-label Learning of Part Detectors for Heavily Occluded Pedestrian Detection	3506
<i>Chunlun Zhou and Junsong Yuan</i>	

SGN: Sequential Grouping Networks for Instance Segmentation	3516
<i>Shu Liu, Jiaya Jia, Sanja Fidler, and Raquel Urtasun</i>	
Adaptive Feeding: Achieving Fast and Accurate Detections by Adaptively Combining Object Detectors	3525
<i>Hong-Yu Zhou, Bin-Bin Gao, and Jianxin Wu</i>	
Aesthetic Critiques Generation for Photos	3534
<i>Kuang-Yu Chang, Kung-Hung Lu, and Chu-Song Chen</i>	
Hide-and-Seek: Forcing a Network to be Meticulous for Weakly-Supervised Object and Action Localization	3544
<i>Krishna Kumar Singh and Yong Jae Lee</i>	
Two-Phase Learning for Weakly Supervised Object Localization	3554
<i>Dahun Kim, Donghyeon Cho, and Donggeun Yoo</i>	
Curriculum Dropout	3564
<i>Pietro Morerio, Jacopo Cavazza, Riccardo Volpi, René Vidal, and Vittorio Murino</i>	
Predictor Combination at Test Time	3573
<i>Kwang In Kim, James Tompkin, and Christian Richardt</i>	
Guided Perturbations: Self-Corrective Behavior in Convolutional Neural Networks	3582
<i>Swami Sankaranarayanan, Arpit Jain, and Ser Nam Lim</i>	
Learning Robust Visual-Semantic Embeddings	3591
<i>Yao-Hung Hubert Tsai, Liang-Kang Huang, and Ruslan Salakhutdinov</i>	
PUNDA: Probabilistic Unsupervised Domain Adaptation for Knowledge Transfer Across Visual Categories	3601
<i>Behnam Gholami, Ognjen (Oggi) Rudovic, and Vladimir Pavlovic</i>	
Learning in an Uncertain World: Representing Ambiguity Through Multiple Hypotheses	3611
<i>Christian Rupprecht, Iro Laina, Robert DiPietro, and Maximilian Baust</i>	
CDTS: Collaborative Detection, Tracking, and Segmentation for Online Multiple Object Segmentation in Videos	3621
<i>Yeong Jun Koh and Chang-Su Kim</i>	
Temporal Superpixels Based on Proximity-Weighted Patch Matching	3630
<i>Se-Ho Lee, Won-Dong Jang, and Chang-Su Kim</i>	
Joint Detection and Recounting of Abnormal Events by Learning Deep Generic Knowledge	3639
<i>Ryota Hinami, Tao Mei, and Shin'ichi Satoh</i>	
TURN TAP: Temporal Unit Regression Network for Temporal Action Proposals	3648
<i>Jiyang Gao, Zhenheng Yang, Chen Sun, Kan Chen, and Ram Nevatia</i>	
Online Real-Time Multiple Spatiotemporal Action Localisation and Prediction	3657
<i>Gurkirt Singh, Suman Saha, Michael Sapienza, Philip Torr, and Fabio Cuzzolin</i>	
Leveraging Weak Semantic Relevance for Complex Video Event Classification	3667
<i>Heng Tao Shen, Chao Li, Jiwei Cao, Zi Huang, and Lei Zhu</i>	
Weakly Supervised Summarization of Web Videos	3677
<i>Rameswar Panda, Abir Das, Ziyang Wu, Jan Ernst, and Amit K. Roy-Chowdhury</i>	

FCN-rLSTM: Deep Spatio-Temporal Neural Networks for Vehicle Counting in City Cameras	3687
<i>Shanghang Zhang, Guanhang Wu, João P. Costeira, and José M. F. Moura</i>	
Fast Face-Swap Using Convolutional Neural Networks	3697
<i>Iryna Korshunova, Wenzhe Shi, Joni Dambre, and Lucas Theis</i>	
Towards a Visual Privacy Advisor: Understanding and Predicting Privacy Risks in Images	3706
<i>Tribhuvanesh Orekondy, Bernt Schiele, and Mario Fritz</i>	

Face and Human Behaviour Analysis

Oral Session 5

First-Person Activity Forecasting with Online Inverse Reinforcement Learning	3716
<i>Nicholas Rhinehart and Kris M. Kitani</i>	
Binarized Convolutional Landmark Localizers for Human Pose Estimation and Face Alignment with Limited Resources	3726
<i>Adrian Bulat and Georgios Tzimiropoulos</i>	
MoFA: Model-Based Deep Convolutional Face Autoencoder for Unsupervised Monocular Reconstruction	3735
<i>Ayush Tewari, Michael Zollhöfer, Hyeonwoo Kim, Pablo Garrido, Florian Bernard, Patrick Pérez, and Christian Theobalt</i>	
RPAN: An End-to-End Recurrent Pose-Attention Network for Action Recognition in Videos	3745
<i>Wenbin Du, Yali Wang, and Yu Qiao</i>	
Temporal Non-volume Preserving Approach to Facial Age-Progression and Age-Invariant Face Recognition	3755
<i>Chi Nhan Duong, Kha Gia Quach, Khoa Luu, T. Hoang Ngan Le, and Marios Savvides</i>	

Spotlight Session 5

Attribute-Enhanced Face Recognition with Neural Tensor Fusion Networks	3764
<i>Guosheng Hu, Yang Hua, Yang Yuan, Zhihong Zhang, Zheng Lu, Sankha S. Mukherjee, Timothy M. Hospedales, Neil M. Robertson, and Yongxin Yang</i>	
Unlabeled Samples Generated by GAN Improve the Person Re-identification Baseline in Vitro	3774
<i>Zhedong Zheng, Liang Zheng, and Yi Yang</i>	
Egocentric Gesture Recognition Using Recurrent 3D Convolutional Neural Networks with Spatiotemporal Transformer Modules	3783
<i>Congqi Cao, Yifan Zhang, Yi Wu, Hanqing Lu, and Jian Cheng</i>	
Recursive Spatial Transformer (ReST) for Alignment-Free Face Recognition	3792
<i>Wanglong Wu, Meina Kan, Xin Liu, Yi Yang, Shiguang Shan, and Xilin Chen</i>	
Learning Discriminative Aggregation Network for Video-Based Face Recognition	3801
<i>Yongming Rao, Ji Lin, Jiwen Lu, and Jie Zhou</i>	

Synergy between Face Alignment and Tracking via Discriminative Global Consensus Optimization	3811
<i>Muhammad Haris Khan, John McDonagh, and Georgios Tzimiropoulos</i>	
SVDNet for Pedestrian Retrieval	3820
<i>Yifan Sun, Liang Zheng, Weijian Deng, and Shengjin Wang</i>	
Towards More Accurate Iris Recognition Using Deeply Learned Spatially Corresponding Features	3829
<i>Zijing Zhao and Ajay Kumar</i>	

Poster Session 6

Semantically Informed Multiview Surface Refinement	3839
<i>Maroš Bláha, Mathias Rothermel, Martin R. Oswald, Torsten Sattler, Audrey Richard, Jan D. Wegner, Marc Pollefeys, and Konrad Schindler</i>	
BB8: A Scalable, Accurate, Robust to Partial Occlusion Method for Predicting the 3D Poses of Challenging Objects without Using Depth	3848
<i>Mahdi Rad and Vincent Lepetit</i>	
Modeling Urban Scenes from Pointclouds	3857
<i>William Nguatem and Helmut Mayer</i>	
Parameter-Free Lens Distortion Calibration of Central Cameras	3867
<i>Filippo Bergamasco, Luca Cosmo, Andrea Gasparetto, Andrea Albarelli, and Andrea Torsello</i>	
Pose Guided RGBD Feature Learning for 3D Object Pose Estimation	3876
<i>Vassileios Balntas, Andreas Doumanoglou, Caner Sahin, Juil Sock, Rigas Kouskouridas, and Tae-Kyun Kim</i>	
Efficient Global Illumination for Morphable Models	3885
<i>Andreas Schneider, Sandro Schönborn, Bernhard Egger, Lavrenti Frobeen, and Thomas Vetter</i>	
Low Compute and Fully Parallel Computer Vision with HashMatch	3894
<i>Sean Ryan Fanello, Julien Valentin, Adarsh Kowdle, Christoph Rhemann, Vladimir Tankovich, Carlo Ciliberto, Philip Davidson, and Shahram Izadi</i>	
Dense Non-rigid Structure-from-Motion and Shading with Unknown Albedos	3904
<i>Mathias Gallardo, Toby Collins, and Adrien Bartoli</i>	
From Point Clouds to Mesh Using Regression	3913
<i>L'ubor Ladický, Olivier Saurer, SoHyeon Jeong, Fabio Maninchedda, and Marc Pollefeys</i>	
Stereo DSO: Large-Scale Direct Sparse Visual Odometry with Stereo Cameras	3923
<i>Rui Wang, Martin Schwörer, and Daniel Cremers</i>	
Space-Time Localization and Mapping	3932
<i>Minhaeng Lee and Charless C. Fowlkes</i>	
Benchmarking Single-Image Reflection Removal Algorithms	3942
<i>Renjie Wan, Boxin Shi, Ling-Yu Duan, Ah-Hwee Tan, and Alex C. Kot</i>	

Attention-Aware Deep Reinforcement Learning for Video Face Recognition	3951
<i>Yongming Rao, Jiwen Lu, and Jie Zhou</i>	
Learning to Fuse 2D and 3D Image Cues for Monocular Body Pose Estimation	3961
<i>Bugra Tekin, Pablo Márquez-Neila, Mathieu Salzmann, and Pascal Fua</i>	
Deep Facial Action Unit Recognition from Partially Labeled Data	3971
<i>Shan Wu, Shangfei Wang, Bowen Pan, and Qiang Ji</i>	
Pose-Driven Deep Convolutional Model for Person Re-identification	3980
<i>Chi Su, Jianing Li, Shiliang Zhang, Junliang Xing, Wen Gao, and Qi Tian</i>	
Recognition of Action Units in the Wild with Deep Nets and a New Global-Local Loss	3990
<i>C. Fabian Benitez-Quiroz, Yan Wang, and Aleix M. Martinez</i>	
Faster than Real-Time Facial Alignment: A 3D Spatial Transformer Network Approach in Unconstrained Poses	4000
<i>Chandrasekhar Bhagavatula, Chenchen Zhu, Khoa Luu, and Marios Savvides</i>	
Towards Large-Pose Face Frontalization in the Wild	4010
<i>Xi Yin, Xiang Yu, Kihyuk Sohn, Xiaoming Liu, and Manmohan Chandraker</i>	
A Joint Intrinsic-Extrinsic Prior Model for Retinex	4020
<i>Bolun Cai, Xianming Xu, Kailing Guo, Kui Jia, Bin Hu, and Dacheng Tao</i>	
Going Unconstrained with Rolling Shutter Deblurring	4030
<i>Mahesh Mohan M. R. and A. N. Rajagopalan</i>	
A Stagewise Refinement Model for Detecting Salient Objects in Images	4039
<i>Tiantian Wang, Ali Borji, Lihe Zhang, Pingping Zhang, and Huchuan Lu</i>	
From Square Pieces to Brick Walls: The Next Challenge in Solving Jigsaw Puzzles	4049
<i>Shir Gur and Ohad Ben-Shahar</i>	
Online Video Deblurring via Dynamic Temporal Blending Network	4058
<i>Tae Hyun Kim, Kyoung Mu Lee, Bernhard Schölkopf, and Michael Hirsch</i>	
Supervision by Fusion: Towards Unsupervised Learning of Deep Salient Object Detector	4068
<i>Dingwen Zhang, Junwei Han, and Yu Zhang</i>	
Fast Multi-image Matching via Density-Based Clustering	4077
<i>Roberto Tron, Xiaowei Zhou, Carlos Esteves, and Kostas Daniilidis</i>	
Characterizing and Improving Stability in Neural Style Transfer	4087
<i>Agrim Gupta, Justin Johnson, Alexandre Alahi, and Li Fei-Fei</i>	
Cross-Modal Deep Variational Hashing	4097
<i>Venice Erin Liong, Jiwen Lu, Yap-Peng Tan, and Jie Zhou</i>	
Spatial Memory for Context Reasoning in Object Detection	4106
<i>Xinlei Chen and Abhinav Gupta</i>	
Deep Binaries: Encoding Semantic-Rich Cues for Efficient Textual-Visual Cross Retrieval	4117
<i>Yuming Shen, Li Liu, Ling Shao, and Jingkuan Song</i>	
Learning a Recurrent Residual Fusion Network for Multimodal Matching	4127
<i>Yu Liu, Yanming Guo, Erwin M. Bakker, and Michael S. Lew</i>	

Rotational Subgroup Voting and Pose Clustering for Robust 3D Object Recognition	4137
<i>Anders Glent Buch, Liliya Kiforenko, and Dirk Kraft</i>	
CoupleNet: Coupling Global Structure with Local Parts for Object Detection	4146
<i>Yousong Zhu, Chaoyang Zhao, Jinqiao Wang, Xu Zhao, Yi Wu, and Hanqing Lu</i>	
Speaking the Same Language: Matching Machine to Human Captions by Adversarial Training	4155
<i>Rakshith Shetty, Marcus Rohrbach, Lisa Anne Hendricks, Mario Fritz, and Bernt Schiele</i>	
Drone-Based Object Counting by Spatially Regularized Regional Proposal Network	4165
<i>Meng-Ru Hsieh, Yen-Liang Lin, and Winston H. Hsu</i>	
BlitzNet: A Real-Time Deep Network for Scene Understanding	4174
<i>Nikita Dvornik, Konstantin Shmelkov, Julien Mairal, and Cordelia Schmid</i>	
Situation Recognition with Graph Neural Networks	4183
<i>Ruiyu Li, Makarand Tapaswi, Renjie Liao, Jiaya Jia, Raquel Urtasun, and Sanja Fidler</i>	
Learning Visual N-Grams from Web Data	4193
<i>Ang Li, Allan Jabri, Armand Joulin, and Laurens van der Maaten</i>	
Attention-Based Multimodal Fusion for Video Description	4203
<i>Chiori Hori, Takaaki Hori, Teng-Yok Lee, Ziming Zhang, Bret Harsham, John R. Hershey, Tim K. Marks, and Kazuhiko Sumi</i>	
Learning the Latent “Look”: Unsupervised Discovery of a Style-Coherent Embedding from Fashion Images	4213
<i>Wei-Lin Hsiao and Kristen Grauman</i>	
Aligned Image-Word Representations Improve Inductive Transfer Across Vision-Language Tasks	4223
<i>Tanmay Gupta, Kevin Shih, Saurabh Singh, and Derek Hoiem</i>	
Learning Discriminative Latent Attributes for Zero-Shot Classification	4233
<i>Huajie Jiang, Ruiping Wang, Shiguang Shan, Yi Yang, and Xilin Chen</i>	
PPR-FCN: Weakly Supervised Visual Relation Detection via Parallel Pairwise R-FCN	4243
<i>Hanwang Zhang, Zawlin Kyaw, Jinyang Yu, and Shih-Fu Chang</i>	
Higher-Order Minimum Cost Lifted Multicuts for Motion Segmentation	4252
<i>Margret Keuper</i>	
Deep Free-Form Deformation Network for Object-Mask Registration	4261
<i>Haoyang Zhang and Xuming He</i>	
Region-Based Correspondence Between 3D Shapes via Spatially Smooth Biclustering	4270
<i>Matteo Denitto, Simone Melzi, Manuele Bicego, Umberto Castellani, Alessandro Farinelli, Mario A. T. Figueiredo, Yanir Kleiman, and Maks Ovsjanikov</i>	
Learning Discriminative $\alpha\beta$ -Divergences for Positive Definite Matrices	4280
<i>A. Cherian, P. Stanitsas, M. Harandi, V. Morellas, and N. Papanikolopoulos</i>	
Consensus Convolutional Sparse Coding	4290
<i>Biswarup Choudhury, Robin Swanson, Felix Heide, Gordon Wetzstein, and Wolfgang Heidrich</i>	

Domain-Adaptive Deep Network Compression	4299
<i>Marc Masana, Joost van de Weijer, Luis Herranz, Andrew D. Bagdanov, and Jose M. Álvarez</i>	
Self-Supervised Learning of Pose Embeddings from Spatiotemporal Relations in Videos	4308
<i>Ömer Sümer, Tobias Dencker, and Björn Ommer</i>	
Approximate Grassmannian Intersections: Subspace-Valued Subspace Learning	4318
<i>Calvin Murdock and Fernando De la Torre</i>	
Side Information in Robust Principal Component Analysis: Algorithms and Applications	4327
<i>Niannan Xue, Yannis Panagakis, and Stefanos Zafeiriou</i>	
Summarization and Classification of Wearable Camera Streams by Learning the Distributions over Deep Features of Out-of-Sample Image Sequences	4336
<i>Alessandro Penna, Sadegh Mohammadi, Nebojsa Jojic, and Vittorio Murino</i>	
Unsupervised Learning from Video to Detect Foreground Objects in Single Images	4345
<i>Ioana Croitoru, Simion-Vlad Bogolin, and Marius Leordeanu</i>	
Supplementary Meta-Learning: Towards a Dynamic Model for Deep Neural Networks	4354
<i>Feihu Zhang and Benjamin W. Wah</i>	
Adversarial Inverse Graphics Networks: Learning 2D-to-3D Lifting and Image-to-Image Translation from Unpaired Supervision	4364
<i>Hsiao-Yu Fish Tung, Adam W. Harley, William Seto, and Katerina Fragkiadaki</i>	
Active Learning for Human Pose Estimation	4373
<i>Buyu Liu and Vittorio Ferrari</i>	
Interleaved Group Convolutions	4383
<i>Ting Zhang, Guo-Jun Qi, Bin Xiao, and Jingdong Wang</i>	
Learning-Based Cloth Material Recovery from Video	4393
<i>Shan Yang, Junbang Liang, and Ming C. Lin</i>	
Unsupervised Video Understanding by Reconciliation of Posture Similarities	4404
<i>Timo Milbich, Miguel Bautista, Ekaterina Sutter, and Björn Ommer</i>	
Action Tubelet Detector for Spatio-Temporal Action Localization	4415
<i>Vicky Kalogeiton, Philippe Weinzaepfel, Vittorio Ferrari, and Cordelia Schmid</i>	
AMTnet: Action-Micro-Tube Regression by End-to-end Trainable Deep Architecture	4424
<i>Suman Saha, Gurkirt Singh, and Fabio Cuzzolin</i>	
Constrained Convolutional Sparse Coding for Parametric Based Reconstruction of Line Drawings	4434
<i>Sara Shaheen, Lama Affara, and Bernard Ghanem</i>	
Neural Ctrl-F: Segmentation-Free Query-by-String Word Spotting in Handwritten Manuscript Collections	4443
<i>Tomas Wilkinson, Jonas Lindström, and Anders Brun</i>	

Video Analysis

Oral Session 6

Spatial-Aware Object Embeddings for Zero-Shot Localization and Classification of Actions	4453
<i>Pascal Mettes and Cees G. M. Snoek</i>	
Semantic Video CNNs Through Representation Warping	4463
<i>Raghudeep Gadde, Varun Jampani, and Peter V. Gehler</i>	
Video Frame Synthesis Using Deep Voxel Flow	4473
<i>Ziwei Liu, Raymond A. Yeh, Xiaoou Tang, Yiming Liu, and Aseem Agarwala</i>	
Detail-Revealing Deep Video Super-Resolution	4482
<i>Xin Tao, Hongyun Gao, Renjie Liao, Jue Wang, and Jiaya Jia</i>	
Learning Video Object Segmentation with Visual Memory	4491
<i>Pavel Tokmakov, Karteek Alahari, and Cordelia Schmid</i>	

Low-Level Vision

Oral Session 7

EnhanceNet: Single Image Super-Resolution Through Automated Texture Synthesis	4501
<i>Mehdi S. M. Sajjadi, Bernhard Schölkopf, and Michael Hirsch</i>	
Makeup-Go: Blind Reversion of Portrait Edit	4511
<i>Ying-Cong Chen, Xiaoyong Shen, and Jiaya Jia</i>	
Shadow Detection with Conditional Generative Adversarial Networks	4520
<i>Vu Nguyen, Tomas F. Yago Vicente, Maozheng Zhao, Minh Hoai, and Dimitris Samaras</i>	
Learning High Dynamic Range from Outdoor Panoramas	4529
<i>Jinsong Zhang and Jean-François Lalonde</i>	
DCTM: Discrete-Continuous Transformation Matching for Semantic Flow	4539
<i>Seungryong Kim, Dongbo Min, Stephen Lin, and Kwanghoon Sohn</i>	

Spotlight Session 6

MemNet: A Persistent Memory Network for Image Restoration	4549
<i>Ying Tai, Jian Yang, Xiaoming Liu, and Chunyan Xu</i>	
Structure-Measure: A New Way to Evaluate Foreground Maps	4558
<i>Deng-Ping Fan, Ming-Ming Cheng, Yun Liu, Tao Li, and Ali Borji</i>	
Weakly- and Self-Supervised Learning for Content-Aware Deep Image Retargeting	4568
<i>Donghyeon Cho, Jinsun Park, Tae-Hyun Oh, Yu-Wing Tai, and In So Kweon</i>	
Practical and Efficient Multi-view Matching	4578
<i>Eleonora Maset, Federica Arrigoni, and Andrea Fusiello</i>	

Unrolled Memory Inner-Products: An Abstract GPU Operator for Efficient Vision-Related Computations	4587
<i>Yu-Sheng Lin, Wei-Chao Chen, and Shao-Yi Chien</i>	
Learning to Push the Limits of Efficient FFT-Based Image Deconvolution	4596
<i>Jakob Kruse, Carsten Rother, and Uwe Schmidt</i>	
Learning Spread-Out Local Feature Descriptors	4605
<i>Xu Zhang, Felix X. Yu, Sanjiv Kumar, and Shih-Fu Chang</i>	
Visual Odometry for Pixel Processor Arrays	4614
<i>Laurie Bose, Jianing Chen, Stephen J. Carey, Piotr Dudek, and Walterio Mayol-Cuevas</i>	

Poster Session 7

Joint Estimation of Camera Pose, Depth, Deblurring, and Super-Resolution from a Blurred Image Sequence	4623
<i>Haesol Park and Kyoung Mu Lee</i>	
2D-Driven 3D Object Detection in RGB-D Images	4632
<i>Jean Lahoud and Bernard Ghanem</i>	
Ray Space Features for Plenoptic Structure-from-Motion	4641
<i>Yingliang Zhang, Peihong Yu, Wei Yang, Yuanxi Ma, and Jingyi Yu</i>	
Depth Estimation Using Structured Light Flow — Analysis of Projected Pattern Flow on an Object's Surface	4650
<i>Ryo Furukawa, Ryusuke Sagawa, and Hiroshi Kawasaki</i>	
Monocular Dense 3D Reconstruction of a Complex Dynamic Scene from Two Perspective Frames	4659
<i>Suryansh Kumar, Yuchao Dai, and Hongdong Li</i>	
Optimal Transformation Estimation with Semantic Cues	4668
<i>Luc Van Gool, Danda Pani Paudel, and Adlane Haded</i>	
Dynamics Enhanced Multi-camera Motion Segmentation from Unsynchronized Videos	4678
<i>Xikang Zhang, Bengisu Ozbay, Mario Sznaiier, and Octavia Camps</i>	
Taking the Scenic Route to 3D: Optimising Reconstruction from Moving Cameras	4687
<i>Oscar Mendez, Simon Hadfield, Nicolas Pugeault, and Richard Bowden</i>	
FLaME: Fast Lightweight Mesh Estimation Using Variational Smoothing on Delaunay Graphs	4696
<i>W. Nicholas Greene and Nicholas Roy</i>	
Efficient Algorithms for Moral Lineage Tracing	4705
<i>Markus Rempfler, Jan-Hendrik Lange, Florian Jug, Corinna Blasse, Eugene W. Myers, Bjoern H. Menze, and Bjoern Andres</i>	
From RGB to Spectrum for Natural Scenes via Manifold-Based Mapping	4715
<i>Yan Jia, Yinqiang Zheng, Lin Gu, Art Subpa-Asa, Antony Lam, Yoichi Sato, and Imari Sato</i>	
DeepFuse: A Deep Unsupervised Approach for Exposure Fusion with Extreme Exposure Image Pairs	4724
<i>K. Ram Prabhakar, V Sai Srikar, and R. Venkatesh Babu</i>	

Learning Dense Facial Correspondences in Unconstrained Images	4733
<i>Ronald Yu, Shunsuke Saito, Haoxiang Li, Duygu Ceylan, and Hao Li</i>	
Jointly Attentive Spatial-Temporal Pooling Networks for Video-Based Person Re-identification	4743
<i>Shuangjie Xu, Yu Cheng, Kang Gu, Yang Yang, Shiyu Chang, and Pan Zhou</i>	
Automatic Content-Aware Projection for 360° Videos	4753
<i>Yeong Won Kim, Chang-Ryeol Lee, Dae-Yong Cho, Yong Hoon Kwon, Hyeok-Jae Choi, and Kuk-Jin Yoon</i>	
Blur-Invariant Deep Learning for Blind-Deblurring	4762
<i>T M Nimisha, Akash Kumar Singh, and A N Rajagopalan</i>	
Non-linear Convolution Filters for CNN-Based Learning	4771
<i>Georgios Zoumpourlis, Alexandros Doumanoglou, Nicholas Vretos, and Petros Daras</i>	
AOD-Net: All-in-One Dehazing Network	4780
<i>Boyi Li, Xiulian Peng, Zhangyang Wang, Jizheng Xu, and Dan Feng</i>	
Simultaneous Detection and Removal of High Altitude Clouds from an Image	4789
<i>Tushar Sandhan and Jin Young Choi</i>	
Understanding Low- and High-Level Contributions to Fixation Prediction	4799
<i>Matthias Kümmerer, Thomas S.A. Wallis, Leon A. Gatys, and Matthias Bethge</i>	
Image Super-Resolution Using Dense Skip Connections	4809
<i>Tong Tong, Gen Li, Xiejie Liu, and Qinquan Gao</i>	
Convergence Analysis of MAP Based Blur Kernel Estimation	4818
<i>Sunghyun Cho and Seungyong Lee</i>	
Blob Reconstruction Using Unilateral Second Order Gaussian Kernels with Application to High-ISO Long-Exposure Image Denoising	4827
<i>Gang Wang, Carlos Lopez-Molina, and Bernard De Baets</i>	
Deep Generative Adversarial Compression Artifact Removal	4836
<i>Leonardo Galteri, Lorenzo Seidenari, Marco Bertini, and Alberto Del Bimbo</i>	
Online Multi-object Tracking Using CNN-Based Single Object Tracker with Spatial-Temporal Attention Mechanism	4846
<i>Qi Chu, Wanli Ouyang, Hongsheng Li, Xiaogang Wang, Bin Liu, and Nenghai Yu</i>	
Mutual Enhancement for Detection of Multiple Logos in Sports Videos	4856
<i>Yuan Liao, Xiaoqing Lu, Chengcui Zhang, Yongtao Wang, and Zhi Tang</i>	
Referring Expression Generation and Comprehension via Attributes	4866
<i>Jingyu Liu, Liang Wang, and Ming-Hsuan Yang</i>	
RoomNet: End-to-End Room Layout Estimation	4875
<i>Chen-Yu Lee, Vijay Badrinarayanan, Tomasz Malisiewicz, and Andrew Rabinovich</i>	
SSH: Single Stage Headless Face Detector	4885
<i>Mahyar Najibi, Pouya Samangouei, Rama Chellappa, and Larry S. Davis</i>	
AnnArbor: Approximate Nearest Neighbors Using Arborescence Coding	4895
<i>Artem Babenko Yandex and Victor Lempitsky</i>	

Boosting Image Captioning with Attributes	4904
<i>Ting Yao, Yingwei Pan, Yehao Li, Zhaofan Qiu, and Tao Mei</i>	
Learning to Estimate 3D Hand Pose from Single RGB Images	4913
<i>Christian Zimmermann and Thomas Brox</i>	
Locally-Transferred Fisher Vectors for Texture Classification	4922
<i>Yang Song, Fan Zhang, Qing Li, Heng Huang, Lauren J. O'Donnell, and Weidong Cai</i>	
Object-Level Proposals	4931
<i>Jianxiang Ma, Anlong Ming, Zilong Huang, Xinggong Wang, and Yu Zhou</i>	
Extreme Clicking for Efficient Object Annotation	4940
<i>Dim P. Papadopoulos, Jasper R. R. Uijlings, Frank Keller, and Vittorio Ferrari</i>	
WordSup: Exploiting Word Annotations for Character Based Text Detection	4950
<i>Han Hu, Chengquan Zhang, Yuxuan Luo, Yuzhuo Wang, Junyu Han, and Errui Ding</i>	
Illuminating Pedestrians via Simultaneous Detection and Segmentation	4960
<i>Garrick Brazil, Xi Yin, and Xiaoming Liu</i>	
Generalized Orderless Pooling Performs Implicit Salient Matching	4970
<i>Marcel Simon, Yang Gao, Trevor Darrell, Joachim Denzler, and Erik Rodner</i>	
Exploiting Spatial Structure for Localizing Manipulated Image Regions	4980
<i>Jawadul H. Bappy, Amit K. Roy-Chowdhury, Jason Bunk, Lakshmanan Nataraj, and B.S. Manjunath</i>	
RDFNet: RGB-D Multi-level Residual Feature Fusion for Indoor Semantic Segmentation	4990
<i>Seungyong Lee, Seong-Jin Park, and Ki-Sang Hong</i>	
Self-Organized Text Detection with Minimal Post-processing via Border Learning	5010
<i>Yue Wu and Prem Natarajan</i>	
Sparse Exact PGA on Riemannian Manifolds	5020
<i>Monami Banerjee, Rudransis Chakraborty, and Baba C. Vemuri</i>	
Tensor RPCA by Bayesian CP Factorization with Complex Noise	5029
<i>Qiong Luo, Zhi Han, Xi'ai Chen, Yao Wang, Deyu Meng, Dong Liang, and Yandong Tang</i>	
Multimodal Gaussian Process Latent Variable Models with Harmonization	5039
<i>Guoli Song, Shuhui Wang, Qingming Huang, and Qi Tian</i>	
Segmentation-Aware Convolutional Networks Using Local Attention Masks	5048
<i>Adam W. Harley, Konstantinos G. Derpanis, and Iasonas Kokkinos</i>	
Rotation Equivariant Vector Field Networks	5058
<i>Diego Marcos, Michele Volpi, Nikos Komodakis, and Devis Tuia</i>	
ThiNet: A Filter Level Pruning Method for Deep Neural Network Compression	5068
<i>Jian-Hao Luo, Jianxin Wu, and Weiyao Lin</i>	
AutoDIAL: Automatic Domain Alignment Layers	5077
<i>Fabio Maria Cariucci, Lorenzo Porzi, Barbara Caputo, Elisa Ricci, and Samuel Rota Bulò</i>	
Focusing Attention: Towards Accurate Text Recognition in Natural Images	5086
<i>Zhanzhan Cheng, Fan Bai, Yunlu Xu, Gang Zheng, Shiliang Pu, and Shuigeng Zhou</i>	

Unsupervised Object Segmentation in Video by Efficient Selection of Highly Probable Positive Features	5095
<i>Emanuela Haller and Marius Leordeanu</i>	
Nonparametric Variational Auto-Encoders for Hierarchical Representation Learning	5104
<i>Prasoon Goyal, Zhiting Hu, Xiaodan Liang, Chenyu Wang, Eric P. Xing, and Carnegie Mellon</i>	
Dense and Low-Rank Gaussian CRFs Using Deep Embeddings	5113
<i>Siddhartha Chandra, Nicolas Usunier, and Iasonas Kokkinos</i>	
A Multimodal Deep Regression Bayesian Network for Affective Video Content Analyses	5123
<i>Quan Gan, Shangfei Wang, Longfei Hao, and Qiang Ji</i>	
Moving Object Detection in Time-Lapse or Motion Trigger Image Sequences Using Low-Rank and Invariant Sparse Decomposition	5133
<i>Moein Shakeri and Hong Zhang</i>	
A Multilayer-Based Framework for Online Background Subtraction with Freely Moving Cameras	5142
<i>Yizhe Zhu and Ahmed Elgammal</i>	
Dynamic Label Graph Matching for Unsupervised Video Re-identification	5152
<i>Mang Ye, Andy J. Ma, Liang Zheng, Jiawei Li, and Pong C. Yuen</i>	
Spatiotemporal Modeling for Crowd Counting in Videos	5161
<i>Feng Xiong, Xingjian Shi, and Dit-Yan Yeung</i>	
Personalized Cinemagraphs Using Semantic Understanding and Collaborative Learning	5170
<i>Tae-Hyun Oh, Kyungdon Joo, Neel Joshi, Baoyuan Wang, In So Kweon, and Sing Bing Kang</i>	
What is Around the Camera?	5180
<i>Stamatios Georgoulis, Konstantinos Rematas, Tobias Ritschel, Mario Fritz, Tinne Tuytelaars, and Luc Van Gool</i>	

Recognition 3

Oral Session 8

Weakly-Supervised Learning of Visual Relations	5189
<i>Julia Peyre, Ivan Laptev, Cordelia Schmid, and Josef Sivic</i>	
BIER — Boosting Independent Embeddings Robustly	5199
<i>Michael Opitz, Georg Waltner, Horst Possegger, and Horst Bischof</i>	
3D Graph Neural Networks for RGBD Semantic Segmentation	5209
<i>Xiaojuan Qi, Renjie Liao, Jiaya Jia, Sanja Fidler, and Raquel Urtasun</i>	
Learning Multi-attention Convolutional Neural Network for Fine-Grained Image Recognition	5219
<i>Heliang Zheng, Jianlong Fu, Tao Mei, and Jiebo Luo</i>	
Learning 3D Object Categories by Looking Around Them	5228
<i>David Novotny, Diane Larlus, and Andrea Vedaldi</i>	

Spotlight Session 7

Quantitative Evaluation of Confidence Measures in a Machine Learning World	5238
<i>Matteo Poggi, Fabio Tosi, and Stefano Mattoccia</i>	
Towards End-to-End Text Spotting with Convolutional Recurrent Neural Networks	5248
<i>Hui Li, Peng Wang, and Chunhua Shen</i>	
DeepSetNet: Predicting Sets with Deep Neural Networks	5257
<i>S. Hamid Rezatofghi, Vijay Kumar B. G, Anton Milan, Ehsan Abbasnejad, Anthony Dick, and Ian Reid</i>	
Learning from Video and Text via Large-Scale Discriminative Clustering	5267
<i>Antoine Miech, Jean-Baptiste Alayrac, Piotr Bojanowski, Ivan Laptev, and Josef Sivic</i>	
TALL: Temporal Activity Localization via Language Query	5277
<i>Jiyang Gao, Chen Sun, Zhenheng Yang, and Ram Nevatia</i>	
End-to-End Face Detection and Cast Grouping in Movies Using Erdős-Rényi Clustering	5286
<i>SouYoung Jin, Hang Su, Chris Stauffer, and Erik Learned-Miller</i>	
Active Decision Boundary Annotation with Deep Generative Models	5296
<i>Miriam Huijser and Jan C. van Gemert</i>	
Convolutional Dictionary Learning via Local Processing	5306
<i>Vardan Papyan, Yaniv Romano, Michael Elad, and Jeremias Sulam</i>	

Poster Session 8

Editable Parametric Dense Foliage from 3D Capture	5315
<i>Paul Beardsley and Gaurav Chaurasia</i>	
Refractive Structure-from-Motion Through a Flat Refractive Interface	5325
<i>François Chadebecq, Francisco Vasconcelos, George Dwyer, René Lacher, Sébastien Ourselin, Tom Vercauteren, and Danail Stoyanov</i>	
Submodular Trajectory Optimization for Aerial 3D Scanning	5334
<i>Mike Roberts, Shital Shah, Debadeepta Dey, Anh Truong, Sudipta Sinha, Ashish Kapoor, Pat Hanrahan, and Neel Joshi</i>	
Camera Calibration by Global Constraints on the Motion of Silhouettes	5344
<i>Gil Ben-Artzi</i>	
Deltille Grids for Geometric Camera Calibration	5354
<i>Hyowon Ha, Michal Perdoch, Hatem Alismail, In So Kweon, and Yaser Sheikh</i>	
A Lightweight Single-Camera Polarization Compass with Covariance Estimation	5363
<i>Wolfgang Stürzl</i>	
Reflectance Capture Using Univariate Sampling of BRDFs	5372
<i>Zhuo Hui, Kalyan Sunkavalli, Joon-Young Lee, Sunil Hadap, Jian Wang, and Aswin C. Sankaranarayanan</i>	
Estimating Defocus Blur via Rank of Local Patches	5381
<i>Guodong Xu, Yuhui Quan, and Hui Ji</i>	

RGB-Infrared Cross-Modality Person Re-identification	5390
<i>Ancong Wu, Wei-Shi Zheng, Hong-Xing Yu, Shaogang Gong, and Jianhuang Lai</i>	
Intrinsic 3D Dynamic Surface Tracking based on Dynamic Ricci Flow and Teichmüller Map	5400
<i>Xiaokang Yu, Na Lei, Yalin Wang, and Xianfeng Gu</i>	
Multi-scale Deep Learning Architectures for Person Re-identification	5409
<i>Xuelin Qian, Yanwei Fu, Yu-Gang Jiang, Tao Xiang, and Xiangyang Xue</i>	
Range Loss for Deep Face Recognition with Long-Tailed Training Data	5419
<i>Xiao Zhang, Zhiyuan Fang, Yandong Wen, Zhifeng Li, and Yu Qiao</i>	
Face Sketch Matching via Coupled Deep Transform Learning	5429
<i>Shruti Nagpal, Maneet Singh, Richa Singh, Mayank Vatsa, Afzel Noore, and Angshul Majumdar</i>	
Realistic Dynamic Facial Textures from a Single Image Using GANs	5439
<i>Kyle Olszewski, Zimo Li, Chao Yang, Yi Zhou, Ronald Yu, Zeng Huang, Sitao Xiang, Shunsuke Saito, Pushmeet Kohli, and Hao Li</i>	
Pixel Recursive Super Resolution	5449
<i>Ryan Dahl, Mohammad Norouzi, and Jonathon Shlens</i>	
Recurrent Color Constancy	5459
<i>Yanlin Qian, Ke Chen, Jarno Nikkanen, Joni-Kristian Kämäräinen, and Jiri Matas</i>	
Saliency Pattern Detection by Ranking Structured Trees	5468
<i>Lei Zhu, Haibin Ling, Jin Wu, Huiping Deng, and Jin Liu</i>	
Monocular Video-Based Trailer Coupler Detection Using Multiplexer Convolutional Neural Network	5478
<i>Yousef Atoum, Joseph Roth, Michael Bliss, Wende Zhang, and Xiaoming Liu</i>	
Parallel Tracking and Verifying: A Framework for Real-Time and High Accuracy Visual Tracking	5487
<i>Heng Fan and Haibin Ling</i>	
Non-rigid Object Tracking via Deformable Patches Using Shape-Preserved KCF and Level Sets	5496
<i>Xin Sun, Ngai-Man Cheung, Hongxun Yao, and Yiluan Guo</i>	
A Discriminative View of MRF Pre-processing Algorithms	5505
<i>Chen Wang, Charles Herrmann, and Ramin Zabih</i>	
Offline Handwritten Signature Modeling and Verification Based on Archetypal Analysis	5515
<i>Elias N. Zois, Ilias Theodorakopoulos, and George Economou</i>	
Long Short-Term Memory Kalman Filters: Recurrent Neural Estimators for Pose Regularization	5525
<i>Huseyin Coskun, Felix Achilles, Robert DiPietro, Nassir Navab, and Federico Tombari</i>	
Learning Spatio-Temporal Representation with Pseudo-3D Residual Networks	5534
<i>Zhaofan Qiu, Ting Yao, and Tao Mei</i>	
Deeper, Broader and Artier Domain Generalization	5543
<i>Da Li, Yongxin Yang, Yi-Zhe Song, and Timothy M. Hospedales</i>	

Deep Spatial-Semantic Attention for Fine-Grained Sketch-Based Image Retrieval	5552
<i>Jifei Song, Qian Yu, Yi-Zhe Song, Tao Xiang, and Timothy M. Hospedales</i>	
Soft-NMS — Improving Object Detection with One Line of Code	5562
<i>Navaneeth Bodla, Bharat Singh, Rama Chellappa, and Larry S. Davis</i>	
Semantic Jitter: Dense Supervision for Visual Comparisons via Synthetic Images	5571
<i>Aron Yu and Kristen Grauman</i>	
Video Scene Parsing with Predictive Feature Learning	5581
<i>Xiaojie Jin, Xin Li, Huaxin Xiao, Xiaohui Shen, Zhe Lin, Jimei Yang, Yunpeng Chen, Jian Dong, Luoqi Liu, Zequn Jie, Jiashi Feng, and Shuicheng Yan</i>	
Understanding and Mapping Natural Beauty	5590
<i>Scott Workman, Richard Souvenir, and Nathan Jacobs</i>	
Human Pose Estimation Using Global and Local Normalization	5600
<i>Ke Sun, Cuiling Lan, Junliang Xing, Wenjun Zeng, Dong Liu, and Jingdong Wang</i>	
HashNet: Deep Learning to Hash by Continuation	5609
<i>Zhangjie Cao, Mingsheng Long, Jianmin Wang, and Philip S. Yu</i>	
Scaling the Scattering Transform: Deep Hybrid Networks	5619
<i>Edouard Oyallon, Eugene Belilovsky, and Sergey Zagoruyko</i>	
Flip-Invariant Motion Representation	5629
<i>Takumi Kobayashi</i>	
Scene Categorization with Spectral Features	5639
<i>Salman H. Khan, Munawar Hayat, and Fatih Porikli</i>	
Image2song: Song Retrieval via Bridging Image Content and Lyric Words	5650
<i>Xuelong Li, Di Hu, and Xiaoqiang Lu</i>	
Deep Functional Maps: Structured Prediction for Dense Shape Correspondence	5660
<i>Or Litany, Tal Remez, Emanuele Rodolà, Alex Bronstein, and Michael Bronstein</i>	
Training Deep Networks to be Spatially Sensitive	5669
<i>Nicholas Kolkin, Gregory Shakhnarovich, and Eli Shechtman</i>	
3DCNN-DQN-RNN: A Deep Reinforcement Learning Framework for Semantic Parsing of Large-Scale 3D Point Clouds	5679
<i>Fangyu Liu, Shuaipeng Li, Liqiang Zhang, Chenghu Zhou, Rongtian Ye, Yuebin Wang, and Jiwen Lu</i>	
Semi Supervised Semantic Segmentation Using Generative Adversarial Network	5689
<i>Nasim Souly, Concetto Spampinato, and Mubarak Shah</i>	
Efficient Low Rank Tensor Ring Completion	5698
<i>Wenqi Wang, Vaneet Aggarwal, and Shuchin Aeron</i>	
Semantic Image Synthesis via Adversarial Learning	5707
<i>Hao Dong, Simiao Yu, Chao Wu, and Yike Guo</i>	
Unified Deep Supervised Domain Adaptation and Generalization	5716
<i>Saeid Motiian, Marco Piccirilli, Donald A. Adjeroh, and Gianfranco Doretto</i>	
Temporal Context Network for Activity Localization in Videos	5727
<i>Xiyang Dai, Bharat Singh, Guyue Zhang, Larry S. Davis, and Yan Qiu Chen</i>	

Interpretable Transformations with Encoder-Decoder Networks	5737
<i>Daniel E. Worrall, Stephan J. Garbin, Daniyar Turmukhambetov, and Gabriel J. Brostow</i>	
Deep Clustering via Joint Convolutional Autoencoder Embedding and Relative Entropy Minimization	5747
<i>Kamran Ghasedi Dizaji, Amirhossein Herandi, Cheng Deng, Weidong Cai, and Heng Huang</i>	
Deep Scene Image Classification with the MFAFVNet	5757
<i>Yunsheng Li, Mandar Dixit, and Nuno Vasconcelos</i>	
Learning Bag-of-Features Pooling for Deep Convolutional Neural Networks	5766
<i>Nikolaos Passalis and Anastasios Tefas</i>	
Adversarial Examples Detection in Deep Networks with Convolutional Filter Statistics	5775
<i>Xin Li and Fuxin Li</i>	
Joint Prediction of Activity Labels and Starting Times in Untrimmed Videos	5784
<i>Tahmida Mahmud, Mahmudul Hasan, and Amit K. Roy-Chowdhury</i>	
R-C3D: Region Convolutional 3D Network for Temporal Activity Detection	5794
<i>Huijuan Xu, Abir Das, and Kate Saenko</i>	
Localizing Moments in Video with Natural Language	5804
<i>Lisa Anne Hendricks, Oliver Wang, Eli Shechtman, Josef Sivic, Trevor Darrell, and Bryan Russell</i>	
TORNADO: A Spatio-Temporal Convolutional Regression Network for Video Action Proposal	5814
<i>Hongyuan Zhu, Romain Vial, and Shijian Lu</i>	
Tube Convolutional Neural Network (T-CNN) for Action Detection in Videos	5823
<i>Rui Hou, Chen Chen, and Mubarak Shah</i>	
Learning Action Recognition Model from Depth and Skeleton Videos	5833
<i>Hossein Rahmani and Mohammed Bennamoun</i>	
The “Something Something” Video Database for Learning and Evaluating Visual Common Sense	5843
<i>Raghav Goyal, Samira Ebrahimi Kahou, Vincent Michalski, Joanna Materzynska, Susanne Westphal, Heuna Kim, Valentin Haenel, Ingo Freund, Peter Yianilos, Moritz Mueller-Freitag, Florian Hoppe, Christian Thureau, Ingo Bax, and Roland Memisevic</i>	
GPLAC: Generalizing Vision-Based Robotic Skills Using Weakly Labeled Images	5852
<i>Avi Singh, Larry Yang, and Sergey Levine</i>	
Semi-Global Weighted Least Squares in Image Filtering	5862
<i>Wei Liu, Xiaogang Chen, Chuanhua Shen, Zhi Liu, and Jie Yang</i>	
Scale Recovery for Monocular Visual Odometry Using Depth Estimated with Deep Convolutional Neural Fields	5871
<i>Xiaochuan Yin, Xiangwei Wang, Xiaoguo Du, and Qijun Chen</i>	

Machine Learning

Oral Session 9

Deep Adaptive Image Clustering	5880
<i>Jianlong Chang, Lingfeng Wang, Gaofeng Meng, Shiming Xiang, and Chunhong Pan</i>	
One Network to Solve Them All — Solving Linear Inverse Problems Using Deep Projection Models	5889
<i>J. H. Rick Chang, Chun-Liang Li, Barnabás Póczos, and B. V. K. Vijaya Kumar</i>	
Representation Learning by Learning to Count	5899
<i>Mehdi Noroozi, Hamed Pirsiavash, and Paolo Favaro</i>	
StackGAN: Text to Photo-Realistic Image Synthesis with Stacked Generative Adversarial Networks	5908
<i>Han Zhang, Tao Xu, and Hongsheng Li</i>	
Unsupervised Domain Adaptation for Face Recognition in Unlabeled Videos	5917
<i>Kihyuk Sohn, Sifei Liu, Guangyu Zhong, Xiang Yu, Ming-Hsuan Yang, and Manmohan Chandraker</i>	

Additional Paper

The Mapillary Vistas Dataset for Semantic Understanding of Street Scenes	5000
<i>Gerhard Neuhold, Tobias Ollmann, Samuel Rota Bulo and Peter Kotschieder</i>	

Author Index