## 2019 IEEE/CVF International Conference on Computer Vision (ICCV 2019)

Seoul, South Korea 27 October – 2 November 2019

Pages 1-631



**IEEE Catalog Number: ISBN:** 

CFP19198-POD 978-1-7281-4804-5

## 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:
 CFP19198-POD

 ISBN (Print-On-Demand):
 978-1-7281-4804-5

 ISBN (Online):
 978-1-7281-4803-8

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



# 2019 IEEE/CVF International Conference on Computer Vision (ICCV) ICCV 2019

#### **Table of Contents**

Aessage from the General and Program Chairs .cx
019 Organizing Committee .cxi
019 Area Chairs .cxii
019 Reviewers cxiii
Poster 1.1
Deep Learning
TaceForensics++: Learning to Detect Manipulated Facial Images .1
DeepVCP: An End-to-End Deep Neural Network for Point Cloud Registration .12.  Weixin Lu (Baidu ADU), Guowei Wan (Baidu Company), Yao Zhou (Baidu ADT), Xiangyu Fu (Baidu), Pengfei Yuan (Baidu), and Shiyu Song (Baidu ADU)
hape Reconstruction Using Differentiable Projections and Deep Priors .22.  Matheus Gadelha (University of Massachusetts Amherst), Rui Wang (U Massachusetts), and Subhransu Maji (University of Massachusetts.  Amherst)
ine-Grained Segmentation Networks: Self-Supervised Segmentation for Improved Long-Term Visual ocalization 31.
Måns Larsson (Chalmers), Erik Stenborg (Chalmers University), Carl Toft (Chalmers), Lars Hammarstrand (Chalmers university of technology), Torsten Sattler (Chalmers University of Technology), and Fredrik Kahl (Chalmers)
ANet: Scene Agnostic Network for Camera Localization .42  Luwei Yang (Simon Fraser University), Ziqian Bai (Simon Fraser  University), Chengzhou Tang (Simon Fraser University), Honghua Li  (Alibaba A.I. Labs), Yasutaka Furukawa (Simon Fraser University), and  Ping Tan (Simon Fraser University)

Total Denoising: Unsupervised Learning of 3D Point Cloud Cleaning .52
Hierarchical Self-Attention Network for Action Localization in Videos 61.  Rizard Renanda Adhi Pramono (National Taiwan University of Science and Technology), Yie-Tarng Chen (National Taiwan University of Science and Technology), and Wen-Hsien Fang (National Taiwan University of Science and Technology)
Goal-Driven Sequential Data Abstraction 7.1.  Umar Riaz Muhammad (Queen Mary University of London), Yongxin Yang (University of Surrey), Timothy Hospedales (Edinburgh University), Tao Xiang (University of Surrey), and Yi-Zhe Song (University of Surrey)
Jointly Aligning Millions of Images With Deep Penalised Reconstruction Congealing 8.1
Drop to Adapt: Learning Discriminative Features for Unsupervised Domain Adaptation 91
NLNL: Negative Learning for Noisy Labels .101
Adversarial Robustness vs. Model Compression, or Both? 111.  Shaokai Ye (Tsinghua University), Kaidi Xu (Northeastern University),  Sijia Liu (IBM), Hao Cheng (Xi'an Jiaotong University), Jan-Henrik  Lambrechts (Tsinghua University), Huan Zhang (UCLA), Aojun Zhou (Sensetime), Kaisheng Ma (Tsinghua University), Yanzhi Wang (Northeastern University), and Xue Lin (Northeastern University)
On the Design of Black-Box Adversarial Examples by Leveraging Gradient-Free Optimization and Operator Splitting Method .121
DewarpNet: Single-Image Document Unwarping With Stacked 3D and 2D Regression Networks .131
Learning Robust Facial Landmark Detection via Hierarchical Structured Ensemble 141.  Xu Zou (Huazhong University of Science and Technology), Sheng Zhong (Huazhong University of Science and Technology), Luxin Yan (Huazhong University of Science and Technology), Xiangyun Zhao (Northwestern University), Jiahuan Zhou (Northwestern University), and Ying Wu (Northwestern University)
Remote Heart Rate Measurement From Highly Compressed Facial Videos: An End-to-End Deep Learning Solution With Video Enhancement .151

Face-to-Parameter Translation for Game Character Auto-Creation .161.  Tianyang Shi (NetEase Fuxi AI Lab), Yi Yuan (NetEase Fuxi AI Lab), Changjie Fan (NetEase Fuxi AI Lab), Zhengxia Zou (University of Michigan), Zhenwei Shi (Beihang University), and Yong Liu (Zhejiang University)
Visual Deprojection: Probabilistic Recovery of Collapsed Dimensions .1.7.1
StructureFlow: Image Inpainting via Structure-Aware Appearance Flow .181.  Yurui Ren (Shenzhen Graduate School. Peking University), Xiaoming Yu (Peking University), Ruonan Zhang (Peng Cheng LaboratoryArtificial intelligence Research Center), Thomas H Li (Advanced Institute of Information Technology. Peking University), Shan Liu (Tencent America), and Ge Li (SECE. Shenzhen Graduate School. Peking University)
Learning Fixed Points in Generative Adversarial Networks: From Image-to-Image Translation to Disease  Detection and Localization .191
Generative Adversarial Training for Weakly Supervised Cloud Matting .201.  Zhengxia Zou (University of Michigan), Wenyuan Li (Beihang University), Tianyang Shi (NetEase Fuxi AI Lab), Zhenwei Shi (Beihang University), and Jieping Ye (Didi Chuxing & University of Michigan)
PAMTRI: Pose-Aware Multi-Task Learning for Vehicle Re-Identification Using Highly Randomized Synthetic Data .2.11
Generative Adversarial Networks for Extreme Learned Image Compression .221.  Eirikur Agustsson (ETH Zurich), Michael Tschannen (Google Brain), Fabian Mentzer (ETH Zurich), Radu Timofte (ETH Zurich), and Luc Van Gool (ETH Zurich)
Instance-Guided Context Rendering for Cross-Domain Person Re-Identification 232.  Yanbei Chen (Queen Mary University of London), Xiatian Zhu (Vision Semantics Limited), and Shaogang Gong (Queen Mary University of London)
What Else Can Fool Deep Learning? Addressing Color Constancy Errors on Deep Neural Network Performance 243.  Mahmoud Afifi (York University) and Michael Brown (York University)
Beyond Cartesian Representations for Local Descriptors 253

istilling Knowledge From a Deep Pose Regressor Network .263	
stance-Level Future Motion Estimation in a Single Image Based on Ordinal Regression .273	
ision-Infused Deep Audio Inpainting .283	••
AWQ: Hessian AWare Quantization of Neural Networks With Mixed-Precision .293.  Zhen Dong (UC Berkeley), Zhewei Yao (University of California.  Berkeley), Amir Gholami (UC Berkeley), Michael Mahoney (University of California. Berkeley), and Kurt Keutzer (EECS. UC Berkeley)	
valuating Robustness of Deep Image Super-Resolution Against Adversarial Attacks 303.  Jun-Ho Choi (Yonsei University), Huan Zhang (UCLA), Jun-Hyuk Kim  (Yonsei University), Cho-Jui Hsieh (UCLA), and Jong-Seok Lee (Yonsei  University. Korea)	. • •
vercoming Catastrophic Forgetting With Unlabeled Data in the Wild .312	
ymmetric Cross Entropy for Robust Learning With Noisy Labels .322	•••
ew-Shot Learning With Embedded Class Models and Shot-Free Meta Training .331	•••
ual Directed Capsule Network for Very Low Resolution Image Recognition .3.40	· • •
ecognizing Part Attributes With Insufficient Data .350	••
SIP: Unsupervised Stable Interest Point Detection From 3D Point Clouds .361.  Jiaxin Li (National University of Singapore) and Gim Hee Lee (National University of Singapore)	••
Sixed High-Order Attention Network for Person Re-Identification .3.7.1	

Budget-Aware Adapters for Multi-Domain Learning .382
Compact Trilinear Interaction for Visual Question Answering 392
Fowards Latent Attribute Discovery From Triplet Similarities .402
GeoStyle: Discovering Fashion Trends and Events 411.  Utkarsh Mall (Cornell University), Kevin Matzen (Facebook), Bharath  Hariharan (Cornell University), Noah Snavely (Cornell University and  Google AI), and Kavita Bala (Cornell)
Fowards Adversarially Robust Object Detection .421
Recognition
Automatic and Robust Skull Registration Based on Discrete Uniformization .431
Few-Shot Image Recognition With Knowledge Transfer .441.  Zhimao Peng (Nanjing University of Science and Technology), Zechao Li  (Nanjing University of Science and Technology), Junge Zhang (CASIA),  Yan Li (Institute of Automation. Chinese Academy of Sciences), Guo-Jun  Qi (Futurewei Technologies), and Jinhui Tang (Nanjing University of  Science and Technology)
Fine-Grained Action Retrieval Through Multiple Parts-of-Speech Embeddings .450.  Michael Wray (University of Bristol), Gabriela Csurka (Naver Labs  Europe), Diane Larlus (Naver Labs Europe), and Dima Damen (University  of Bristol)
Vehicle Re-Identification in Aerial Imagery: Dataset and Approach .460.  Peng Wang (Northwestern Polytechnical University), Bingliang Jiao (Northwestern Polytechnical University), Lu Yang (Northwestern Polytechnical University), Yifei Yang (Northwestern Polytechnical University), Shizhou Zhang (NorthWestern Polytechnical University), Wei Wei (Northwestern Polytechnical University), and Yanning Zhang (Northwestern Polytechnical University)
Bridging the Domain Gap for Ground-to-Aerial Image Matching .4.7.0
A Robust Learning Approach to Domain Adaptive Object Detection .480

Graph-Based Object Classification for Neuromorphic Vision Sensing 491.  Yin Bi (University College London), Aaron Chadha (University College London), Alhabib Abbas (University College London), Eirina Bourtsoulatze (University College London), and Yiannis Andreopoulos (University College London)
Gaussian YOLOv3: An Accurate and Fast Object Detector Using Localization Uncertainty for Autonomous Driving .502
Jiwoong Choi (Seoul National University), Dayoung Chun (Seoul National University), Hyun Kim (Seoul National University of Science and Technology), and Hyuk-Jae Lee (SNU)
Sharpen Focus: Learning With Attention Separability and Consistency 5.12  Lezi Wang (Rutgers), Ziyan Wu (Siemens Corporation), Srikrishna  Karanam (Siemens Corporate Technology. Princeton), Kuan-Chuan Peng (Siemens Corporation), Rajat Vikram Singh (Siemens Corporation), Bo  Liu (Rutgers University), and Dimitris Metaxas (Rutgers)
Learning Semantic-Specific Graph Representation for Multi-Label Image Recognition .522
DeceptionNet: Network-Driven Domain Randomization 532.  Sergey Zakharov (TU Munich / Siemens Corporate Technology), Wadim Kehl (Toyota Research Institute), and Slobodan Ilic (TUM)
Pose-Guided Feature Alignment for Occluded Person Re-Identification .542  Jiaxu Miao (University of Technology Sydney), Yu Wu (University of Technology Sydney), Ping Liu (UTS), Yuhang Ding (University of Technology. Sydney), and Yi Yang (UTS)
Robust Person Re-Identification by Modelling Feature Uncertainty .552.  Tianyuan Yu (University of Surrey), Da Li (QMUL), Yongxin Yang (University of Edinburgh), Timothy Hospedales (Edinburgh University), and Tao Xiang (University of Surrey)
Co-Segmentation Inspired Attention Networks for Video-Based Person Re-Identification .562
A Delay Metric for Video Object Detection: What Average Precision Fails to Tell <u>5.7.3.</u> Huizi Mao (stanford university), Xiaodong Yang (NVIDIA Research), and Bill Dally (stanford university)
IL2M: Class Incremental Learning With Dual Memory .583

### Segmentation, Grouping, & Shape

Asymmetric Non-Local Neural Networks for Semantic Segmentation 593.  Zhen Zhu (Huazhong University of Science and Technology), Mengdu Xu (Huazhong University of Science and Technology), Song Bai (University of Oxford), Tengteng Huang (Huazhong University of Science and Technology), and Xiang Bai (Huazhong University of Science and Technology)
CCNet: Criss-Cross Attention for Semantic Segmentation .603.  Zilong Huang (Huazhong Univ. of Science and Technology), Xinggang Wang (Huazhong University of Science and Technology), Lichao Huang (Horizon Robotics), Chang Huang (Horizon Robotics), Yunchao Wei (UIUC), and Wenyu Liu (Huazhong University of Science and Technology)
Convex Shape Prior for Multi-Object Segmentation Using a Single Level Set Function .6.13.  Shousheng Luo (Beijing Computational Science Research Center),  Xue-Cheng Tai (Hong Kong Baptist University), Limei Huo (Henan  University), Yang Wang (HKUST), and Roland Glowinski (University of  Houston)
Feature Weighting and Boosting for Few-Shot Segmentation .622.  Khoi Nguyen (Oregon State University) and Sinisa Todorovic (Oregon State U)
Surface Networks via General Covers .632  Niv Haim (Weizmann Institute of Science), Nimrod Segol (Weizmann Institute of Science), Heli Ben-Hamu (Weizmann Institute of Science), Haggai Maron (Weizmann Institute of Science), and Yaron Lipman (Weizmann Institute of Science)
SSAP: Single-Shot Instance Segmentation With Affinity Pyramid .642.  Naiyu Gao (Institue of Automation. Chinese Academy of Sciences;  University of Chinese Academy of Sciences), Yanhu Shan (Horizon Robotics), Yupei Wang (Institue of Automation. Chinese Academy of Sciences; University of Chinese Academy of Sciences), Xin Zhao (Institute of Automation. Chinese Academy of Sciences), Yinan Yu (Horizon Robotics), Ming Yang (Horizon Robotics), and Kaiqi Huang (Institute of Automation. Chinese Academy of Sciences)
Learning Propagation for Arbitrarily-Structured Data .652  Sifei Liu (NVIDIA), Xueting Li (University of California Merced),  Varun Jampani (Nvidia Research), Shalini Mello (NVIDIA Research), and  Jan Kautz (NVIDIA)
MultiSeg: Semantically Meaningful, Scale-Diverse Segmentations From Minimal User Input .662
Robust Motion Segmentation From Pairwise Matches .6.71
InstaBoost: Boosting Instance Segmentation via Probability Map Guided Copy-Pasting .682

#### Face & Body

Racial Faces in the Wild: Reducing Racial Bias by Information Maximization Adaptation Network .692  Mei Wang (Beijing University of Posts and Telecommunications), Weihong  Deng (Beijing University of Posts and Telecommunications), Jiani Hu  (Beijing University of Posts and Telecommunications), Xunqiang Tao  (Canon Information Technology. Beijing Co Ltd), and Yaohai Huang  (Canon Information Technology. Beijing Co Ltd)
Uncertainty Modeling of Contextual-Connections Between Tracklets for Unconstrained Video-Based Face Recognition .703
Spatio-Temporal Fusion Based Convolutional Sequence Learning for Lip Reading .7.13
Occlusion-Aware Networks for 3D Human Pose Estimation in Video .723
Context-Aware Feature and Label Fusion for Facial Action Unit Intensity Estimation With Partially Labeled Data .733
Distill Knowledge From NRSfM for Weakly Supervised 3D Pose Learning .743
MONET: Multiview Semi-Supervised Keypoint Detection via Epipolar Divergence .753
Talking With Hands 16.2M: A Large-Scale Dataset of Synchronized Body-Finger Motion and Audio for Conversational Motion Analysis and Synthesis .763
Occlusion Robust Face Recognition Based on Mask Learning With Pairwise Differential Siamese Network .7.7.  Lingxue Song (Tsinghua University), Dihong Gong (Tencent AI Lab),  Zhifeng Li (Tencent AI Lab), Changsong Liu (Tsinghua University), and  Wei Liu (Tencent)
Teacher Supervises Students How to Learn From Partially Labeled Images for Facial Landmark Detection.783.  Xuanyi Dong (UTS) and Yi Yang (UTS)

A2J: Anchor-to-Joint Regression Network for 3D Articulated Pose Estimation From a Single Depth Image.793. Fu Xiong (Huazhong University of Science and Technology), Boshen Zhang (School of Artificial Intelligence and Automation. HUST), Yang Xiao (Huazhong Univ. of Sci.&Tech.), Zhiguo Cao (Huazhong Univ. of Sci.&Tech.), Taidong Yu (Huazhong University of Science and Technology), Joey Tianyi Zhou (IHPC. ASTAR), and Junsong Yuan (State University of New York at Buffalo. USA)
TexturePose: Supervising Human Mesh Estimation With Texture Consistency .803
FreiHAND: A Dataset for Markerless Capture of Hand Pose and Shape From Single RGB Images .8.13
Markerless Outdoor Human Motion Capture Using Multiple Autonomous Micro Aerial Vehicles .823  Nitin Saini (Max Planck Institute for Intelligent Systems), Eric Price (Max Planck Institute for Intelligent Systems), Rahul Tallamraju (Max Planck Institute for Intelligent Systems), Raffi Enficiaud (Max Planck Institute for Intelligent Systems), Roman Ludwig (Max Planck Institute for Intelligent Systems), Igor Martinovic (Max Planck Institute for Intelligent Systems), Aamir Ahmad (Max Planck Institute for Intelligent Systems), and Michael Black (Max Planck Institute for Intelligent Systems)
Action & Video
Toyota Smarthome: Real-World Activities of Daily Living .833 Srijan Das (INRIA), Rui Dai (INRIA), Michal Koperski (INRIA), Luca Minciullo (Toyota-Europe), Lorenzo Garattoni (Toyota-Europe), Francois Bremond (Inria Sophia Antipolis. France), and Gianpiero Francesca (Toyota-Europe)
Relation Parsing Neural Network for Human-Object Interaction Detection .843.  Penghao Zhou (Fudan university) and Mingmin Chi (Fudan university)
DistInit: Learning Video Representations Without a Single Labeled Video .852.  Rohit Girdhar (Carnegie Mellon University), Du Tran (Facebook Research), Lorenzo Torresani (Facebook AI Research), and Deva Ramanan (Carnegie Mellon University)
Zero-Shot Anticipation for Instructional Activities .862
Making the Invisible Visible: Action Recognition Through Walls and Occlusions .8.72

Recursive Visual Sound Separation Using Minus-Plus Net .882
Motion & Tracking
Unsupervised Video Interpolation Using Cycle Consistency .892  Fitsum Reda (NVIDIA), Deqing Sun (Google), Aysegul Dundar (NVIDIA),  Mohammad Shoeybi (NVIDIA), Guilin Liu (NVIDIA), Kevin Shih (NVIDIA),  Andrew Tao (NVIDIA), Jan Kautz (NVIDIA), and Bryan Catanzaro (NVIDIA)
Deformable Surface Tracking by Graph Matching 901.  Tao Wang (Beijing Jiaotong University), Haibin Ling (Temple University), Congyan Lang (Beijing Jiaotong University), Songhe Feng (School of Computer and Information Technology. Beijing Jiaotong University), and Xiaohui Hou (HiScene)
Deep Meta Learning for Real-Time Target-Aware Visual Tracking .9.11.  Janghoon Choi (Seoul National University), Junseok Kwon (Chung-Ang Univ Korea), and Kyoung Mu Lee (Seoul National University)
Looking to Relations for Future Trajectory Forecast .921.  Chiho Choi (Honda Research Institute US) and Behzad Dariush (Honda Research Institute US)
Anchor Diffusion for Unsupervised Video Object Segmentation .931.  Zhao Yang (University of Oxford), Qiang Wang (CASIA), Luca Bertinetto (University of Oxford), Song Bai (University of Oxford), Weiming Hu (Institute of AutomationChinese Academy of Sciences), and Philip Torr (University of Oxford)
Tracking Without Bells and Whistles .941.  Philipp Bergmann (Technical University of Munich), Tim Meinhardt  (TUM), and Laura Leal-Taixé (TUM)
Scene Understanding
Perspective-Guided Convolution Networks for Crowd Counting .952.  Zhaoyi Yan (Harbin Institute of Technology), Yuchen Yuan (Baidu Inc.),  Wangmeng Zuo (Harbin Institute of Technology. China), Xiao Tan (Baidu Inc.), Yezhen Wang (Harbin Institute of Technology), Shilei Wen (Baidu Research), and Errui Ding (Baidu Inc.)
End-to-End Wireframe Parsing 962  Yichao Zhou (UC Berkeley), Haozhi Qi (UC Berkeley), and Yi Ma (UC Berkeley)
Incremental Class Discovery for Semantic Segmentation With RGBD Sensing 9.7.2

SSF-DAN: Separated Semantic Feature Based Domain Adaptation Network for Semantic Segmentation Liang Du (Fudan University), Jingang Tan (SIMIT), Hongye Yang (SIMIT), Jianfeng Feng (Fudan University), Xiangyang Xue (Fudan University), Qibao Zheng (Fudan University), Xiaoqing Ye (SIMIT), and Xiaolin Zhang (SIMIT)	on .9&2
SpaceNet MVOI: A Multi-View Overhead Imagery Dataset .992	
Multi-Level Bottom-Top and Top-Bottom Feature Fusion for Crowd Counting 1002	
Learning Lightweight Lane Detection CNNs by Self Attention Distillation .1013.  Yuenan Hou (The Chinese University of Hong Kong), Zheng Ma (SenseTime Research), Chunxiao Liu (SenseTime Research), and Chen Change Loy (Nanyang Technological University)	
SplitNet: Sim2Sim and Task2Task Transfer for Embodied Visual Navigation 1022.  Daniel Gordon (University of Washington), Abhishek Kadian (Facebook AI Research), Devi Parikh (Georgia Tech & Facebook AI Research), Judy Hoffman (Facebook AI Research and Georgia Tech), and Dhruv Batra	
(Georgia Tech & Facebook AI Research)	
(Georgia Tech & Facebook AI Research)  3D From Multiview & Sensors	
3D From Multiview & Sensors  Cascaded Parallel Filtering for Memory-Efficient Image-Based Localization 1032  Wentao Cheng (Nanyang Technological University), Weisi Lin (Nanyang Technological University. Singapore), Kan Chen (Fraunhofer Singapore),	
3D From Multiview & Sensors  Cascaded Parallel Filtering for Memory-Efficient Image-Based Localization 1032	
3D From Multiview & Sensors  Cascaded Parallel Filtering for Memory-Efficient Image-Based Localization .1032.  Wentao Cheng (Nanyang Technological University), Weisi Lin (Nanyang Technological University. Singapore), Kan Chen (Fraunhofer Singapore), and Xinfeng Zhang (City University of Hong Kong)  Pixel2Mesh++: Multi-View 3D Mesh Generation via Deformation .1042.  Chao Wen (Fudan University), Yinda Zhang (Google LLC), Zhuwen Li (Nuro), and Yanwei Fu (Fudan University)  A Differential Volumetric Approach to Multi-View Photometric Stereo .1052.  Fotios Logothetis (cambridge university), Roberto Mecca (Toshiba	

QUARCH: A New Quasi-Affine Reconstruction Stratum From Vague Relative Camera Orientation Knowledge 1082
Devesh Adlakha (University of Strasbourg), Adlane Habed (University of
Strasbourg), Fabio Morbidi (University of Picardie Jules vernes),
Cedric Demonceaux (Univ. Bourgogne Franche-Comte. France), and Michel De Mathelin (University of Strasbourg)
Homography From Two Orientation- and Scale-Covariant Features .1091
Applications. Medical, & Robotics
Hiding Video in Audio via Reversible Generative Models .1.100
GSLAM: A General SLAM Framework and Benchmark .1.110.
Yong Zhao (Northwestern Polytechnical University), Shibiao Xu
(Institute of Automation. Chinese Academy of Sciences), Shuhui Bu
(Northwestern Polytechnical University), Hongkai Jiang (Northwestern Polytechnical University), and Pengcheng Han (Northwestern
Polytechnical University)
Elaborate Monocular Point and Line SLAM With Robust Initialization 1121
Sang Jun Lee (Handong Global University) and Sung Soo Hwang (Handong Global University)
Adaptive Density Map Generation for Crowd Counting .1.130.
Jia Wan (City University of Hong Kong) and Antoni Chan (City
University of Hong Kong. Hong. Kong)
Attention-Aware Polarity Sensitive Embedding for Affective Image Retrieval .1.140
Xingxu Yao (Nankai University), Dongyu She (Nankai University),
Sicheng Zhao (University of California Berkeley), Jie Liang (Nankai
University), Yu-Kun Lai (Cardiff University), and Jufeng Yang (Nankai University)
Zero-Shot Emotion Recognition via Affective Structural Embedding .1.1.5.1
Chi Zhan (Nankai University), Dongyu She (Nankai University), Sicheng
Zhao (University of California Berkeley), Ming-Ming Cheng (Nankai
University), and Jufeng Yang (Nankai University)
FW-GAN: Flow-Navigated Warping GAN for Video Virtual Try-On .1161.
Haoye Dong (Sun Yat-sen University), Xiaodan Liang (Sun Yat-sen
University), Xiaohui Shen (ByteDance AI Lab), Bowen Wu (Sun Yat-sen
University), Bing-Cheng Chen (Sun Yat-sen University), and Jian Yin (Sun Yat-Sen University)
Interactive Sketch & Fill: Multiclass Sketch-to-Image Translation 1171
Arnab Ghosh (University of Oxford), Richard Zhang (Adobe), Puneet Dokania (University of Oxford), Oliver Wang (Adobe Systems Inc),
Alexei Efros (UC Berkeley), Philip Torr (University of Oxford), and
Eli Shechtman (Adobe Research. US)

Attention-Based Autism Spectrum Disorder Screening With Privileged Modality 1.18.1
Shi Chen (University of Minnesota) and Qi Zhao (University of Minnesota)
Image Aesthetic Assessment Based on Pairwise Comparison - A Unified Approach to Score Regression, Binary Classification, and Personalization .1191.
Jun-Tae Lee (Korea University) and Chang-Su Kim (Korea university)
Delving Into Robust Object Detection From Unmanned Aerial Vehicles: A Deep Nuisance Disentanglement Approach .1201
Zhenyu Wu (Texas A&M University), Karthik Suresh (Texas A&M University), Priya Narayanan (U.S. Army Research Laboratory), Hongyu
Xu (University of Maryland), Heesung Kwon (U.S. Army Research Laboratory), and Zhangyang Wang (TAMU)
Bit-Flip Attack: Crushing Neural Network With Progressive Bit Search .121.1
Adnan Siraj Rakin (University of Central Florida), Zhezhi He
(University of Central Florida), and Deliang Fan (Arizona State University)
Pushing the Frontiers of Unconstrained Crowd Counting: New Dataset and Benchmark Method .1221
Vishwanath Sindagi (Johns Hopkins University), Rajeev Yasarla (Johns
Hopkins University. Whiting School of Engineering), and Vishal Patel (Johns Hopkins University)
Employing Deep Part-Object Relationships for Salient Object Detection .1232
Yi Liu (Xidian University), Qiang Zhang (Xidian University), Dingwen
Zhang (Xidian University), and Jungong Han (Lancaster University)
Self-Supervised Deep Depth Denoising 1242.
Vladimiros Sterzentsenko (CERTH), Leonidas Saroglou (CERTH), Anargyros Chatzitofis (CERTH), Spiros Thermos (CERTH), Nikolaos Zioulis (CERTH /
CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS), Alexandros Doumanoglou
(CERTH), Dimitrios Zarpalas (CERTH / CENTRE FOR RESEARCH AND
TECHNOLOGY HELLAS), and Petros Daras (ITI-CERTH. Greece)
Cost-Aware Fine-Grained Recognition for IoTs Based on Sequential Fixations .1252
Hanxiao Wang (Boston University), Venkatesh Saligrama (Boston
University), Stan Sclaroff (Boston University), and Vitaly Ablavsky (Boston University)
Layout-Induced Video Representation for Recognizing Agent-in-Place Actions .1262.
Ruichi Yu (Waymo LLC.), Hongcheng Wang (Comcast), Ang Li (DeepMind.
Mountain View), Jingxiao Zheng (University of Maryland. College Park), Vlad Morariu (Adobe Research), and Larry Davis (University of
Maryland)
Anomaly Detection in Video Sequence With Appearance-Motion Correspondence .1273
Trong reguyen reguyen (Omversuy of monneu) and Jean meanier (Canada)

#### Oral 1.2A

#### **Architectures, Multi-Task Learning, Domain Adaptation**

Exploring Randomly Wired Neural Networks for Image Recognition .1284	
Progressive Differentiable Architecture Search: Bridging the Depth Gap Between Search and Evalu Xin Chen (Tongji University), Lingxi Xie (Huawei Noah's Ark Lab), Jun Wu (Tongji University), and Qi Tian (Huawei Noah's Ark Lab)	ation.129.4
Multinomial Distribution Learning for Effective Neural Architecture Search .1304.  Xiawu Zheng (Xiamen University), Rongrong Ji (Xiamen University.  China), Lang Tang (Xiamen University. China), Baochang Zhang (Beihang  University), Jianzhuang Liu (Huawei Noah's Ark Lab), and Qi Tian  (Huawei Noah's Ark Lab)	
Searching for MobileNetV3 1314	
Data-Free Quantization Through Weight Equalization and Bias Correction .1325	
A Camera That CNNs: Towards Embedded Neural Networks on Pixel Processor Arrays .1335  Laurie Bose (University of Bristol), Piotr Dudek (School of Electrical and Electronic Engineering. The University of Manchester. UK), Jianing Chen (The University of Manchester), Stephen Carey (The University of Manchester), and Walterio Mayol-Cuevas (Bristol University)	
Knowledge Distillation via Route Constrained Optimization 1345.  Xiao Jin (Sensetime Group Limited), Baoyun Peng (National University of Defense Technology), Yichao Wu (Sensetime Group Limited), Yu Liu (The Chinese University of Hong Kong), Jiaheng Liu (Beihang University), Ding Liang (Sensetime Group Limited), Junjie Yan (Sensetime Group Limited), and Xiaolin Hu (Tsinghua University)	
Distillation-Based Training for Multi-Exit Architectures .1355.  Mary Phuong (IST Austria) and Christoph Lampert (IST Austria)	
Similarity-Preserving Knowledge Distillation .1365	
Many Task Learning With Task Routing .1375	
Stochastic Filter Groups for Multi-Task CNNs: Learning Specialist and Generalist Convolution Ker Felix Bragman (University College London), Ryutaro Tanno (University College London), Sebastien Ourselin (King's College London), Daniel Alexander (University College London), and Jorge Cardoso (Kings College London)	nels.1385.

Transferability and Hardness of Supervised Classification Tasks .1395
Moment Matching for Multi-Source Domain Adaptation 1406.  Xingchao Peng (Boston University), Qinxun Bai (Boston University), Xide Xia (Boston University), Zijun Huang (Columbia University), Kate
Saenko (Boston University), and Bo Wang (Vector Institute)
Unsupervised Domain Adaptation via Regularized Conditional Alignment .1416
Larger Norm More Transferable: An Adaptive Feature Norm Approach for Unsupervised Domain Adaptation
1426
Ruijia Xu (Sun Yat-sen University), Guanbin Li (Sun Yat-sen
University), Jihan Yang (Sun Yat-sen University), and Liang Lin (Sun Yat-sen University)
• *
UM-Adapt: Unsupervised Multi-Task Adaptation Using Adversarial Cross-Task Distillation .1436
(Indian Institute of Science), and Venkatesh Babu Radhakrishnan (Indian Institute of Science)
Episodic Training for Domain Generalization .1446.
Da Li (QMUL), Jianshu Zhang (University of Science and Technology of
China), Yongxin Yang (University of Edinburgh), Cong Liu (iFLYTEK
Research), Yi-Zhe Song (University of Surrey), and Timothy Hospedales
(Edinburgh University)
Domain Adaptation for Structured Output via Discriminative Patch Representations .1456
Yi-Hsuan Tsai (NEC Labs America), Kihyuk Sohn (Google Cloud AI),
Samuel Schulter (NEC Labs), and Manmohan Chandraker (NEC Labs America)
Semi-Supervised Learning by Augmented Distribution Alignment .1466.  Qin Wang (ETH Zurich), Wen Li (ETHZ), and Luc Van Gool (ETH Zurich)
S4L: Self-Supervised Semi-Supervised Learning .1476.
Lucas Beyer (Google Brain), Xiaohua Zhai (Google Brain), Avital Oliver
(Google Brain), and Alexander Kolesnikov (Google Brain)
Oral 1.2B
Multi-View Geometry, 3D Scene Understanding
Privacy Preserving Image Queries for Camera Localization .1486  Pablo Speciale (ETH Zurich), Johannes Schönberger (Microsoft), Sudipta Sinha (Microsoft Research), and Marc Pollefeys (ETH Zurich / Microsoft)
Calibration Wizard: A Guidance System for Camera Calibration Based on Modelling Geometric and Corner
Uncertainty .1497.
Songyou Peng (ETH Zurich) and Peter Sturm (INRIA Grenoble Rhone-Alpes)
. ,
Gated2Depth: Real-Time Dense Lidar From Gated Images 1506.
Tobias Gruber (Daimler AG), Frank Julca-Aguilar (Algolux), Mario Bijelic (Daimler AG), and Felix Heide (Princeton University)
Dijene (Dannet AO), and Fens Heme (Finction Oniversity)

X-Section: Cross-Section Prediction for Enhanced RGB-D Fusion .1517	
Learning an Event Sequence Embedding for Dense Event-Based Deep Stereo 1527	••••
Point-Based Multi-View Stereo Network .1538.  Rui Chen (Tsinghua University), Songfang Han (HKUST), Jing Xu (Tsinghua University), and Hao Su (UCSD)	
Discrete Laplace Operator Estimation for Dynamic 3D Reconstruction .1548.  Xiangyu Xu (STEVENS INSTITUTE OF TECHNOLOGY) and Enrique Dunn (Stevens Institute of Technology)	••••
Deep Non-Rigid Structure From Motion .1558.  Chen Kong (CMU) and Simon Lucey (CMU)	•••••
Equivariant Multi-View Networks .1568	
Interpolated Convolutional Networks for 3D Point Cloud Understanding .1578.  Jiageng Mao (The Chinese University of Hong Kong), Xiaogang Wang (Chinese University of Hong Kong. Hong Kong), and Hongsheng Li (Chinese University of Hong Kong)	
Revisiting Point Cloud Classification: A New Benchmark Dataset and Classification Model on Real-World Data 1588.  Mikaela Angelina Uy (Hong Kong University of Science and Technology), Quang-Hieu Pham (Singapore University of Technology and Design), Binh-Son Hua (The University of Tokyo), Thanh Nguyen (Deakin University. Australia), and Sai-Kit Yeung (Hong Kong University of Science and Technology)	
PointCloud Saliency Maps .1598.  Tianhang Zheng (University of Toronto), Changyou Chen (University at Buffalo), Junsong Yuan (State University of New York at Buffalo. USA), Bo Li (Zhejiang University), and Kui Ren (Zhejiang University)	•••••
ShellNet: Efficient Point Cloud Convolutional Neural Networks Using Concentric Shells Statistics .1607.  Zhiyuan Zhang (Singapore University of Technology and Design),  Binh-Son Hua (The University of Tokyo), and Sai-Kit Yeung (Hong Kong  University of Science and Technology)	••••
Unsupervised Deep Learning for Structured Shape Matching .161.7	
Linearly Converging Quasi Branch and Bound Algorithms for Global Rigid Registration .1628	
Consensus Maximization Tree Search Revisited .1637	

Quasi-Globally Optimal and Efficient Vanishing Point Estimation in Manhattan World .1646
An Efficient Solution to the Homography-Based Relative Pose Problem With a Common Reference Direction .1655
A Quaternion-Based Certifiably Optimal Solution to the Wahba Problem With Outliers .1665
PLMP - Point-Line Minimal Problems in Complete Multi-View Visibility .1675
Poster 1.2
Deep Learning
Variational Few-Shot Learning .1685  Jian Zhang (Shanghai Jiaotong University), Chenglong Zhao (Shanghai  Jiao Tong University), Bingbing Ni (Shanghai Jiao Tong University),  Minghao Xu (Shanghai Jiaotong University), and Xiaokang Yang (Shanghai  Jiao Tong University of China)
Generative Adversarial Minority Oversampling .1695
(Indian Statistical Institute), and Swagatam Das (Indian Statistical Institute)
Memorizing Normality to Detect Anomaly: Memory-Augmented Deep Autoencoder for Unsupervised Anomaly Detection .1705
Copological Map Extraction From Overhead Images .17.15
Exploiting Temporal Consistency for Real-Time Video Depth Estimation .1.7.25.  Haokui Zhang (Northwestern Polytechnical University), Ying Li (Northwestern Polytechnical University), Yuanzhouhan Cao (The University of Adelaide), Yu Liu (The University of Adelaide), Chunhua Shen (University of Adelaide), and Youliang Yan (Huawei)

The Sound of Motions .1.735.
Hang Zhao (MIT), Chuang Gan (MIT-Watson AI Lab), Wei-Chiu Ma (MIT), and Antonio Torralba (MIT)
SC-FEGAN: Face Editing Generative Adversarial Network With User's Sketch and Color 17.45
Exploring Overall Contextual Information for Image Captioning in Human-Like Cognitive Style .1.7.5.4  Hongwei Ge (Dalian University of Technology), Zehang Yan (Dalian University of Technology), Kai Zhang (Dalian University of Technology), Mingde Zhao (Mila. McGill University), and Liang Sun (Dalian University of Technology)
Order-Aware Generative Modeling Using the 3D-Craft Dataset .1764
Crowd Counting With Deep Structured Scale Integration Network .1.7.7.4.  Lingbo Liu (Sun Yat-sen University), Zhilin Qiu (Sun Yat-sen University), Guanbin Li (Sun Yat-sen University), Shufan Liu (The University of Sydney), Wanli Ouyang (The University of Sydney), and Liang Lin (Sun Yat-sen University)
Bidirectional One-Shot Unsupervised Domain Mapping .1.7.84
Evolving Space-Time Neural Architectures for Videos .1.793  Aj Piergiovanni (Indiana University), Anelia Angelova (Google),  Alexander Toshev (Google), and Michael Ryoo (Google Brain; Indiana  University)
Universally Slimmable Networks and Improved Training Techniques .1803.  Jiahui Yu (UIUC) and Thomas Huang (UIUC)
AutoDispNet: Improving Disparity Estimation With AutoML .1812
Deep Meta Functionals for Shape Representation .1824
Differentiable Kernel Evolution .1834  Yu Liu (The Chinese University of Hong Kong), Jihao Liu (Sensetime),  Xiaogang Wang (Chinese University of Hong Kong. Hong Kong), and Ailing  Zeng (CUHK)
Batch Weight for Domain Adaptation With Mass Shift .1844.  Mikolaj Binkowski (Imperial College London), Devon Hjelm (Microsoft Research), and Aaron Courville (MILA. Université de Montréal)

SRM: A Style-Based Recalibration Module for Convolutional Neural Networks .1854
Switchable Whitening for Deep Representation Learning .1863.  Xingang Pan (The Chinese University of Hong Kong), Xiaohang Zhan (The Chinese University of Hong Kong), Jianping Shi (Sensetime Group Limited), Xiaoou Tang (The Chinese University of Hong Kong), and Ping Luo (The Chinese University of Hong Kong)
Adaptative Inference Cost With Convolutional Neural Mixture Models .1872
On Network Design Spaces for Visual Recognition .1882
Improved Techniques for Training Adaptive Deep Networks .1891
Resource Constrained Neural Network Architecture Search: Will a Submodularity Assumption Help? .1901  Yunyang Xiong (University of Wisconsin-Madison), Ronak Mehta (University of Wisconsin-Madison), and Vikas Singh (University of Wisconsin-Madison USA)
ACNet: Strengthening the Kernel Skeletons for Powerful CNN via Asymmetric Convolution Blocks .19.1  Xiaohan Ding (Tsinghua University), Yuchen Guo (Tsinghua University),  Guiguang Ding (Tsinghua University. China), and Jungong Han (Lancaster University)
A Comprehensive Overhaul of Feature Distillation .1921
Recognition
Transferable Semi-Supervised 3D Object Detection From RGB-D Data .1931
DPOD: 6D Pose Object Detector and Refiner .1941
STD: Sparse-to-Dense 3D Object Detector for Point Cloud .1951  Zetong Yang (Tencent), Yanan Sun (Tencent), Shu Liu (Tencent),  Xiaoyong Shen (Tencent), and Jiaya Jia (Chinese University of Hong  Kong)

DUP-Net: Denoiser and Upsampler Network for 3D Adversarial Point Clouds Defense .1961
Learning Rich Features at High-Speed for Single-Shot Object Detection .197.1
Detecting Unseen Visual Relations Using Analogies .1981
Disentangling Monocular 3D Object Detection .1991.  Andrea Simonelli (Mapillary Research), Samuel Rota Bulò (Mapillary Research), Lorenzo Porzi (Mapillary Research), Manuel Lopez-Antequera (Mapillary), and Peter Kontschieder (Mapillary Research)
STM: SpatioTemporal and Motion Encoding for Action Recognition 2000.  Boyuan Jiang (Zhejiang University), Mengmeng Wang (SenseTime Group Limited), Weihao Gan (SenseTime Group Limited), Wei Wu (SenseTime Group Limited), and Junjie Yan (Sensetime Group Limited)
Dynamic Context Correspondence Network for Semantic Alignment 2010.  Shuaiyi Huang (ShanghaiTech University), Qiuyue Wang (Northwestern  Polytechnical University), Songyang Zhang (ShanghaiTech University),  Shipeng Yan (ShanghaiTech University), and Xuming He (ShanghaiTech  University)
Fooling Network Interpretation in Image Classification 2020.  Akshayvarun Subramanya (UMBC), Vipin Pillai (UMBC), and Hamed  Pirsiavash (UMBC)
Unconstrained Foreground Object Search 2030.  Yinan Zhao (University of Texas at Austin), Brian Price (Adobe), Scott Cohen (Adobe Research), and Danna Gurari (University of Texas at Austin)
Embodied Amodal Recognition: Learning to Move to Perceive Objects 2040.  Jianwei Yang (Georgia Institute of Technology), Zhile Ren (Georgia Institute of Technology), Mingze Xu (Indiana University), Xinlei Chen (Facebook AI Research), David Crandall (Indiana University), Devi Parikh (Georgia Tech & Facebook AI Research), and Dhruv Batra (Georgia Tech & Facebook AI Research)
SpatialSense: An Adversarially Crowdsourced Benchmark for Spatial Relation Recognition 2051

TensorMask: A Foundation for Dense Object Segmentation .2061.  Xinlei Chen (Facebook AI Research), Ross Girshick (FAIR), Kaiming He (Facebook AI Research), and Piotr Dollar (FAIR)  Integral Object Mining via Online Attention Accumulation .2070.
Peng-Tao Jiang (Nankai University), Qibin Hou (Nankai University), Yang Cao (Nankai University), Ming-Ming Cheng (Nankai University), Yunchao Wei (UIUC), and Hongkai Xiong (Shanghai Jiao Tong University)
Segmentation, Grouping, & Shape
Accelerated Gravitational Point Set Alignment With Altered Physical Laws 2080.  Vladislav Golyanik (MPI), Christian Theobalt (MPI Informatik), and Didier Stricker (DFKI)
Domain Adaptation for Semantic Segmentation With Maximum Squares Loss .2090
Domain Randomization and Pyramid Consistency: Simulation-to-Real Generalization Without Accessing Target Domain Data 2100.  Xiangyu Yue (UC Berkeley), Yang Zhang (University of Central Florida), Sicheng Zhao (University of California Berkeley), Alberto Sangiovanni-Vincentelli (University of California. Berkeley), Kurt Keutzer (EECS. UC Berkeley), and Boqing Gong (Google / ICSI Berkeley)
Semi-Supervised Skin Detection by Network With Mutual Guidance .211.1.  Yi He (DUT-RU International School of Information Science & Engineering. Dalian University of Technology), Jiayuan Shi (Face++.  Megvii), Chuan Wang (Face++. Megvii), Haibin Huang (Megvii Technology), Jiaming Liu (Megvii), Guanbin Li (Sun Yat-sen University), Risheng Liu (Dalian University of Technology), and Jue Wang (Megvii Technology)
ACE: Adapting to Changing Environments for Semantic Segmentation 2121.  Zuxuan Wu (UMD), Xin Wang (UC Berkeley), Joseph Gonzalez (UC Berkeley), Tom Goldstein (University of Maryland. College Park), and Larry Davis (University of Maryland)
Efficient Segmentation: Learning Downsampling Near Semantic Boundaries 2.13.1.  Dmitrii Marin (University of Waterloo), Zijian He (Facebook), Peter  Vajda (Facebook), Priyam Chatterjee (Facebook), Sam Tsai (Facebook),  Fei Yang (Facebook), and Yuri Boykov (University of Waterloo)
Recurrent U-Net for Resource-Constrained Segmentation 2142.  Wei Wang (EPFL), Kaicheng Yu (EPFL), Joachim Hugonot (EPFL), Pascal Fua (EPFL. Switzerland), and Mathieu Salzmann (EPFL)
Detecting the Unexpected via Image Resynthesis .2152  Krzysztof Lis (EPFL), Krishna Kanth Nakka (EPFL), Pascal Fua (EPFL.  Switzerland), and Mathieu Salzmann (EPFL)

#### 3D From Single View & RGBD

Self-Supervised Monocular Depth Hints .2162  Jamie Watson (Niantic), Michael Firman (Niantic), Gabriel Brostow (University College London), and Daniyar Turmukhambetov (Niantic)
3D Scene Reconstruction With Multi-Layer Depth and Epipolar Transformers .2172.  Daeyun Shin (University of California. Irvine), Zhile Ren (Georgia Institute of Technology), Erik Sudderth (University of California. Irvine), and Charless Fowlkes (UC Irvine)
How Do Neural Networks See Depth in Single Images? .2183
On Boosting Single-Frame 3D Human Pose Estimation via Monocular Videos 2192  Zhi Li (Xi'an Jiaotong University), Xuan Wang (Xi'an Jiaotong  University), Fei Wang (Xi'an Jiaotong University), and Peilin Jiang  (Xi'an Jiaotong University)
Canonical Surface Mapping via Geometric Cycle Consistency .2202
3D-RelNet: Joint Object and Relational Network for 3D Prediction 2212.  Nilesh Kulkarni (Carnegie Mellon University), Ishan Misra (Facebook AI Research), Shubham Tulsiani (Facebook AI Research), and Abhinav Gupta (CMU/FAIR)
GP2C: Geometric Projection Parameter Consensus for Joint 3D Pose and Focal Length Estimation in the Wild 2222.  Alexander Grabner (Graz University of Technology), Peter Roth (Graz University of Technology. Austria), and Vincent Lepetit (TU Graz)
Face & Body
Moulding Humans: Non-Parametric 3D Human Shape Estimation From Single Images .2232
3DPeople: Modeling the Geometry of Dressed Humans 2242.  Albert Pumarola (IRI), Jordi Sanchez (IRI), Gary P. T. Choi (Harvard University), Alberto Sanfeliu (Industrial Robotics Institute), and Francesc Moreno (IRI)
Learning to Reconstruct 3D Human Pose and Shape via Model-Fitting in the Loop .2252
Optimizing Network Structure for 3D Human Pose Estimation 2262

Yuj Teo Jian Teo at I	ting Spatial-Temporal Relationships for 3D Pose Estimation via Graph Convolutional Networks .2272. in Cai (Nanyang Technological University), Liuhao Ge (Nanyang Ehnological University), Jun Liu (Nanyang Technological University), nfei Cai (Nanyang Technological University), Tat-Jen Cham (Nanyang Ehnological University), Junsong Yuan (State University of New York Buffalo. USA), and Nadia Magnenat Thalmann (Nanyang Technological iversity)
Mo Vas Din	ing 3D Human Pose Ambiguities With 3D Scene Constraints .2282
Thi Chi	nape: Detailed Full Human Body Geometry From a Single Image .2293
Shu (Ur Uni and Cai	Pixel-Aligned Implicit Function for High-Resolution Clothed Human Digitization 2304.  unsuke Saito (University of Southern California), Zeng Huang niversity of Southern California), Ryota Natsume (Waseda iversity), Shigeo Morishima (Waseda Research Institute for Science I Engineering), Hao Li (Pinscreen/University of Southern lifornia/USC ICT), and Angjoo Kanazawa (University of California rkeley)
Xia Aca	et: A Dense-Fine-Finer Network for Detailed 3D Face Reconstruction .2315
Sai Vai	ular 3D Human Pose Estimation by Generation and Ordinal Ranking .2325
Lin Mu	ng Latent Spaces for 3D Hand Pose Estimation 2335.  lin Yang (University of Bonn), Shile Li (Technical University of nich), Dongheui Lee (Technical University of Munich), and Angela Yao attional University of Singapore)
Kur Res She (So	ets Pose: Learning Part-Centric Heatmap Triplets for Accurate 3D Human Pose Estimation .2344
Xio Lal Con	End Hand Mesh Recovery From a Monocular RGB Image 2354  Ing Zhang (Y-Lab. Kwai), Qiang Li (Y-Lab. Kwai), Hong Mo (State Key  Booratory of Virtual Reality Technology and Systems. School of  Imputer Science and Engineering. Beihang University), Wenbo Zhang  Lab. Kwai), and Wen Zheng (Y-Lab. Kwai)

#### **Motion & Tracking**

Wenwei Zhang (SenseTime Group Limited), Hui Zhou (Sensetime Group Limited.), Shuyang Sun (The University of Sydney), Zhe Wang (SenseTime Group Limited), Jianping Shi (Sensetime Group Limited), and Chen Change Loy (Nanyang Technological University)	
The Trajectron: Probabilistic Multi-Agent Trajectory Modeling With Dynamic Spatio Boris Ivanovic (Stanford University) and Marco Pavone (Stanford University)	temporal Graphs .2375
'Skimming-Perusal' Tracking: A Framework for Real-Time and Robust Long-Term The Bin Yan (Dalian University of Technology), Haojie Zhao (Dalian University of Technology), Dong Wang (Dalian University of Technology), Huchuan Lu (Dalian University of Technology), and Xiaoyun Yang (China Science IntelliCloud Technology Co Ltd)	Pracking .2385
TASED-Net: Temporally-Aggregating Spatial Encoder-Decoder Network for Video S Kyle Min (University of Michigan) and Jason Corso (University of Michigan)	Saliency Detection .239.4
Attacking Optical Flow 2404	
Computational Photography & Graphics	
Computational Photography & Graphics  Pro-Cam SSfM: Projector-Camera System for Structure and Spectral Reflectance From Chunyu Li (Tokyo Institute of Technology), Yusuke Monno (Tokyo Institute of Technology), Hironori Hidaka (Tokyo Institute of Technology), and Masatoshi Okutomi (Tokyo Institute of Technology)	m Motion .241.4
Pro-Cam SSfM: Projector-Camera System for Structure and Spectral Reflectance From Chunyu Li (Tokyo Institute of Technology), Yusuke Monno (Tokyo Institute of Technology), Hironori Hidaka (Tokyo Institute of	
Pro-Cam SSfM: Projector-Camera System for Structure and Spectral Reflectance From Chunyu Li (Tokyo Institute of Technology), Yusuke Monno (Tokyo Institute of Technology), Hironori Hidaka (Tokyo Institute of Technology), and Masatoshi Okutomi (Tokyo Institute of Technology)  Mop Moiré Patterns Using MopNet .2424	
Pro-Cam SSfM: Projector-Camera System for Structure and Spectral Reflectance From Chunyu Li (Tokyo Institute of Technology), Yusuke Monno (Tokyo Institute of Technology), Hironori Hidaka (Tokyo Institute of Technology), and Masatoshi Okutomi (Tokyo Institute of Technology)  Mop Moiré Patterns Using MopNet 2424	

eep Learning for Seeing Through Window With Raindrops 2463.  Yuhui Quan (South China Univ Tech), Shijie Deng (South China Univ Tech), Yixin Chen (South China Univ Tech), and Hui Ji (National University of Singapore)
Iask-ShadowGAN: Learning to Remove Shadows From Unpaired Data .247.2
ow-Level Vision & Optimization
Datio-Temporal Filter Adaptive Network for Video Deblurring .2482
earning Deep Priors for Image Dehazing .2492  Yang Liu (Dalian University of Technology), Jinshan Pan (Nanjing  University of Science and Technology), Jimmy Ren (SenseTime Research),  and Zhixun Su (Dalian University of Technology)
PEG Artifacts Reduction via Deep Convolutional Sparse Coding 2501.  Xueyang Fu (University of Science and Technology of China), Zheng-Jun Zha (University of Science and Technology of China), Feng Wu (University of Science and Technology of China), Xinghao Ding (Xiamen University), and John Paisley (Columbia University)
elf-Guided Network for Fast Image Denoising .251.1
on-Local Intrinsic Decomposition With Near-Infrared Priors 2521  Ziang Cheng (Australian National University), Yinqiang Zheng (National  Institute of Informatics), Shaodi You (Data61-CSIRO), and Imari Sato  (National Institute of Informatics)
cene Understanding
ideoMem: Constructing, Analyzing, Predicting Short-Term and Long-Term Video Memorability .2531  Romain Cohendet (Technicolor), Claire-Helene Demarty (Technicolor),  Ngoc Duong (Technicolor), and Martin Engilberge (Technicolor)
escan: Inductive Instance Segmentation for Indoor RGBD Scans 2541

End-to-End CAD Model Retrieval and 9DoF Alignment in 3D Scans .255.1.  Armen Avetisyan (Technical University of Munich), Angela Dai  (Technical University of Munich), and Matthias Niessner (Technical  University of Munich)
Making History Matter: History-Advantage Sequence Training for Visual Dialog .2561
Stochastic Attraction-Repulsion Embedding for Large Scale Image Localization .257.0.  Liu Liu (ANU. Australian National University), Hongdong Li (Australian National University. Australia), and Yuchao Dai (Northwestern Polytechnical University)
Scene Graph Prediction With Limited Labels .2580
Language & Reasoning
Taking a HINT: Leveraging Explanations to Make Vision and Language Models More Grounded .2591  Ramprasaath Ramasamy Selvaraju (Georgia Institute of Technology),  Stefan Lee (Georgia Institute of Technology), Yilin Shen (Samsung  Research America), Hongxia Jin (Samsung Research America), Shalini  Ghosh (Samsung Research America), Larry Heck (Samsung Research  America), Dhruv Batra (Georgia Tech & Facebook AI Research), and Devi  Parikh (Georgia Tech & Facebook AI Research)
Align2Ground: Weakly Supervised Phrase Grounding Guided by Image-Caption Alignment .2601
Adaptive Reconstruction Network for Weakly Supervised Referring Expression Grounding .261.1
Hierarchy Parsing for Image Captioning .2621  Ting Yao (JD AI Research), Yingwei Pan (JD AI Research), Yehao Li (Sun Yat-Sen University), and Tao Mei (AI Research of JD.com)
HowTo100M: Learning a Text-Video Embedding by Watching Hundred Million Narrated Video Clips .2630.  Antoine Miech (Inria), Dimitri Zhukov (Inria), Jean-Baptiste Alayrac (DeepMind), Makarand Tapaswi (INRIA), Ivan Laptev (INRIA Paris), and Josef Sivic (Inria and Czech Technical University)
Controllable Video Captioning With POS Sequence Guidance Based on Gated Fusion Network .2641

#### **3D From Multiview & Sensors**

Multi-View Stereo by Temporal Nonparametric Fusion .265.1.  Yuxin Hou (Aalto University), Juho Kannala (Aalto University.  Finland), and Arno Solin (Aalto University)
Floor-SP: Inverse CAD for Floorplans by Sequential Room-Wise Shortest Path .2661.  Jiacheng Chen (Simon Fraser University), Chen Liu (Washington University in St. Louis), Jiaye Wu (Washington University in St.Louis), and Yasutaka Furukawa (Simon Fraser University)
Polarimetric Relative Pose Estimation .267.1
Closed-Form Optimal Two-View Triangulation Based on Angular Errors .2681
Pix2Vox: Context-Aware 3D Reconstruction From Single and Multi-View Images .2690.  Haozhe Xie (Harbin Institute of Technology), Hongxun Yao (Harbin Institute of Technology), Xiaoshuai Sun (Harbin Institute of Technology), Shangchen Zhou (Nanyang Technological University), and Shengping Zhang (Harbin Institute of Technology)
Image & Video Synthesis
Unsupervised Robust Disentangling of Latent Characteristics for Image Synthesis .2699.  Patrick Esser (Heidelberg University), Johannes Haux (Heidelberg University), and Bjorn Ommer (Heidelberg University)
SROBB: Targeted Perceptual Loss for Single Image Super-Resolution 2710.  Mohammad Saeed Rad (EPFL), Behzad Bozorgtabar (EPFL), Urs-Viktor Marti (Swisscom), Max Basler (Swisscom), Hazim Kemal Ekenel (EPFL), and Jean-Philippe Thiran (École Polytechnique Fédérale de Lausanne)
An Internal Learning Approach to Video Inpainting .2720  Haotian Zhang (Stanford University), Long Mai (Adobe Research), Hailin  Jin (Adobe Research), Zhaowen Wang (Adobe Research), Ning Xu (Adobe  Research), and John Collomosse (University of Surrey)
Deep CG2Real: Synthetic-to-Real Translation via Image Disentanglement .2730.  Sai Bi (University of California. San Diego), Kalyan Sunkavalli (Adobe Research), Federico Perazzi (Adobe Research), Eli Shechtman (Adobe Research. US), Vladimir Kim (Adobe), and Ravi Ramamoorthi (University of California San Diego)
Adversarial Defense via Learning to Generate Diverse Attacks .27.40

Image Generation From Small Datasets via Batch Statistics Adaptation .2750
Lifelong GAN: Continual Learning for Conditional Image Generation 2759.  Mengyao Zhai (Simon Fraser University), Lei Chen (Simon Fraser University), Fred Tung (Simon Fraser University), Jiawei He (Simon Fraser University), Megha Nawhal (Simon Fraser University), and Greg Mori (Simon Fraser University)
Applications. Medical, & Robotics
Bayesian Relational Memory for Semantic Visual Navigation .27.69.  Yi Wu (UC Berkeley), Yuxin Wu (Facebook AI Research), Aviv Tamar (UC Berkeley), Stuart Russell (UC Berkeley), Georgia Gkioxari (Facebook), and Yuandong Tian (Facebook)
Mono-SF: Multi-View Geometry Meets Single-View Depth for Monocular Scene Flow Estimation of Dynamic Traffic Scenes .2780.  Fabian Brickwedde (Robert Bosch GmbH), Steffen Abraham (Robert Bosch GmbH), and Rudolf Mester (NTNU Trondheim)
Prior Guided Dropout for Robust Visual Localization in Dynamic Environments .2791.  Zhaoyang Huang (Zhejiang University), Yan Xu (Sensetime Group Limited), Jianping Shi (Sensetime Group Limited), Xiaowei Zhou (Zhejiang Univ China), Hujun Bao (Zhejiang University), and Guofeng Zhang (Zhejiang University)
Drive&Act: A Multi-Modal Dataset for Fine-Grained Driver Behavior Recognition in Autonomous Vehicles.2801  Manuel Martin (Fraunhofer IOSB), Alina Roitberg (KIT), Monica Haurilet (KIT), Matthias Horne (Herr), Simon Reiß (Karlsruhe Institute of Technology), Michael Voit (Fraunhofer IOSB), and Rainer Stiefelhagen (Karlsruhe Institute of Technology)
Depth Completion From Sparse LiDAR Data With Depth-Normal Constraints .281.1.  Yan Xu (Sensetime Group Limited), Xinge Zhu (The Chinese University of Hong Kong), Jianping Shi (Sensetime Group Limited), Guofeng Zhang (Zhejiang University), Hujun Bao (Zhejiang University), and Hongsheng Li (Chinese University of Hong Kong)
PRECOG: PREdiction Conditioned on Goals in Visual Multi-Agent Settings .2821
LPD-Net: 3D Point Cloud Learning for Large-Scale Place Recognition and Environment Analysis .2831  Zhe Liu (The Chinese University of Hong Kong), Shunbo Zhou (The Chinese University of Hong Kong), Chuanzhe Suo (The Chinese University of Hong Kong), Peng Yin (CMU), Wen Chen (The Chinese University of Hong Kong), Hesheng Wang (Shanghai Jiao Tong University), Haoang Li (The Chinese University of Hong Kong), and Yunhui Liu (CUHK)
Local Supports Global: Deep Camera Relocalization With Sequence Enhancement .2841.  Fei Xue (Peking University), Xin Wang (Peking University), Zike Yan (Peking University), Qiuyuan Wang (Peking University), Junqiu Wang (Beijing Changcheng Aviation Measurement and Control Institute), and Hongbin Zha (Peking University. China)

Sequential Adversarial Learning for Self-Supervised Deep Visual Odometry .285.1
TextPlace: Visual Place Recognition and Topological Localization Through Reading Scene Texts .2861  Ziyang Hong (Heriot-Watt University), Yvan Petillot (Heriot-Watt  University), David Lane (Heriot-Watt University), Yishu Miao  (University of Oxford), and Sen Wang (Heriot-Watt University)
CamNet: Coarse-to-Fine Retrieval for Camera Re-Localization .287.1.  Mingyu Ding (Renmin University of China), Zhe Wang (SenseTime Group Limited), Jiankai Sun (SenseTime Group Limited), Jianping Shi (Sensetime Group Limited), and Ping Luo (The Chinese University of Hong Kong)
Situational Fusion of Visual Representation for Visual Navigation 2881.  William Shen (Stanford), Danfei Xu (Stanford), Yuke Zhu (Stanford University), Li Fei-Fei (Stanford University), Leonidas Guibas (Stanford University), and Silvio Savarese (Stanford University)
Learning Aberrance Repressed Correlation Filters for Real-Time UAV Tracking .289.1.  Ziyuan Huang (National University of Singapore), Changhong Fu (Tongji University), Yiming Li (Tongji University), Fuling Lin (Tongji University), and Peng Lu (Hong Kong Polytechnic University)
6-DOF GraspNet: Variational Grasp Generation for Object Manipulation .2901
DAGMapper: Learning to Map by Discovering Lane Topology .291  Namdar Homayounfar (University of Toronto), Justin Liang (Uber ATG),  Wei-Chiu Ma (MIT), Jack Fan (Uber), Xinyu Wu (UberATG), and Raquel  Urtasun (Uber ATG)
3D-LaneNet: End-to-End 3D Multiple Lane Detection .2921
Oral 2.1A
Feature Representations, Similarity Learning
Sampling-Free Epistemic Uncertainty Estimation Using Approximated Variance Propagation .2931
Universal Adversarial Perturbation via Prior Driven Uncertainty Approximation 2941.  Hong Liu (Xiamen University), Rongrong Ji (Xiamen University. China),  Jie Li (Xiamen University), Baochang Zhang (Beihang University), Yue  Gao (Tsinghua University), Yongjian Wu (Tencent Technology. Shanghai  Co.), and Feiyue Huang (Tencent)

Understanding Deep Networks via Extremal Perturbations and Smooth Masks .2950.  Ruth Fong (University of Oxford), Mandela Patrick (University of Oxford), and Andrea Vedaldi (Oxford University)
Unsupervised Pre-Training of Image Features on Non-Curated Data 2959.  Mathilde Caron (Facebook Artificial Intelligence Research), Piotr Bojanowski (Facebook), Julien Mairal (INRIA), and Armand Joulin (Facebook AI Research)
Learning Local Descriptors With a CDF-Based Dynamic Soft Margin .2969.  Linguang Zhang (Princeton University) and Szymon Rusinkiewicz (Princeton University)
Bayes-Factor-VAE: Hierarchical Bayesian Deep Auto-Encoder Models for Factor Disentanglement .2979  Minyoung Kim (Samsung AI Center), Yuting Wang (Rutgers University),  Pritish Sahu (Rutgers University), and Vladimir Pavlovic (Rutgers  University)
Linearized Multi-Sampling for Differentiable Image Transformation .2988.  Wei Jiang (University of Victoria), Weiwei Sun (University of Victoria), Andrea Tagliasacchi (Google Inc.), Eduard Trulls (Google), and Kwang Moo Yi (University of Victoria)
AdaTransform: Adaptive Data Transformation .2998.  Zhiqiang Tang (Rutgers), Xi Peng (University of Delaware), Tingfeng Li (Rutgers University), Yizhe Zhu (Rutgers University), and Dimitris Metaxas (Rutgers)
CARAFE: Content-Aware ReAssembly of FEatures 3007.  Jiaqi Wang (The Chinese University of Hong Kong), Kai Chen (The Chinese University of Hong Kong), Rui Xu (CUHK), Ziwei Liu (The Chinese University of Hong Kong), Chen Change Loy (Nanyang Technological University), and Dahua Lin (The Chinese University of Hong Kong)
AFD-Net: Aggregated Feature Difference Learning for Cross-Spectral Image Patch Matching .3017
Deep Joint-Semantics Reconstructing Hashing for Large-Scale Unsupervised Cross-Modal Retrieval .3027 Shupeng Su (Peking University), Zhisheng Zhong (Peking University), and Chao Zhang (Peking University)
Unsupervised Neural Quantization for Compressed-Domain Similarity Search .3036.  Stanislav Morozov (Yandex) and Artem Babenko (MIPT/Yandex)
Siamese Networks: The Tale of Two Manifolds 3046.  Soumava Roy (AUSTRALIAN NATIONAL UNIVERSITY), Mehrtash Harandi (Monash University), Richard Nock (Data61. CSIRO), and Richard Hartley (Australian National University. Australia)
Learning Combinatorial Embedding Networks for Deep Graph Matching .3056

Guanbin Li (Sun Yat-sen University), Ping Luo (The Chinese University of Hong Kong), Yimin Chen (sensetime), Liang Lin (Sun Yat-sen	Z	Zhanghui Kuang (Sensetime Ltd.), Yiming Gao (Sun Yat-sen University),
	0	of Hong Kong), Yimin Chen (sensetime), Liang Lin (Sun Yat-sen
University), and Wayne Zhang (SenseTime Research)	Ü	University), and Wayne Zhang (SenseTime Research)

#### Oral 2.1B

#### **Low Level Vision**

Wavelet Domain Style Transfer for an Effective Perception-Distortion Tradeoff in Single Image Super-Resolution 3076.  Xin Deng (Imperial College London), Ren Yang (ETH Zurich), Mai Xu (BUAA), and Pier Luigi Dragotti (Imperial College London)
Toward Real-World Single Image Super-Resolution: A New Benchmark and a New Model 3086  Jianrui Cai (The Hong Kong Polytechnic University. Hong Kong. China),  Hui Zeng (The Hong Kong Polytechnic University), Hongwei Yong (The  Hong Kong Polytechnic University), Zisheng Cao (Da-Jiang Innovations),  and Lei Zhang (Hong Kong Polytechnic University. Hong Kong. China)
RankSRGAN: Generative Adversarial Networks With Ranker for Image Super-Resolution 3096  Wenlong Zhang (SIAT), Yihao Liu (University of Chinese Academy of Sciences), Chao Dong (SIAT), and Yu Qiao (Shenzhen Institutes of Advanced Technology. Chinese Academy of Sciences)
Progressive Fusion Video Super-Resolution Network via Exploiting Non-Local Spatio-Temporal Correlations 3.106
Deep SR-ITM: Joint Learning of Super-Resolution and Inverse Tone-Mapping for 4K UHD HDR Applications 3116 Soo Ye Kim (KAIST), Jihyong Oh (KAIST), and Munchurl Kim (KAIST-VICLab)
Dynamic PET Image Reconstruction Using Nonnegative Matrix Factorization Incorporated With Deep Image Prior .3.126
DSIC: Deep Stereo Image Compression 3136.  Jerry Liu (Uber ATG), Shenlong Wang (Uber ATG. University of Toronto), and Raquel Urtasun (Uber ATG)
Variable Rate Deep Image Compression With a Conditional Autoencoder 3.146

Real Image Denoising With Feature Attention 3.155.  Saeed Anwar (ANU) and Nick Barnes (CSIRO(Data61)
Noise Flow: Noise Modeling With Conditional Normalizing Flows .3.165
Bottleneck Potentials in Markov Random Fields 3174.  Ahmed Abbas (MPI-INF) and Paul Swoboda (MPI fuer Informatik.  Saarbruecken)
Seeing Motion in the Dark .3184  Chen Chen (UIUC), Qifeng Chen (HKUST), Minh Do (UIUC), and Vladlen  Koltun (Intel Labs)
SENSE: A Shared Encoder Network for Scene-Flow Estimation 3.194.  Huaizu Jiang (UMass Amherst), Deqing Sun (Google), Varun Jampani (Nvidia Research), Zhaoyang Lv (GEORGIA TECH), Erik Learned-Miller (University of Massachusetts. Amherst), and Jan Kautz (NVIDIA)
Poster 2.1
Deep Learning
Adversarial Feedback Loop 3204
Dynamic-Net: Tuning the Objective Without Re-Training for Synthesis Tasks .3214
AutoGAN: Neural Architecture Search for Generative Adversarial Networks 3223.  Xinyu Gong (Texas A&M University), Shiyu Chang (IBM Research), Yifan  Jiang (Huazhong University of Science and Technology), and Zhangyang  Wang (TAMU)
Co-Evolutionary Compression for Unpaired Image Translation ,3234  Han Shu (Huawei Noah's Ark Lab), Yunhe Wang (Huawei Noah's Ark Lab),  Xu Jia (Huawei Noah's Ark Lab), Kai Han (Huawei Noah's Ark Lab),  Hanting Chen (Peking University), Chunjing Xu (Huawei Noah's Ark Lab),  Qi Tian (Huawei Noah's Ark Lab), and Chang Xu (University of Sydney)
Self-Supervised Representation Learning From Multi-Domain Data 3244.  Zeyu Feng (University of Sydney), Chang Xu (University of Sydney), and Dacheng Tao (University of Sydney)
Controlling Neural Networks via Energy Dissipation .3255
Indices Matter: Learning to Index for Deep Image Matting 3265  Hao Lu (The University of Adelaide), Yutong Dai (The University of Adelaide), Chunhua Shen (University of Adelaide), and Songcen Xu (Noah's Ark Lab. Huawei Technologies Co., Ltd.)

LAP-Net: Level-Aware Progressive Network for Image Dehazing .3275  Yunan Li (Xidian University), Qiguang Miao (Xidian University), Wanli  Ouyang (The University of Sydney), Zhenxin Ma (Xidian University),  Huijuan Fang (Xidian University), Chao Dong (SIAT), and Yining Quan  (Xidian University)
Attention Augmented Convolutional Networks 3285
MetaPruning: Meta Learning for Automatic Neural Network Channel Pruning 3295.  Zechun Liu (HKUST), Haoyuan Mu (Tsinghua University), Xiangyu Zhang (Megvii Technology), Zichao Guo (Megvii Inc), Xin Yang (Huazhong University of Science and Technology), Kwang-Ting Cheng (Hong Kong University of Science and Technology), and Jian Sun (Megvii Technology)
Accelerate CNN via Recursive Bayesian Pruning .3305  Yuefu Zhou (Cooperative Medianet Innovation Center. Shanghai Jiao Tong University), Ya Zhang (Cooperative Medianet Innovation Center. Shang hai Jiao Tong University), Yan-Feng Wang (Cooperative medianet innovation center of Shanghai Jiao Tong University), and Qi Tian (Huawei Noah's Ark Lab)
HBONet: Harmonious Bottleneck on Two Orthogonal Dimensions .3315
O2U-Net: A Simple Noisy Label Detection Approach for Deep Neural Networks 3325.  Jinchi Huang (Alibaba Group), Lie Qu (Alibaba Group), Rongfei Jia (Alibaba Group), and Binqiang Zhao (Alibaba)
Continual Learning by Asymmetric Loss Approximation With Single-Side Overestimation .3334
Label-PEnet: Sequential Label Propagation and Enhancement Networks for Weakly Supervised Instance Segmentation .3344
(Malong Technologies)  LIP: Local Importance-Based Pooling .3354
Ziteng Gao (Nanjing University), Limin Wang (Nanjing University), and Gangshan Wu (Nanjing University)
Global Feature Guided Local Pooling .3364
Conditional Coupled Generative Adversarial Networks for Zero-Shot Domain Adaptation .337.4

Adversarial Defense by Restricting the Hidden Space of Deep Neural Networks .338.4
Hyperpixel Flow: Semantic Correspondence With Multi-Layer Neural Features .339.4.  Juhong Min (POSTECH), Jongmin Lee (POSTECH), Jean Ponce (Inria), and Minsu Cho (POSTECH)
Information Entropy Based Feature Pooling for Convolutional Neural Networks .3404
Patchwork: A Patch-Wise Attention Network for Efficient Object Detection and Segmentation in Video Streams 3414
AttentionRNN: A Structured Spatial Attention Mechanism .3424
Drop an Octave: Reducing Spatial Redundancy in Convolutional Neural Networks With Octave Convolution.343.  Yunpeng Chen (National University of Singapore), Haoqi Fan (Facebook  AI Research), Bing Xu (Facebook AI), Zhicheng Yan (Facebook AI),  Yannis Kalantidis (Facebook Research), Marcus Rohrbach (Facebook AI  Research), Yan Shuicheng (National University of Singapore), and  Jiashi Feng (NUS)
Domain Intersection and Domain Difference .3444
Learned Video Compression 3453.  Oren Rippel (WaveOne. Inc.), Sanjay Nair (WaveOne. Inc.), Carissa Lew (WaveOne. Inc.), Steve Branson (WaveOne. Inc.), Alexander Anderson (WaveOne. Inc.), and Lubomir Bourdev (WaveOne. Inc.)
Local Relation Networks for Image Recognition .3463
DiscoNet: Shapes Learning on Disconnected Manifolds for 3D Editing .3473
Deep Residual Learning in the JPEG Transform Domain .3483
Approximated Bilinear Modules for Temporal Modeling .3493

Customizing Student Networks From Heterogeneous Teachers via Adaptive Knowledge Amalgamation .3503  Chengchao Shen (Zhejiang University), Mengqi Xue (Zhejiang  University), Xinchao Wang (Stevens Institute of Technology), Jie Song  (College of Computer Science and Technology. Zhejiang University), Li  Sun (Zhejiang University), and Mingli Song (Zhejiang University)
Data-Free Learning of Student Networks 3513
Deep Closest Point: Learning Representations for Point Cloud Registration .3522
Orientation-Aware Semantic Segmentation on Icosahedron Spheres 3532.  Chao Zhang (Toshiba Research Europe Ltd), Stephan Liwicki (Toshiba Research Europe Ltd), William Smith (University of York), and Roberto Cipolla (University of Cambridge)
Differentiable Learning-to-Group Channels via Groupable Convolutional Neural Networks .3541
HarDNet: A Low Memory Traffic Network 355.1.  Ping Chao (university of michigan), Chao-Yang Kao (National Tsing Hua University), Yushan Ruan (National Tsing Hua University), Chien-Hsiang Huang (NTHU), and Youn-Long Lin (National Tsing Hua University)
Dynamic Multi-Scale Filters for Semantic Segmentation .3561
Online Model Distillation for Efficient Video Inference .3572
Recognition
Rethinking Zero-Shot Learning: A Conditional Visual Classification Perspective .3582
Task-Driven Modular Networks for Zero-Shot Compositional Learning .3592

Transductive Episodic-Wise Adaptive Metric for Few-Shot Learning 3602	
Deep Multiple-Attribute-Perceived Network for Real-World Texture Recognition .3612	
RGB-Infrared Cross-Modality Person Re-Identification via Joint Pixel and Feature Alignment .362 Guan'an Wang (Chinese Academy of Sciences), Tianzhu Zhang (University of Science and Technology of China), Jian Cheng (Chinese Academy of Sciences. China), Si Liu (Beihang University), Yang Yang (Chinese Academy of Sciences), and Zengguang Hou (Chinese Academy of Sciences)	22
EvalNorm: Estimating Batch Normalization Statistics for Evaluation .3632.  Saurabh Singh (Google) and Abhinav Shrivastava (University of Maryland)	
Beyond Human Parts: Dual Part-Aligned Representations for Person Re-Identification .3641  Jianyuan Guo (Peking University), Yuhui Yuan (Microsoft Research),  Lang Huang (Peking University), Chao Zhang (Peking University), Jin-Ge  Yao (Microsoft), and Kai Han (Huawei Noah's Ark Lab)	
Person Search by Text Attribute Query As Zero-Shot Learning .365.1	
Semantic-Aware Knowledge Preservation for Zero-Shot Sketch-Based Image Retrieval .3661  Qing Liu (Johns Hopkins University), Lingxi Xie (Huawei Noah's Ark  Lab), Huiyu Wang (Johns Hopkins University), and Alan Yuille (Johns  Hopkins University)	
Active Learning for Deep Detection Neural Networks .367.1.  Hamed H. Aghdam (Computer Vision Center. UAB), Abel Gonzalez-Garcia (Computer Vision Center), Antonio Lopez (CVC & UAB), and Joost Weijer (Computer Vision Center)	
One-Shot Neural Architecture Search via Self-Evaluated Template Network .3680	
Batch DropBlock Network for Person Re-Identification and Beyond .3690.  Zuozhuo Dai (Alibaba A.I. Labs), Mingqiang Chen (Alibaba A.I. Labs),  Xiaodong Gu (Alibaba A.I. Labs), Siyu Zhu (Alibaba A.I. Labs), and  Ping Tan (Simon Fraser University)	
Omni-Scale Feature Learning for Person Re-Identification 37.0.1.  Kaiyang Zhou (University of Surrey), Yongxin Yang (University of Edinburgh), Andrea Cavallaro (Queen Mary University of London. UK), and Tao Xiang (University of Surrey)	

Be Your Own Teacher: Improve the Performance of Convolutional Neural Networks via Self Distillation .3.7.12  Linfeng Zhang (Tsinghua University), Jiebo Song (Institute for Interdisciplinary Information Core Technology), Anni Gao (Institute for Interdisciplinary Information Core Technology), Jingwei Chen (Tusinghua University), Chenglong Bao (Tsinghua University), and Kaisheng Ma (Tsinghua University)
Diversity With Cooperation: Ensemble Methods for Few-Shot Classification 3.7.22.  Nikita Dvornik (INRIA), Julien Mairal (INRIA), and Cordelia Schmid  (INRIA)
Enhancing 2D Representation via Adjacent Views for 3D Shape Retrieval .3.7.3.1
Adversarial Fine-Grained Composition Learning for Unseen Attribute-Object Recognition .3.7.4.0
Auto-ReID: Searching for a Part-Aware ConvNet for Person Re-Identification 37.49.  Ruijie Quan (University of Technology Sydney), Xuanyi Dong (UTS), Yu  Wu (University of Technology Sydney), Linchao Zhu (University of  Technology. Sydney), and Yi Yang (UTS)
Second-Order Non-Local Attention Networks for Person Re-Identification .3759.  Bryan Bryan (Ning Xia. University of Notre Dame), Yuan Gong (University of Notre Dame), Yizhe Zhang (University of Notre Dame), and Christian Poellabauer (University of Notre Dame)
Segmentation, Grouping, & Shape
Fast Computation of Content-Sensitive Superpixels and Supervoxels Using Q-Distances .3.769
Progressive-X: Efficient, Anytime, Multi-Model Fitting Algorithm 3779.  Dániel Baráth (MTA SZTAKI. CMP Prague) and Jiri Matas (CMP CTU FEE)
Structured Modeling of Joint Deep Feature and Prediction Refinement for Salient Object Detection .3788  Yingyue Xu (University of Oulu), Dan Xu (University of Oxford),  Xiaopeng Hong (Xi'an Jiaotong University), Wanli Ouyang (The  University of Sydney), Rongrong Ji (Xiamen University. China), Min Xu  (University of Technology Sydney), and Guoying Zhao (University of  Oulu)
Selectivity or Invariance: Boundary-Aware Salient Object Detection .3.798.  Jinming Su (Beihang University), Jia Li (Beihang University), Yu Zhang (Beihang University), Changqun Xia (Beihang University), and Yonghong Tian (PKU)

Online Unsupervised Learning of the 3D Kinematic Structure of Arbitrary Rigid Bodies .3808
3D From Single View & RGBD
Few-Shot Generalization for Single-Image 3D Reconstruction via Priors .381.7.  Bram Wallace (Cornell University) and Bharath Hariharan (Cornell University)
Digging Into Self-Supervised Monocular Depth Estimation .3827.  Clement Godard (University College London), Oisin Mac Aodha (Caltech),  Michael Firman (Niantic), and Gabriel Brostow (University College  London)
Learning Object-Specific Distance From a Monocular Image .383.8.  Jing Zhu (New York University) and Yi Fang (New York University)
Unsupervised 3D Reconstruction Networks .3848
3D Point Cloud Generative Adversarial Network Based on Tree Structured Graph Convolutions .385  Dongwook Shu (Chung-Ang Univ Korea), Sung Woo Park (Chung-Ang Univ  Korea), and Junseok Kwon (Chung-Ang Univ Korea)
Visualization of Convolutional Neural Networks for Monocular Depth Estimation .3868
Action & Video
Co-Separating Sounds of Visual Objects .3878
BMN: Boundary-Matching Network for Temporal Action Proposal Generation .3888
Weakly Supervised Temporal Action Localization Through Contrast Based Evaluation Networks .3898  Ziyi Liu (Xi'an Jiaotong University), Le Wang (Xi'an Jiaotong University), Qilin Zhang (HERE Technologies), Zhanning Gao (Alibaba Group), Zhenxing Niu (Alibaba Group), Nanning Zheng (Xi'an Jiaotong University), and Gang Hua (Wormpex AI Research)
Progressive Sparse Local Attention for Video Object Detection .3908.  Chaoxu Guo (Institue of Automation. Chinese Academy of Science), Bin Fan (Institute of Automation. Chinese Academy of Sciences. China), Jie Gu (National Laboratory of Pattern Recognition. Institute of Automation. Chinese Academy of Sciences), Qian Zhang (Horizon Robotics), Shiming Xiang (Chinese Academy of Sciences. China), Véronique Prinet (The Hebrew University of Jerusalem. Israel), and Chunhong Pan (Institute of Automation. Chinese Academy of Sciences)

easoning About Human-Object Interactions Through Dual Attention Networks .3918  Tete Xiao (Peking University), Quanfu Fan (IBM Research), Danny Gutfreund (IBM), Mathew Monfort (MIT), Aude Oliva (MIT), and Bolei Zhou (CUHK)
MMM-Net: Differentiable Mask-Matching Network for Video Object Segmentation .3928
Asymmetric Cross-Guided Attention Network for Actor and Action Video Segmentation From Natural anguage Query 3938
GSS-VOS: Attention Guided Single-Shot Video Object Segmentation 3948.  Huaijia Lin (The Chinese University of Hong Kong), Xiaojuan Qi (University of Oxford), and Jiaya Jia (Chinese University of Hong Kong)
Jianing Li (Peking University), Shiliang Zhang (Peking University),  Jingdong Wang ((), Wen Gao (PKU), and Qi Tian (Huawei Noah's Ark Lab)
dvIT: Adversarial Frames Identifier Based on Temporal Consistency in Videos .3967
Motion & Tracking
ANet: Ranking Attention Network for Fast Video Object Segmentation .397.7.  Ziqin Wang (Xi'an Jiaotong University), Jun Xu (Inception Institute of Artificial Intelligence), Li Liu (the inception institute of artificial intelligence), Fan Zhu (Inception Institute of Artificial Intelligence), and Ling Shao (Inception Institute of Artificial Intelligence)
patial-Temporal Relation Networks for Multi-Object Tracking .3987.  Jiarui Xu (Hong Kong University of Science and Technology. HKUST), Yue  Cao (Tsinghua University), Zheng Zhang (MSRA), and Han Hu (Microsoft  Research Asia)
ridging the Gap Between Detection and Tracking: A Unified Approach .3998.  Lianghua Huang (CASIA), Xin Zhao (Institute of Automation. Chinese  Academy of Sciences), and Kaiqi Huang (Institute of Automation.  Chinese Academy of Sciences)

Learning the Model Update for Siamese Trackers .4009.  Lichao Zhang (Computer Vision Center), Abel Gonzalez-Garcia (Computer Vision Center), Joost Van De Weijer (Computer Vision Center), Martin  Danelljan (ETH Zurich), and Fahad Shahbaz Khan (Inception Institute of Artificial Intelligence)
Fast-deepKCF Without Boundary Effect .4019.  Linyu Zheng (Institute of Automation. Chinese Academy of Sciences),  Ming Tang (Chinese Academy of Sciences. China), Yingying Chen (CASIA),  Jinqiao Wang (Institute of Automation. Chinese Academy of Sciences),  and Hanqing Lu (NLPR. Institute of Automation. CAS)
Computational Photography & Graphics
Program-Guided Image Manipulators 4029.  Xiuming Zhang (MIT), Jiayuan Mao (Tsinghua University), Yikai Li (Shanghai Jiao Tong University), William Freeman (MIT), Joshua Tenenbaum (MIT), and Jiajun Wu (MIT)
Calibration of Axial Fisheye Cameras Through Generic Virtual Central Models .4039
Micro-Baseline Structured Light .4048.  Vishwanath Saragadam Raja Venkata (Carnegie Mellon University), Jian  Wang (Snap), Shree Nayar (Snap), and Mohit Gupta (University of  Wisconsin-Madison. USA)
lambda-Net: Reconstruct Hyperspectral Images From a Snapshot Measurement .4058
Deep Depth From Aberration Map 4069.  Masako Kashiwagi (Toshiba), Nao Mishima (Toshiba Research and Development Center), Tatsuo Kozakaya (Toshiba), and Shinsaku Hiura (Hiroshima city univ.)
A Dataset of Multi-Illumination Images in the Wild .4079
Monocular Neural Image Based Rendering With Continuous View Control .4089.  Jie Song (ETH Zurich), Xu Chen (ETH Zürich), and Otmar Hilliges (ETH Zurich)
Multi-View Image Fusion .4100

# **Low-Level & Optimization**

Enhancing Low Light Videos by Exploring High Sensitivity Camera Noise 4.110.  Wei Wang (Nanjing University), Xin Chen (Nanjing University), Cheng Yang (Nanjing University), Xiang Li (Nanjing University), Xuemei Hu (Nanjing University), and Tao Yue (Nanjing University)
Deep Restoration of Vintage Photographs From Scanned Halftone Prints 4.119.  Qifan Gao (Shanghai Jiao Tong University), Xiao Shu (McMaster  University; Shanghai Jiao Tong University), and Xiaolin Wu (McMaster  University; Shanghai Jiao Tong University)
Context-Aware Image Matting for Simultaneous Foreground and Alpha Estimation .4.129
CFSNet: Toward a Controllable Feature Space for Image Restoration .4.139.  Wei Wang (Tsinghua University), Ruiming Guo (The Chinese University of Hong Kong), Yapeng Tian (University of Rochester), and Wenming Yang (Tsinghua University)
Deep Blind Hyperspectral Image Fusion .4.149
Fully Convolutional Pixel Adaptive Image Denoiser .4159.  Sungmin Cha (Sungkyunkwan University) and Taesup Moon (Sungkyunkwan University)
Coherent Semantic Attention for Image Inpainting .4169
Embedded Block Residual Network: A Recursive Restoration Model for Single-Image Super-Resolution .4.179 Yajun Qiu (Yunnan University), Ruxin Wang (Union Vision Innovation Co Ltd.), Dapeng Tao (Yunnan University), and Jun Cheng (Shenzhen Institutes of Advanced Technology. Chinese Academy of Sciences)
Fast Image Restoration With Multi-Bin Trainable Linear Units .4189
Scene Understanding
Counting With Focus for Free 4.199
SynDeMo: Synergistic Deep Feature Alignment for Joint Learning of Depth and Ego-Motion .4209
Diverse Image Synthesis From Semantic Layouts via Conditional IMLE 4219

Towards Bridging Semantic Gap to Improve Semantic Segmentation .4229.  Yanwei Pang (Tianjin University), Yazhao Li (Tianjin University),  Jianbing Shen (Inception Institute of Artificial Intelligence), and  Ling Shao (Inception Institute of Artificial Intelligence)
Language & Reasoning
Generating Diverse and Descriptive Image Captions Using Visual Paraphrases 4239
Learning to Collocate Neural Modules for Image Captioning .4249  Xu Yang (Nanyang Technological University), Hanwang Zhang (Nanyang Technological University), and Jianfei Cai (Nanyang Technological University)
Sequential Latent Spaces for Modeling the Intention During Diverse Image Captioning .4260.  Jyoti Aneja (University of Illinois. Urbana-Champaign), Harsh Agrawal (Georgia Institute of Technology), Dhruv Batra (Georgia Tech & Facebook AI Research), and Alexander Schwing (UIUC)
Why Does a Visual Question Have Different Answers? 4270  Nilava Bhattacharya (University of Texas at Austin), Qing Li (University of California. Los Angeles), and Danna Gurari (University of Texas at Austin)
G3raphGround: Graph-Based Language Grounding .4280
Scene Text Visual Question Answering .4290.  Ali Furkan Biten (Computer Vision Center), Rubèn Tito (Centre de Visió per Computador. CVC), Andrés Mafla (Computer Vision Centre), Lluis Gomez (Universitat Autónoma de Barcelona), Marçal Rusiñol (Computer Vision Center. UAB), C.V. Jawahar (IIIT-Hyderabad), Ernest Valveny (Universitat Autónoma de Barcelona), and Dimosthenis Karatzas (Computer Vision Centre)
3D From Multiview & Sensors
Unsupervised Collaborative Learning of Keyframe Detection and Visual Odometry Towards Monocular Deep SLAM .4301.  Lu Sheng (Beihang University), Dan Xu (University of Oxford), Wanli Ouyang (The University of Sydney), and Xiaogang Wang (Chinese University of Hong Kong. Hong Kong)
MVSCRF: Learning Multi-View Stereo With Conditional Random Fields .431.1.  Youze Xue (Tsinghua University), Jiansheng Chen (Tsinghua University), Weitao Wan (Tsinghua University), Yiqing Huang (Tsinghua University), Cheng Yu (Tsinghua University), Tianpeng Li (Tsinghua University), and

Jiayu Bao (Tsinghua University)

Neural-Guided RANSAC: Learning Where to Sample Model Hypotheses .4321
Eric Brachmann (Heidelberg University) and Carsten Rother (University of Heidelberg)
Efficient Learning on Point Clouds With Basis Point Sets .4331
Sergey Prokudin (Max Planck Institute for Intelligent Systems),
Christoph Lassner (Facebook Reality Labs), and Javier Romero (Amazon)
Cross View Fusion for 3D Human Pose Estimation .4341.
Haibo Qiu (University of Science and Technology of China), Chunyu Wang
(Microsoft Research asia), Jingdong Wang ((), Naiyan Wang (TuSimple),
and Wenjun Zeng (Microsoft Research)
Shape-Aware Human Pose and Shape Reconstruction Using Multi-View Images .4351
Junbang Liang (University of Maryland. College Park) and Ming Lin
(UMD-CP & UNC-CH)
Monocular Piecewise Depth Estimation in Dynamic Scenes by Exploiting Superpixel Relations .4362
Di Yan (Tsinghua university), Henrique Morimitsu (Tsinghua
University), Shan Gao (nwpu), and Xiangyang Ji (Tsinghua University)
Is This the Right Place? Geometric-Semantic Pose Verification for Indoor Visual Localization .4372
Hajime Taira (Tokyo Institute of Technology), Ignacio Rocco (Inria),
Jiri Sedlar (CVUT), Masatoshi Okutomi (Tokyo Institute of Technology),
Josef Sivic (Inria and Czech Technical University), Tomas Pajdla
(Czech Technical University in Prague), Torsten Sattler (Chalmers
University of Technology), and Akihiko Torii (Tokyo Institute of
Technology. Japan)
DeepPruner: Learning Efficient Stereo Matching via Differentiable PatchMatch .4383
Shivam Duggal (Delhi Technological University), Shenlong Wang (Uber
ATG. University of Toronto), Wei-Chiu Ma (MIT), Rui Hu (Uber), and
Raquel Urtasun (Uber ATG)
Image & Video Synthesis
Convolutional Sequence Generation for Skeleton-Based Action Synthesis 4393. Sijie Yan (Chinese University of Hong Kong), Zhizhong Li (CUHK),
Yuanjun Xiong (Amazon), Huahan Yan (Trootopia), and Dahua Lin (The
Chinese University of Hong Kong)
Onion-Peel Networks for Deep Video Completion .4402.
Seoung Wug Oh (Yonsei Univeristy), Sungho Lee (Yonsei University),
Joon-Young Lee (Adobe Research), and Seon Joo Kim (Yonsei Univ.)
Copy-and-Paste Networks for Deep Video Inpainting .4412
Sungho Lee (Yonsei University), Seoung Wug Oh (Yonsei University),
Daeyeun Won (Hyundai-mnsoft), and Seon Joo Kim (Yonsei Univ.)
Content and Style Disentanglement for Artistic Style Transfer .4421
Dmytro Kotovenko (Heidelberg University), Artsiom Sanakoyeu
(Heidelberg University), Sabine Lang (Heidelberg University), and
Bjorn Ommer (Heidelberg University)

#### Oral 3.1A

#### **Generative Modeling & Synthesis**

Image2StyleGAN: How to Embed Images Into the StyleGAN Latent Space? .443.  Rameen Abdal (KAUST), Yipeng Qin (KAUST), and Peter Wonka (KAUST)	1
Controllable Artistic Text Style Transfer via Shape-Matching GAN .4441	
Understanding Generalized Whitening and Coloring Transform for Universal Sty. <i>Tai-Yin Chiu (University of Texas)</i>	le Transfer .4451
Learning Implicit Generative Models by Matching Perceptual Features .4460  Cicero Nogueira Dos Santos (IBM Research), Youssef Mroueh (IBM Research), Inkit Padhi (IBM Research), and Pierre Dognin (IBM Research)	
Free-Form Image Inpainting With Gated Convolution .4470	
FiNet: Compatible and Diverse Fashion Image Inpainting .4480	
InGAN: Capturing and Retargeting the "DNA" of a Natural Image .449.1  Assaf Shocher (Weizmann Institute of Science), Shai Bagon (Weizmann Institute of Science), Phillip Isola (MIT), and Michal Irani (Weizmann Institute. Israel)	
Seeing What a GAN Cannot Generate .4501  David Bau (MIT), Jun-Yan Zhu (MIT), Jonas Wulff (MIT), William Peebles (MIT), Bolei Zhou (CUHK), Hendrik Strobelt (IBM Research), and Antonio Torralba (MIT)	
COCO-GAN: Generation by Parts via Conditional Coordinating 451.1	
Neural Turtle Graphics for Modeling City Road Layouts 4521	

Texture Fields: Learning Texture Representations in Function Space .4530.  Michael Oechsle (MPI-IS. University of Tuebingen and ETAS GmbH), Lars  Mescheder (MPI-IS and University of Tuebingen), Michael Niemeyer  (MPI-IS and University of Tuebingen), Thilo Strauss (ETAS Gmbh), and  Andreas Geiger (MPI-IS and University of Tuebingen)
PointFlow: 3D Point Cloud Generation With Continuous Normalizing Flows 4540.  Guandao Yang (Cornell University), Xun Huang (Cornell University),  Zekun Hao (Cornell University), Ming-Yu Liu (NVIDIA), Serge Belongie (Cornell University), and Bharath Hariharan (Cornell University)
Meta-Sim: Learning to Generate Synthetic Datasets 4550  Amlan Kar (University of Toronto), Aayush Prakash (Nvidia), Ming-Yu  Liu (NVIDIA), Eric Cameracci (Nvidia), Justin Yuan (Nvidia), Matt  Rusiniak (NVIDIA), David Acuna (University of Toronto), Antonio  Torralba (MIT), and Sanja Fidler (University of Toronto. NVIDIA)
Specifying Object Attributes and Relations in Interactive Scene Generation .4560
SinGAN: Learning a Generative Model From a Single Natural Image .4569.  Tamar Rott Shaham (Technion), Tali Dekel (Google), and Tomer Michaeli (Technion)
Oral 3.1B
Vision, Language, & Text
VaTeX: A Large-Scale, High-Quality Multilingual Dataset for Video-and-Language Research .4580
A Graph-Based Framework to Bridge Movies and Synopses .459.1.  Yu Xiong (The Chinese University of HK), Qingqiu Huang (The Chinese University of Hong Kong), Lingfeng Guo (UCSD), Hang Zhou (The Chinese University of Hong Kong), Bolei Zhou (CUHK), and Dahua Lin (The Chinese University of Hong Kong)
From Strings to Things: Knowledge-Enabled VQA Model That Can Read and Reason .4601
Counterfactual Critic Multi-Agent Training for Scene Graph Generation .4612.  Long Chen (Zhejiang University), Hanwang Zhang (Nanyang Technological  University), Jun Xiao (Zhejiang University), Xiangnan He (University  of Science and Technology of China), Shiliang Pu (Hikvision Research  Institute), and Shih-Fu Chang (Columbia University)
Robust Change Captioning 4623.

Attention on Attention for Image Captioning .4633.  Lun Huang (Peking University), Wenmin Wang (Peking University), Jie Chen (Peng Cheng Laboratory), and Xiao-Yong Wei (Peng Cheng Laboratory)
Dynamic Graph Attention for Referring Expression Comprehension 4643.  Sibei Yang (The University of Hong Kong), Guanbin Li (Sun Yat-sen University), and Yizhou Yu (Deepwise AI Lab)
Visual Semantic Reasoning for Image-Text Matching 4653.  Kunpeng Li (Northeastern University), Yulun Zhang (Northeastern  University), Kai Li (Northeastern University), Yuanyuan Li  (Northeastern University), and Yun Fu (Northeastern University)
Phrase Localization Without Paired Training Examples .4662  Josiah Wang (Imperial College London) and Lucia Specia (University of Sheffield)
Learning to Assemble Neural Module Tree Networks for Visual Grounding .4672.  Daqing Liu (University of Science and Technology of China), Hanwang  Zhang (Nanyang Technological University), Zheng-Jun Zha (University of  Science and Technology of China), and Feng Wu (University of Science  and Technology of China)
A Fast and Accurate One-Stage Approach to Visual Grounding .4682
Zero-Shot Grounding of Objects From Natural Language Queries .4693
Towards Unconstrained End-to-End Text Spotting .4703.  Siyang Qin (Google Inc.), Alessandro Bissaco (Google Inc.), Michalis  Raptis (Google Inc.), Yasuhisa Fujii (Google Inc.), and Ying Xiao (Google)
What Is Wrong With Scene Text Recognition Model Comparisons? Dataset and Model Analysis .47.14  Jeonghun Baek (Clova AI Research. NAVER Corp.), Geewook Kim (Kyoto University), Junyeop Lee (Clova AI Research. NAVER Corp.), Sungrae Park (Clova AI Research. NAVER Corp.), Dongyoon Han (Clova AI Research. NAVER Corp.), Sangdoo Yun (Clova AI Research. NAVER Corp.), Seong Joon Oh (Clova AI Research. LINE Plus), and Hwalsuk Lee (Clova AI Research. NAVER Corp.)
Poster 3.1
Deep Learning
Sparse and Imperceivable Adversarial Attacks 4723

Enhancing Adversarial Example Transferability With an Intermediate Level Attack .4.7.3.2
Implicit Surface Representations As Layers in Neural Networks 47.42
A Tour of Convolutional Networks Guided by Linear Interpreters 47.52  Pablo Navarrete Michelini (BOE Technology Group Co Ltd.), Hanwen Liu  (BOE Technology Group Co Ltd.), Yunhua Lu (BOE Technology Group Co  Ltd.), and Xingqun Jiang (BOE Technology Group Co Ltd.)
Small Steps and Giant Leaps: Minimal Newton Solvers for Deep Learning .47.62
Semantic Adversarial Attacks: Parametric Transformations That Fool Deep Classifiers <u>4772</u>
Hilbert-Based Generative Defense for Adversarial Examples 4.7.8.3
On the Efficacy of Knowledge Distillation .4.793
Sym-Parameterized Dynamic Inference for Mixed-Domain Image Translation .4802.  Simyung Chang (Seoul National University), Seonguk Park (Seoul National University), John Yang (Seoul National University), and Nojun Kwak (Seoul National University)
Better and Faster: Exponential Loss for Image Patch Matching .481.1
Physical Adversarial Textures That Fool Visual Object Tracking .4821
Wasserstein GAN With Quadratic Transport Cost .4831.  Huidong Liu (Stony Brook University), Xianfeng Gu (Stony Brook University), and Dimitris Samaras (Stony Brook University)

Scalable Verified Training for Provably Robust Image Classification 4841
Differentiable Soft Quantization: Bridging Full-Precision and Low-Bit Neural Networks 4851.  Ruihao Gong (Beihang University), Xianglong Liu (Beihang University),  Shenghu Jiang (Beihang University), Tianxiang Li (Beijing Institute of  Technology), Peng Hu (Beihang University), Jiazhen Lin (Beihang  University), Fengwei Yu (Sensetime Research), and Junjie Yan  (Sensetime Group Limited)
The LogBarrier Adversarial Attack: Making Effective Use of Decision Boundary Information .4861
Proximal Mean-Field for Neural Network Quantization .4870  Thalaiyasingam Ajanthan (ANU), Puneet Dokania (University of Oxford),  Richard Hartley (Australian National University. Australia), and  Philip Torr (University of Oxford)
Improving Adversarial Robustness via Guided Complement Entropy .4880.  Hao-Yun Chen (National Tsing Hua University), Jhao-Hong Liang (National Tsing Hua University), Shih-Chieh Chang (National Tsing Hua University), Jia-Yu Pan (Google), Yu-Ting Chen (Google), Wei Wei (Google), and Da-Cheng Juan (Google)
A Geometry-Inspired Decision-Based Attack .4889.  Yujia Liu (University of Science and Technology of China), Seyed-Mohsen Moosavi-Dezfooli (EPFL), and Pascal Frossard (EPFL)
Universal Perturbation Attack Against Image Retrieval 4898  Jie Li (Xiamen University), Rongrong Ji (Xiamen University. China),  Hong Liu (Xiamen University), Xiaopeng Hong (Xi'an Jiaotong  University), Yue Gao (Tsinghua University), and Qi Tian (Huawei Noah's  Ark Lab)
Bayesian Optimized 1-Bit CNNs 4908.  Jiaxin Gu (Beihang University), Junhe Zhao (Beihang University),  Xiaolong Jiang (Beihang Unviersity), Baochang Zhang (Beihang  University), Jianzhuang Liu (Huawei Noah's Ark Lab), Guodong Guo  (Baidu), and Rongrong Ji (Xiamen University. China)
Rethinking ImageNet Pre-Training .4917
Defending Against Universal Perturbations With Shared Adversarial Training 4927.  Chaithanya Kumar Mummadi (Robert Bosch GmbH), Thomas Brox (University of Freiburg), and Jan Hendrik Metzen (Robert Bosch GmbH)
Adaptive Activation Thresholding: Dynamic Routing Type Behavior for Interpretability in Convolutional Neural Networks 4937

XRAI: Better Attributions Through Regions 4947.
Andrei Kapishnikov (Google), Tolga Bolukbasi (Google), Fernanda Viegas (Google), and Michael Terry (Google)
Guessing Smart: Biased Sampling for Efficient Black-Box Adversarial Attacks .495.7.  Thomas Brunner (fortiss GmbH), Frederik Diehl (Fortiss GmbH), Michael  Truong Le (fortiss GmbH), and Alois Knoll (Robotics and Embedded  Systems)
Recognition
Mask-Guided Attention Network for Occluded Pedestrian Detection 4966.  Yanwei Pang (Tianjin University), Jin Xie (Tianjin University), Muhammad Haris Khan (Inception Institute of Artificial Intelligence), Rao Muhammad Anwer (Inception Institute of Artificial Intelligence), Fahad Shahbaz Khan (Inception Institute of Artificial Intelligence), and Ling Shao (Inception Institute of Artificial Intelligence)
Spectral Feature Transformation for Person Re-Identification 4975
Permutation-Invariant Feature Restructuring for Correlation-Aware Image Set-Based Recognition .4985  Xiaofeng Liu (CMU), Zhenhua Guo (Graduate School at Shenzhen. Tsinghua University. China), Site Li (Carnegie Mellon University), Ping Jia (CIOMP), Lingsheng Kong (Changchun Institute of Optics. Fine Mechanics and Physics), Jane You (HK Poly U), and B. V. K. Vijaya Kumar (CMU. USA)
Improving Pedestrian Attribute Recognition With Weakly-Supervised Multi-Scale Attribute-Specific Localization 4996  Chufeng Tang (Tsinghua University), Lu Sheng (Beihang University), Zhao-Xiang Zhang (Chinese Academy of Sciences. China), and Xiaolin Hu (Tsinghua University)
Correlation Congruence for Knowledge Distillation .5006  Baoyun Peng (National University of Defense Technology), Xiao Jin (Sensetime Group Limited), Dongsheng Li (School of Computer Science. National University of Defense Technology), Shunfeng Zhou (SenseTime), Yichao Wu (Sensetime Group Limited), Jiaheng Liu (Beihang University), Zhaoning Zhang (School of Computer Science. National University of Defense Technology), and Yu Liu (The Chinese University of Hong Kong)
Dynamic Curriculum Learning for Imbalanced Data Classification .501.6
Video Face Clustering With Unknown Number of Clusters .5026.  Makarand Tapaswi (INRIA), Marc Law (NVIDIA), and Sanja Fidler (University of Toronto. NVIDIA)

Targeted Mismatch Adversarial Attack: Query With a Flower to Retrieve the Tower .503.6.  Giorgos Tolias (Czech Technical University in Prague. Faculty of Electrical Engineering. Visual Recognition Group), Filip Radenovic (Visual Recognition Group. CTU Prague), and Ondrej Chum (Vision Recognition Group. Czech Technical University in Prague)
Fashion++: Minimal Edits for Outfit Improvement .5046.  Wei-Lin Hsiao (UT-Austin), Isay Katsman (Cornell University),  Chao-Yuan Wu (UT Austin), Devi Parikh (Georgia Tech & Facebook AI  Research), and Kristen Grauman (Facebook AI Research & UT Austin)
Semi-Supervised Pedestrian Instance Synthesis and Detection With Mutual Reinforcement .5056
SILCO: Show a Few Images, Localize the Common Object .5066.  Tao Hu (University of Amsterdam), Pascal Mettes (University of Amsterdam), Jia-Hong Huang (University of Amsterdam), and Cees Snoek (University of Amsterdam)
A Deep Step Pattern Representation for Multimodal Retinal Image Registration .507.6.  Jimmy Lee (Cixi Institute of Biomedical Engineering. Chinese Academy of Sciences), Peng Liu (University of Electronic Science and Technology of China), Jun Cheng (Cixi Institute of Biomedical Engineering. Chinese Academy of Sciences), and Huazhu Fu (Inception Institute of Artificial Intelligence)
Deep Graphical Feature Learning for the Feature Matching Problem .5086
Minimum Delay Object Detection From Video 5096.  Dong Lao (KAUST) and Ganesh Sundaramoorthi (Kaust)
Learning With Average Precision: Training Image Retrieval With a Listwise Loss .5.106
Learning to Find Common Objects Across Few Image Collections 5.116.  Amirreza Shaban (Georgia Institute of Technology), Amir Rahimi (Australian National University), Shray Bansal (Georgia Institute of Technology), Stephen Gould (Australian National University. Australia), Byron Boots (Georgia Institute of Technology), and Richard Hartley (Australian National University. Australia)
Weakly Aligned Cross-Modal Learning for Multispectral Pedestrian Detection .5.126.  Lu Zhang (Institute of Automation. Chinese Academy of Sciences),  Xiangyu Zhu (Chinese Academy of Science), Xiangyu Chen (Renmin  University of China), Xu Yang (Chinese Academy of Sciences), Zhen Lei  (NLPR. CASIA. China), and Zhiyong Liu (State Key Lab of Management and  Control for Complex Systems. Institute of Automation. Chinese Academy  of Sciences)
Deep Self-Learning From Noisy Labels 5137.  Jiangfan Han (The Chinese University of Hong Kong), Ping Luo (The Chinese University of Hong Kong), and Xiaogang Wang (Chinese University of Hong Kong).

DSConv: Efficient Convolution Operator .5.147.  Marcelo Gennari Do Nascimento (Unviersity of Oxford), Victor  Prisacariu (University of Oxford), and Roger Fawcett (Intel)
Once a MAN: Towards Multi-Target Attack via Learning Multi-Target Adversarial Network Once .5.15.7  Jiangfan Han (The Chinese University of Hong Kong), Xiaoyi Dong (University of Science and Technology of China), Ruimao Zhang (The Chinese University of Hong Kong), Dongdong Chen (university of science and technology of china), Weiming Zhang (University of Science and Technology of China), Nenghai Yu (University of Science and Technology of China), Ping Luo (The Chinese University of Hong Kong), and Xiaogang Wang (Chinese University of Hong Kong. Hong Kong)
Segmentation, Grouping, & Shape
Explicit Shape Encoding for Real-Time Instance Segmentation .5167  Wenqiang Xu (Shanghai Jiaotong University), Haiyang Wang (SHANG HAI  JIAO TONG UNIVERSITY), Fubo Qi (Shanghai JiaoTong University), and  Cewu Lu (Shanghai Jiao Tong University)
IMP: Instance Mask Projection for High Accuracy Semantic Segmentation of Things .5177.  Cheng-Yang Fu (UNC-Chapel Hill), Tamara Berg (University on North carolina), and Alexander Berg (University of North Carolina. USA)
Video Instance Segmentation 5.187
Attention Bridging Network for Knowledge Transfer 5.197
Self-Supervised Difference Detection for Weakly-Supervised Semantic Segmentation .5207
SPGNet: Semantic Prediction Guidance for Scene Parsing .5217  Bowen Cheng (UIUC), Liang-Chieh Chen (Google Inc.), Yunchao Wei (UIUC), Yukun Zhu (Google Inc.), Zilong Huang (Huazhong Univ. of Science and Technology), Jinjun Xiong (IBM Thomas J. Watson Research Center), Thomas Huang (UIUC), Wen-Mei Hwu (University of Illinois at Urbana-Champaign), Honghui Shi (IBM), and Uiuc Uiuc
Gated-SCNN: Gated Shape CNNs for Semantic Segmentation .5228.  Towaki Takikawa (University of Waterloo), David Acuna (University of Toronto), Varun Jampani (Nvidia Research), and Sanja Fidler (University of Toronto. NVIDIA)
DensePoint: Learning Densely Contextual Representation for Efficient Point Cloud Processing .5238

AMP: Adaptive Masked Proxies for Few-Shot Segmentation .5248
Universal Semi-Supervised Semantic Segmentation .5258
Statistics, Physics, Theory & Datasets
Accelerate Learning of Deep Hashing With Gradient Attention .5270
SVD: A Large-Scale Short Video Dataset for Near-Duplicate Video Retrieval .5280
Block Annotation: Better Image Annotation With Sub-Image Decomposition .5289
Probabilistic Deep Ordinal Regression Based on Gaussian Processes .5300.  Yanzhu Liu (Nanyang Technological University), Fan Wang (Nanyang Technological University), and Wai-Kin Adams Kong (Nanyang Technological University)
Balanced Datasets Are Not Enough: Estimating and Mitigating Gender Bias in Deep Image Representations .5309
Pouya Bashivan (Massachusetts Institute of Technology), Mark Tensen (University of Amsterdam), and James Dicarlo (Massachusetts Institute of Technology)
BD From Single View & RGBD
FACSIMILE: Fast and Accurate Scans From an Image in Less Than a Second .5329
Delving Deep Into Hybrid Annotations for 3D Human Recovery in the Wild .5339.  Yu Rong (The Chinese University of Hong Kong), Ziwei Liu (The Chinese University of Hong Kong), Cheng Li (SenseTime Research), Kaidi Cao (Stanford University), and Chen Change Loy (Nanyang Technological University)

Human Mesh Recovery From Monocular Images via a Skeleton-Disentangled Representation .5348
Three-D Safari: Learning to Estimate Zebra Pose, Shape, and Texture From Images "In the Wild" .5358  Silvia Zuffi (IMATI-CNR), Angjoo Kanazawa (University of California Berkeley), Tanya Berger-Wolf (University of Illinois at Chicago), and Michael Black (Max Planck Institute for Intelligent Systems)
Object-Driven Multi-Layer Scene Decomposition From a Single Image .5368.  Helisa Dhamo (Technical University of Munich), Nassir Navab (TU  Munich. Germany), and Federico Tombari (TUM. Google)
Occupancy Flow: 4D Reconstruction by Learning Particle Dynamics .5378.  Michael Niemeyer (MPI-IS and University of Tuebingen), Lars Mescheder (MPI-IS and University of Tuebingen), Michael Oechsle (MPI-IS.  University of Tuebingen and ETAS GmbH), and Andreas Geiger (MPI-IS and University of Tuebingen)
Joint Monocular 3D Vehicle Detection and Tracking .5389  Hou-Ning Hu (National Tsing Hua University), Qi-Zhi Cai (Sinovation  Ventures AI Institute), Dequan Wang (UC Berkeley), Ji Lin (MIT), Min  Sun (NTHU), Philipp Kraehenbuehl (UT Austin), Trevor Darrell (UC  Berkeley), and Fisher Yu (UC Berkeley)
Face & Body
Fingerspelling Recognition in the Wild With Iterative Visual Attention .5399.  Bowen Shi (Toyota Technological Institute at Chicago), Aurora Martinez  Del Rio (University of Chicago), Jonathan Keane (University of  Chicago), Diane Brentari (University of Chicago), Greg Shakhnarovich  (TTI-Chicago), and Karen Livescu (TTI-Chicago)
PointAE: Point Auto-Encoder for 3D Statistical Shape and Texture Modelling .5409
Multi-Garment Net: Learning to Dress 3D People From Images .5419.  Bharat Bhatnagar (MPI-INF), Garvita Tiwari (MPI-INF), Christian Theobalt (MPI Informatik), and Gerard Pons-Moll (MPII. Germany)
Skeleton-Aware 3D Human Shape Reconstruction From Point Clouds .5430
AMASS: Archive of Motion Capture As Surface Shapes .544.1
Person-in-WiFi: Fine-Grained Person Perception Using WiFi .545.1

FAB: A Robust Facial Landmark Detection Framework for Motion-Blurred Videos .5461
Attentional Feature-Pair Relation Networks for Accurate Face Recognition .547.1.  Bong-Nam Kang (POSTECH), Yonghyun Kim (POSTECH), Bongjin Jun (StradVision. Inc.), and Daijin Kim (Pohang University of Science and Technology)
Action & Video
Action Recognition With Spatial-Temporal Discriminative Filter Banks .5481
EPIC-Fusion: Audio-Visual Temporal Binding for Egocentric Action Recognition .549.1
Weakly-Supervised Action Localization With Background Modeling .5501
Grouped Spatial-Temporal Aggregation for Efficient Action Recognition .551.1
Temporal Structure Mining for Weakly Supervised Action Detection .5521.  Tan Yu (Nanyang Technological University), Zhou Ren (Wormpex AI Research), Yuncheng Li (Snap), Enxu Yan (Snap Inc.), Ning Xu (-), and Junsong Yuan (State University of New York at Buffalo. USA)
Temporal Recurrent Networks for Online Action Detection .5531.  Mingze Xu (Indiana University), Mingfei Gao (University of Maryland),  Yi-Ting Chen (Honda Research Institute USA), Larry Davis (University of Maryland), and David Crandall (Indiana University)
StartNet: Online Detection of Action Start in Untrimmed Videos .5541.  Mingfei Gao (University of Maryland), Mingze Xu (Indiana University),  Larry Davis (University of Maryland), Richard Socher (Salesforce), and  Caiming Xiong (Salesforce Research)
Video Classification With Channel-Separated Convolutional Networks .555.1.  Du Tran (Facebook Research), Heng Wang (Facebook Research), Matt Feiszli (Facebook Research), and Lorenzo Torresani (Facebook AI Research)
Predicting the Future: A Jointly Learnt Model for Action Anticipation .5561  Harshala Gammulle (Queensland University of Technology), Simon Denman (Queensland University of Technology. Australia), Sridha Sridharan (QUT), and Clinton Fookes (Queensland University of Technology)

# **Low-Level & Optimization**

Iuman-Aware Motion Deblurring 557.1.  Ziyi Shen (Inception Institute of Artificial Intelligence), Wenguan Wang (Inception Institute of Artificial Intelligence), Xiankai Lu (Inception Institute of Artificial Intelligence), Jianbing Shen (Inception Institute of Artificial Intelligence), Haibin Ling (Temple University), Tingfa Xu (Beijing Institute of Technology), and Ling Shao (Inception Institute of Artificial Intelligence)	••••
Fast Video Object Segmentation via Dynamic Targeting Network .5581  Lu Zhang (Dalian University of Technology), Zhe Lin (Adobe Research),  Jianming Zhang (Adobe Research), Huchuan Lu (Dalian University of  Technology), and You He (Naval Aviation University)	•••
Solving Vision Problems via Filtering .559.1	
GAN-Based Projector for Faster Recovery With Convergence Guarantees in Linear Inverse Problems .560.  Ankit Raj (University of Illinois at Urbana-Champaign), Yuqi Li (University of Illinois Urbana-Champaign), and Yoram Bresler (UIUC)	l
Coot: A Perceptual Metric for Facial Sketches .561.1	•••
Learning Filter Basis for Convolutional Neural Network Compression .5622	•••
End-to-End Learning of Representations for Asynchronous Event-Based Data .5632.  Daniel Gehrig (University of Zurich & ETH Zurich), Antonio Loquercio (ETH / University of Zurich), Konstantinos Derpanis (Ryerson University), and Davide Scaramuzza (University of Zurich & ETH Zurich. Switzerland)	•••
ERL-Net: Entangled Representation Learning for Single Image De-Raining .5643	•••
Perceptual Deep Depth Super-Resolution .5652  Oleg Voynov (Skoltech), Alexey Artemov (Skoltech), Vage Egiazarian (Skoltech), Alexandr Notchenko (Skoltech), Gleb Bobrovskikh (Higher School of Economics), Evgeny Burnaev (Skoltech), and Denis Zorin (New York University)	••••

#### **Scene Understanding**

3D Scene Graph: A Structure for Unified Semantics, 3D Space, and Camera .5663  Iro Armeni (Stanford University), Zhi-Yang He (Stanford University),  Amir Zamir (Stanford. UC Berkeley), Junyoung Gwak (Stanford  University), Jitendra Malik (University of California at Berkley),  Martin Fischer (Stanford University), and Silvio Savarese (Stanford  University)
Floorplan-Jigsaw: Jointly Estimating Scene Layout and Aligning Partial Scans .5673
Enforcing Geometric Constraints of Virtual Normal for Depth Prediction .5683.  Wei Yin (University of Adelaide), Yifan Liu (University of Adelaide), Chunhua Shen (University of Adelaide), and Youliang Yan (Huawei)
Deep Contextual Attention for Human-Object Interaction Detection 5693.  Tiancai Wang (Tianjin University), Rao Muhammad Anwer (Inception Institute of Artificial Intelligence), Muhammad Haris Khan (Inception Institute of Artificial Intelligence), Fahad Shahbaz Khan (Inception Institute of Artificial Intelligence), Yanwei Pang (Tianjin University), Ling Shao (Inception Institute of Artificial Intelligence), and Jorma Laaksonen (Aalto University)
Learning Compositional Neural Information Fusion for Human Parsing .57.02.  Wenguan Wang (Inception Institute of Artificial Intelligence), Zhijie  Zhang (Tianjin University), Siyuan Qi (UCLA), Jianbing Shen (Inception  Institute of Artificial Intelligence), Yanwei Pang (Tianjin  University), and Ling Shao (Inception Institute of Artificial  Intelligence)
Attentional Neural Fields for Crowd Counting .5713.  Anran Zhang (Beihang University), Lei Yue (Beihang University), Jiayi Shen (Beihang University), Fan Zhu (Inception Institute of Artificial Intelligence), Xiantong Zhen (Inception Institute of Artificial Intelligence), Xianbin Cao (Beihang University. China), and Ling Shao (Inception Institute of Artificial Intelligence)
Understanding Human Gaze Communication by Spatio-Temporal Graph Reasoning .5.7.23.  Lifeng Fan (University of California. Los Angeles), Wenguan Wang (Inception Institute of Artificial Intelligence), Song-Chun Zhu (UCLA), Xinyu Tang (USTC), and Siyuan Huang (UCLA)
Controllable Attention for Structured Layered Video Decomposition .5.7.3.3
GANalyze: Toward Visual Definitions of Cognitive Image Properties .57.43.  Lore Goetschalckx (MIT), Alex Andonian (MIT), Aude Oliva (MIT), and Phillip Isola (MIT)

# Language & Reasoning

Saliency-Guided Attention Network for Image-Sentence Matching .5753.  Zhong Ji (Tianjin University), Haoran Wang (Tianjin University),  Jungong Han (Lancaster University), and Yanwei Pang (Tianjin  University)
CAMP: Cross-Modal Adaptive Message Passing for Text-Image Retrieval .5.7.63.  Zihao Wang (Sensetime), Xihui Liu (The Chinese University of Hong Kong), Hongsheng Li (Chinese University of Hong Kong), Lu Sheng (Beihang University), Junjie Yan (Sensetime Group Limited), Xiaogang Wang (Chinese University of Hong Kong. Hong Kong), and Jing Shao (Sensetime)
ACMM: Aligned Cross-Modal Memory for Few-Shot Image and Sentence Matching 5.7.73
Creativity Inspired Zero-Shot Learning .5783
Generating Easy-to-Understand Referring Expressions for Target Identifications .5.79.3.  Mikihiro Tanaka (The University of Tokyo), Takayuki Itamochi (NVIDIA),  Kenichi Narioka (DENSO CORPORATION), Ikuro Sato (Denso IT Laboratory),  Yoshitaka Ushiku (The University of Tokyo), and Tatsuya Harada (The  University of Tokyo / RIKEN)
Language-Agnostic Visual-Semantic Embeddings .5803
Adversarial Representation Learning for Text-to-Image Matching .5813.  Nikolaos Sarafianos (University of Houston), Xiang Xu (University of Houston), and Ioannis Kakadiaris (University of Houston)
Multi-Modality Latent Interaction Network for Visual Question Answering 5824.  Gao Peng (Chinese university of hong kong), Haoxuan You (Tsinghua University), Zhanpeng Zhang (SenseTime Group Limited), Xiaogang Wang (Chinese University of Hong Kong, Hong Kong), and Hongsheng Li (Chinese University of Hong Kong)
3D From Multiview & Sensors
Key.Net: Keypoint Detection by Handcrafted and Learned CNN Filters 5835.  Axel Barroso Laguna (Imperial College London), Edgar Riba (Computer Vision Center. Computer Science Department Universitat Autònoma de Barcelona Bellaterra. Barcelona), Daniel Ponsa (Centre de Visió per Computador - Universitat Autònoma de Barcelona), and Krystian Mikolajczyk (Imperial College London)
Learning Two-View Correspondences and Geometry Using Order-Aware Network .5844.  Jiahui Zhang (Tsinghua University), Dawei Sun (Tsinghua University),  Zixin Luo (HKUST), Anbang Yao (Intel Labs China), Lei Zhou (HKUST),  Tianwei Shen (HKUST), Yurong Chen (Intel Labs China), Hongen Liao  (Tsinghua University), and Long Quan (Hong Kong University of Science and Technology)

Learning Meshes for Dense Visual SLAM .5854.
Michael Bloesch (Deepmind), Tristan Laidlow (Imperial College London),
Ronald Clark (Imperial College London), Stefan Leutenegger (Imperial
College London), and Andrew Davison (Imperial College London)
EM-Fusion: Dynamic Object-Level SLAM With Probabilistic Data Association .5864.
Michael Strecke (Max Planck Institute for Intelligent Systems) and
Joerg Stueckler (Max-Planck-Institute for Intelligent Systems)
ClusterSLAM: A SLAM Backend for Simultaneous Rigid Body Clustering and Motion Estimation .5874
Jiahui Huang (Tsinghua University), Sheng Yang (Tsinghua University),
Zishuo Zhao (Tsinghua University), Yu-Kun Lai (Cardiff University),
and Shimin Hu (Tsinghua University)
Efficient and Robust Registration on the 3D Special Euclidean Group .5884.
Uttaran Bhattacharya (University of Maryland. College Park) and Venu
Madhav Govindu (Indian Institute of Science)
Algebraic Characterization of Essential Matrices and Their Averaging in Multiview Settings .5894
Yoni Kasten (Weizmann Institute), Amnon Geifman (Weizmann Institute),
Meirav Galun (Weizmann Institute of Science), and Ronen Basri
(Weizmann Institute of Science)
Image & Video Synthesis
Liquid Warping GAN: A Unified Framework for Human Motion Imitation, Appearance Transfer and Novel
View Synthesis 5903
University), Jie Min (ShanghaiTech University), Wenhan Luo (Tencent AI
Lab), Lin Ma (Tencent AI Lab), and Shenghua Gao (Shanghaitech
University)
RelGAN: Multi-Domain Image-to-Image Translation via Relative Attributes .5913.
Yu-Jing Lin (National Taiwan University), Po-Wei Wu (National Taiwan
University), Che-Han Chang (HTC Research & Healthcare), Edward Chang
(HTC Research & Healthcare), and Shih-Wei Liao (National Taiwan
University)
Attribute-Driven Spontaneous Motion in Unpaired Image Translation .5922.
Ruizheng Wu (The Chinese University of Hong KONG), Xin Tao (Tencent),
Xiaodong Gu (Harbin Institute of Technology. Shenzhen), Xiaoyong Shen
(Tencent), and Jiaya Jia (Chinese University of Hong Kong)
Everybody Dance Now 5932.
Caroline Chan (UC Berkeley), Shiry Ginosar (UC Berkeley), Tinghui Zhou
(Berkeley), and Alexei Efros (UC Berkeley)
Multimodal Style Transfer via Graph Cuts .5942.
Yulun Zhang (Northeastern University), Chen Fang (ByteDance), Yilin
Wang (Adobe), Zhaowen Wang (Adobe Research), Zhe Lin (Adobe Research),
Yun Fu (Northeastern University), and Jimei Yang (Adobe)
A Closed-Form Solution to Universal Style Transfer .595.1.
Ming Lu (Tsinghua University), Hao Zhao (Tsinghua University), Anbang
Yao (Intel Labs China), Yurong Chen (Intel Labs China), Feng Xu
(Tsinghua University), and Li Zhang (Tsinghua University)

Progressive Reconstruction of Visual Structure for Image Inpainting .5961
Oral 3.2A
Recognition, Detection, & Re-Identification
Variational Adversarial Active Learning .597.1.  Samrath Sinha (University of Toronto), Sayna Ebrahimi (UC Berkeley), and Trevor Darrell (UC Berkeley)
Confidence Regularized Self-Training .5981  Yang Zou (Carnegie Mellon University), Zhiding Yu (NVIDIA), Xiaofeng Liu (CMU), B. V. K. Vijaya Kumar (CMU. USA), and Jinsong Wang (General Motors)
Anchor Loss: Modulating Loss Scale Based on Prediction Difficulty .599.1  Serim Ryou (California Institute of Technology), Seong-Gyun Jeong (code42.ai), and Pietro Perona (California Institute of Technology)
Local Aggregation for Unsupervised Learning of Visual Embeddings .6001.  Chengxu Zhuang (Stanford University), Alex Zhai (Stanford University), and Daniel Yamins (Stanford University)
PR Product: A Substitute for Inner Product in Neural Networks .6012
CutMix: Regularization Strategy to Train Strong Classifiers With Localizable Features .6022.  Sangdoo Yun (Clova AI Research. NAVER Corp.), Dongyoon Han (Clova AI Research. NAVER Corp.), Sanghyuk Chun (Clova AI Research. NAVER Corp.), Seong Joon Oh (Clova AI Research. LINE Plus), Youngjoon Yoo (Clova AI Research. NAVER Corp.), and Junsuk Choe (Yonsei University)
Towards Interpretable Object Detection by Unfolding Latent Structures .6032.  Tianfu Wu (NC State University) and Xi Song (None)
Scaling Object Detection by Transferring Classification Weights .6043.  Jason Kuen (Nanyang Technological University), Federico Perazzi (Adobe Research), Zhe Lin (Adobe Research), Jianming Zhang (Adobe Research), and Yap-Peng Tan (Nanyang Technological University. Singapore)
Scale-Aware Trident Networks for Object Detection .6053  Yanghao Li (Peking University), Yuntao Chen (CASIA), Naiyan Wang (TuSimple), and Zhao-Xiang Zhang (Chinese Academy of Sciences. China)

(Princeton University), Tomas Pfister (Google), and Li-Jia Li (Stanford)

Lanlan Liu (University of Michigan), Michael Muelly (Google), Jia Deng

Satoshi Kosugi (The University of Tokyo), Toshihiko Yamasaki (The University of Tokyo), and Kiyoharu Aizawa (The University of Tokyo)

Object-Aware Instance Labeling for Weakly Supervised Object Detection .6063.....

Generative Modeling for Small-Data Object Detection .6072....

Transductive Learning for Zero-Shot Object Detection .6081  Shafin Rahman (Australian National University), Salman Khan (Australian National University. ANU), and Nick Barnes (CSIRO(Data61)
Self-Training and Adversarial Background Regularization for Unsupervised Domain Adaptive One-Stage Object Detection 6091.
Seunghyeon Kim (KAIST), Jaehoon Choi (KAIST), Taekyung Kim (KAIST), and Changick Kim (KAIST)
Memory-Based Neighbourhood Embedding for Visual Recognition .6.10.1.  Suichan Li (University of Science and Technology of China), Dapeng Chen (Sensetime Group Limited), Bin Liu (University of Science and Technology of China), Nenghai Yu (University of Science and Technology of China), and Rui Zhao (SenseTime Group Limited)
Self-Similarity Grouping: A Simple Unsupervised Cross Domain Adaptation Approach for Person Re-Identification .6.1.1.  Yang Fu (UIUC), Yunchao Wei (UIUC), Guanshuo Wang (Shanghai Jiao Tong University), Yuqian Zhou (UIUC), Honghui Shi (IBM), Uiuc Uiuc, and Thomas Huang (UIUC)
Deep Reinforcement Active Learning for Human-in-the-Loop Person Re-Identification .6.121
A Dual-Path Model With Adaptive Attention for Vehicle Re-Identification .6.13.1.  Pirazh Khorramshahi (University of Maryland), Amit Kumar (University of Maryland), Neehar Peri (University of Maryland), Sai Saketh Rambhatla (University of Maryland), Jun-Cheng Chen (University of Maryland), and Rama Chellappa (University of Maryland)
Bayesian Loss for Crowd Count Estimation With Point Supervision .6141.  Zhiheng Ma (Xi'an Jiaotong University), Xing Wei (Xi'an Jiaotong University), Xiaopeng Hong (Xi'an Jiaotong University), and Yihong Gong (Xi'an Jiaotong University)
Learning Spatial Awareness to Improve Crowd Counting 6.15.1

#### Oral 3.2B

#### Video & Action Underst&ing

GradNet: Gradient-Guided Network for Visual Object Tracking .6161...

Peixia Li (Dalian University of Technology), Boyu Chen (Dalian

University of Technology), Wanli Ouyang (The University of Sydney),

Dong Wang (Dalian University of Technology), Xiaoyun Yang (China

Science IntelliCloud Technology Co.. Ltd), and Huchuan Lu (Dalian

University of Technology)

FAMNet: Joint Learning of Feature, Affinity and Multi-Dimensional Assignment for Online Multiple Object Tracking .6.17.1
Learning Discriminative Model Prediction for Tracking .6181
DynamoNet: Dynamic Action and Motion Network .6191
SlowFast Networks for Video Recognition .620.1.  Christoph Feichtenhofer (Facebook AI Research), Haoqi Fan (Facebook AI Research), Jitendra Malik (University of California at Berkley), and Kaiming He (Facebook AI Research)
Generative Multi-View Human Action Recognition .621.1
Multi-Agent Reinforcement Learning Based Frame Sampling for Effective Untrimmed Video Recognition .6221 Wenhao Wu (Shenzhen Institutes of Advanced Technology. Chinese Academy of Sciences), Dongliang He (Baidu), Xiao Tan (Baidu Research), Shifeng Chen (SIAT), and Shilei Wen (Baidu Research)
SCSampler: Sampling Salient Clips From Video for Efficient Action Recognition .623.1
Weakly Supervised Energy-Based Learning for Action Segmentation .6242.  Jun Li (Oregon State University), Peng Lei (Amazon.com Services.  Inc.), and Sinisa Todorovic (Oregon State U)
What Would You Expect? Anticipating Egocentric Actions With Rolling-Unrolling LSTMs and Modality Attention .6251
PIE: A Large-Scale Dataset and Models for Pedestrian Intention Estimation and Trajectory Prediction .6261  Amir Rasouli (York University), Iuliia Kotseruba (York University),  Toni Kunic (York University), and John Tsotsos (York University)
STGAT: Modeling Spatial-Temporal Interactions for Human Trajectory Prediction .627.1.  Yingfan Huang (Institute of Computing Technology Chinese Academy of Sciences), Huikun Bi (Institute of Computing Technology Chinese Academy of Sciences), Zhaoxin Li (Institute of Computing Technology Chinese Academy of Sciences), Tianlu Mao (Institute of Computing Technology Chinese Academy of Sciences), and Zhaoqi Wang (Chinese Academy of Sciences)
Learning Motion in Feature Space: Locally-Consistent Deformable Convolution Networks for Fine-Grained Action Detection .628.1

Dual Attention Matching for Audio-Visual Event Localization .629.1.  Yu Wu (University of Technology Sydney), Linchao Zhu (University of Technology. Sydney), Yan Yan (Texas State University), and Yi Yang (UTS)
Uncertainty-Aware Audiovisual Activity Recognition Using Deep Bayesian Variational Inference .6300  Mahesh Subedar (Intel), Ranganath Krishnan (Intel), Paulo Lopez Meyer  (Intel), Omesh Tickoo (Intel), and Jonathan Huang (Intel)
Non-Local Recurrent Neural Memory for Supervised Sequence Modeling .6310.  Canmiao Fu (Peking University), Wenjie Pei (Tencent), Qiong Cao (Tencent), Chaopeng Zhang (Peking University), Yong Zhao (Peking University Shenzhen Graduate School), Xiaoyong Shen (Tencent), and Yu-Wing Tai (Tencent)
Temporal Attentive Alignment for Large-Scale Video Domain Adaptation .6320.  Min-Hung Chen (Georgia Institute of Technology), Zsolt Kira (Georgia Institute of Technology), Ghassan Alregib (Georgia Institute of Technology), Jaekwon Yoo (Sony Interactive Entertainment LLC), Ruxin Chen (Sie), and Jian Zheng (Binghamton University)
Action Assessment by Joint Relation Graphs .6330.  Jia-Hui Pan (Sun Yat-sen University), Jibin Gao (Sun Yat-sen University), and Wei-Shi Zheng (Sun Yat-sen University. China)
Unsupervised Procedure Learning via Joint Dynamic Summarization .6340.  Ehsan Elhamifar (Northeastern University) and Zwe Naing (Northeastern University)
ViSiL: Fine-Grained Spatio-Temporal Video Similarity Learning .6350
Poster 3.2
Deep Learning
Unsupervised Learning of Landmarks by Descriptor Vector Exchange 6360.  James Thewlis (University of Oxford), Samuel Albanie (University of Oxford), Hakan Bilen (University of Edinburgh), and Andrea Vedaldi (Oxford University)
Learning Compositional Representations for Few-Shot Recognition .637.1.  Pavel Tokmakov (CMU), Yu-Xiong Wang (Carnegie Mellon University), and  Martial Hebert (Carnegie Mellon University)
Spectral Regularization for Combating Mode Collapse in GANs .6381.  Kanglin Liu (Shenzhen University), Guoping Qiu (University of Nottingham), Wenming Tang (Shenzhen University), and Fei Zhou (Shenzhen University)
Scaling and Benchmarking Self-Supervised Visual Representation Learning 6390.  Priya Goyal (Facebook Inc.), Dhruv Mahajan (Facebook), Abhinav Gupta  (CMU/FAIR), and Ishan Misra (Facebook Al Research)

earning an Effective Equivariant 3D Descriptor Without Supervision .6400
CPConv: Flexible and Deformable Convolution for Point Clouds .6410
Heural Inter-Frame Compression for Video Coding .6420
Cask2Vec: Task Embedding for Meta-Learning .6429
Deep Clustering by Gaussian Mixture Variational Autoencoders With Graph Embedding .6439
oftTriple Loss: Deep Metric Learning Without Triplet Sampling .6449
Weakly Supervised Fine Label Classifier Enhanced by Coarse Supervision .6458.  Fariborz Taherkhani (West Virginia University), Hadi Kazemi (WVU), Ali  Dabouei (West Virginia university), Jeremy Dawson (West Virginia  University), and Nasser Nasrabadi (West Virginia University)
Gaussian Affinity for Max-Margin Class Imbalanced Learning .6468
AttPool: Towards Hierarchical Feature Representation in Graph Convolutional Networks via Attention Mechanism .6479
Deep Metric Learning With Tuplet Margin Loss .6489

Normalized Wasserstein for Mixture Distributions With Applications in Adversarial Learning and Domain Adaptation .6499
Fast and Practical Neural Architecture Search .6508.  Jiequan Cui (Chinese University of Hong Kong), Pengguang Chen (Chinese University of Hong Kong), Ruiyu Li (Tencent), Shu Liu (Tencent), Xiaoyong Shen (Tencent), and Jiaya Jia (Chinese University of Hong Kong)
Symmetric Graph Convolutional Autoencoder for Unsupervised Graph Representation Learning .6518  Jiwoong Park (Seoul National University), Minsik Lee (Hanyang University), Hyung Jin Chang (University of Birmingham), Kyuewang Lee (Seoul National University), and Jin Young Choi (Seoul National University)
Deep Elastic Networks With Model Selection for Multi-Task Learning .6528.  Chanho Ahn (Department of ECE and ASRI. Seoul National University),  Eunwoo Kim (University of Oxford), and Songhwai Oh (Seoul National University)
Metric Learning With HORDE: High-Order Regularizer for Deep Embeddings .6538  Pierre Jacob (ETIS), David Picard (ETIS - CNRS), Aymeric Histace (ETIS), and Edouard Klein (C3N Gendarmerie Nationale)
Adversarial Learning With Margin-Based Triplet Embedding Regularization .6548.  Yaoyao Zhong (Beijing University of Posts and Telecommunications) and Weihong Deng (Beijing University of Posts and Telecommunications)
Recognition
Simultaneous Multi-View Instance Detection With Learned Geometric Soft-Constraints .6558
CenterNet: Keypoint Triplets for Object Detection .6568  Kaiwen Duan (University of Chinese Academy of Sciences), Song Bai (University of Oxford), Lingxi Xie (Huawei Noah's Ark Lab), Honggang Qi (University of Chinese Academy of Sciences), Qingming Huang (University of Chinese Academy of Sciences), and Qi Tian (Huawei Noah's Ark Lab)
Online Hyper-Parameter Learning for Auto-Augmentation Strategy .6578.  Chen Lin (Sensetime), Minghao Guo (Sensetime), Chuming Li (sensetime),  Xin Yuan (Tsinghua University), Wei Wu (SenseTime Group Limited),  Junjie Yan (Sensetime Group Limited), Dahua Lin (The Chinese  University of Hong Kong), and Wanli Ouyang (The University of Sydney)
DANet: Divergent Activation for Weakly Supervised Object Localization .6588.  Haolan Xue (University of Chinese Academy of Sciences), Chang Liu (University of Chinese Academy of Sciences), Fang Wan (University of Chinese Academy of Sciences), Jianbin Jiao (University of Chinese Academy of Sciences), Xiangyang Ji (Tsinghua University), and Qixiang Ye (University of Chinese Academy of Sciences. China)

Selective Sparse Sampling for Fine-Grained Image Recognition .6598.
Yao Ding (University of Chinese Academy of Sciences), Yanzhao Zhou
(University of Chinese Academy of Sciences), Yi Zhu (University of Chinese Academy of Sciences), Qixiang Ye (University of Chinese
Academy of Sciences. China), and Jianbin Jiao (University of Chinese
Academy of Sciences)
Dynamic Anchor Feature Selection for Single-Shot Object Detection .6608.
Shuai Li (PolyU), Lingxiao Yang (The Hong Kong Polytechnic
University), Jianqiang Huang (Alibaba Group), Xian-Sheng Hua (Alibaba Group), and Lei Zhang (Hong Kong Polytechnic University. Hong Kong.
China)
Incremental Learning Using Conditional Adversarial Networks .661.8
Ye Xiang (Beijing Institute of Technology), Ying Fu (Beijing Institute
of Technology), Pan Ji (NEC Laboratories America), and Hua Huang (Beijing Institute of Technology)
Bilateral Adversarial Training: Towards Fast Training of More Robust Models Against Adversarial
Attacks .6628.
Jianyu Wang (Baidu Research USA) and Haichao Zhang (Baidu Research)
View Confusion Feature Learning for Person Re-Identification 663.8
Auto-FPN: Automatic Network Architecture Adaptation for Object Detection Beyond Classification .6648
Hang Xu (Huawei Noah's Ark Lab), Lewei Yao (Huawei Noah's Ark Lab),
Zhenguo Li (Huawei Noah's Ark Lab), Xiaodan Liang (Sun Yat-sen
University), and Wei Zhang (Noah's Ark Lab. Huawei Inc.)
PARN: Position-Aware Relation Networks for Few-Shot Learning 6658.
Ziyang Wu (South China University of Technology), Yuwei Li (South China University of Technology), Lihua Guo (South China University of
Technology), and Kui Jia (South China University of Technology)
Multi-Adversarial Faster-RCNN for Unrestricted Object Detection .6667
Zhenwei He (Chongqing University) and Lei Zhang (Chongqing University)
Object Guided External Memory Network for Video Object Detection .667.7.
Hanming Deng (Shanghai Jiao Tong University), Yang Hua (Queen's University Belfast), Tao Song (Shanghai Jiao Tong University), Zongpu
Zhang (Shanghai Jiao Tong University), Zhengui Xue (Shanghai Jiao Tong
University), Ruhui Ma (Shanghai Jiao Tong University), Neil Robertson
(Queen's University Belfast), and Haibing Guan (Shanghai Jiao Tong
University)
An Empirical Study of Spatial Attention Mechanisms in Deep Networks .6687.
Xizhou Zhu (University of Science and Technology of China), Dazhi
Cheng (Beijing Institute of Technology), Zheng Zhang (MSRA), Stephen
Lin (Microsoft Research), and Jifeng Dai (Microsoft Research Asia)
Attribute Attention for Semantic Disambiguation in Zero-Shot Learning .6697
(Zhejiang University), and Xiaofei He (Zhejiang University)
CIIDefence: Defeating Adversarial Attacks by Fusing Class-Specific Image Inpainting and Image
Denoising .6707.
Puneet Gupta (IIT Indore) and Esa Rahtu (Tampere University of Technology)
0.77

nunderNet: Towards Real-Time Generic Object Detection on Mobile Devices .6.7.17
ual Student: Breaking the Limits of the Teacher in Semi-Supervised Learning .67.27.  Zhanghan Ke (City University of Hong Kong), Daoye Wang (SenseTime Research), Qiong Yan (SenseTime Group Limited), Jimmy Ren (SenseTime Research), and Rynson Lau (City University of Hong Kong)
IVP Matching: A Maximum-Value Perfect Matching for Mining Hard Samples, With Application to Persor e-Identification .6.7.36.
Han Sun (Institute of Advanced Artificial Intelligence. IAAI), Zhiyuan Chen (Institute of Advanced Artificial Intelligence. IAAI), Shiyang Yan (Queen's University Belfast), and Lin Xu (Institute of Advanced Artificial Intelligence. IAAI)
egmentation, Grouping, & Shape
daptive Context Network for Scene Parsing .67.47.  Jun Fu (National Laboratory of Pattern Recognition. Institute of Automation. Chinese Academy of Sciences and University of Chinese Academy of Sciences), Jing Liu (National Lab of Pattern Recognition. Institute of Automation), Yuhang Wang (Institute of Automation. Chinese Academy of Sciences), Yong Li (Business Growth BU. JD.com), Yongjun Bao (JD.com), Jinhui Tang (Nanjing University of Science and Technology), and Hanqing Lu (NLPR. Institute of Automation. CAS)
onstructing Self-Motivated Pyramid Curriculums for Cross-Domain Semantic Segmentation: A on-Adversarial Approach .6757
Qing Lian (University of Electronic Science and Technology of China), Lixin Duan (University of Electronic Science and Technology of China), Fengmao Lv (University of Electronic Science and Technology of China), and Boqing Gong (Google / ICSI Berkeley)
barseMask: Differentiable Connectivity Learning for Dense Image Prediction .67.67
gnificance-Aware Information Bottleneck for Domain Adaptive Semantic Segmentation .6.7.7
elational Attention Network for Crowd Counting .6787  Anran Zhang (Beihang University), Jiayi Shen (Beihang University),  Zehao Xiao (Beihang University), Fan Zhu (Inception Institute of  Artificial Intelligence), Xiantong Zhen (Inception Institute of  Artificial Intelligence), Xianbin Cao (Beihang University. China), and  Ling Shao (Inception Institute of Artificial Intelligence)

ACFNet: Attentional Class Feature Network for Semantic Segmentation .67.97.  Fan Zhang (Institute of Software. Chinese Academy of Sciences), Yanqin Chen (Baidu Inc.), Zhihang Li (Institute of Automation. Chinese Academy of Science), Zhibin Hong (Baidu Inc.), Jingtuo Liu (baidu), Feifei Ma (Institute of Software. Chinese Academy of Sciences), Junyu Han (Baidu Inc.), and Errui Ding (Baidu Inc.)
Frame-to-Frame Aggregation of Active Regions in Web Videos for Weakly Supervised Semantic Segmentation .6807
Boundary-Aware Feature Propagation for Scene Segmentation .6818
Self-Ensembling With GAN-Based Data Augmentation for Domain Adaptation in Semantic Segmentation .6829  Jaehoon Choi (KAIST), Taekyung Kim (KAIST), and Changick Kim (KAIST)
3D From Single View & RGBD
Explaining the Ambiguity of Object Detection and 6D Pose From Visual Data .6840
Accurate Monocular 3D Object Detection via Color-Embedded 3D Reconstruction for Autonomous Driving .6850 Xinzhu Ma (Dalian University of Technology), Zhihui Wang (Dalian University of Technology), Haojie Li (Dalian University of Technology), Wanli Ouyang (The University of Sydney), and Xin Fan (Dalian University of Technology)
MonoLoco: Monocular 3D Pedestrian Localization and Uncertainty Estimation .6860.  Lorenzo Bertoni (EPFL), Sven Kreiss (EPFL), and Alexandre Alahi (EPFL)
Unsupervised High-Resolution Depth Learning From Videos With Dual Networks .687.1
Face & Body
Bayesian Graph Convolution LSTM for Skeleton Based Action Recognition .6881.  Rui Zhao (Amazon), Kang Wang (RPI), Hui Su (IBM), and Qiang Ji (Rensselaer Polytechnic Institute)

DeCaFA: Deep Convolutional Cascade for Face Alignment in the Wild .6892.  Arnaud Dapogny (Pierre and Marie Curie University. UPMC), Matthieu
Cord (Sorbonne University), and Kevin Bailly (Datakalab)  Probabilistic Face Embeddings .6901  Yichun Shi (Michigan State University) and Anil Jain (Michigan State University)
Gaze360: Physically Unconstrained Gaze Estimation in the Wild .6911
Unsupervised Person Re-Identification by Camera-Aware Similarity Consistency Learning .6921
Photo-Realistic Monocular Gaze Redirection Using Generative Adversarial Networks .693.1
Dynamic Kernel Distillation for Efficient Pose Estimation in Videos 6941.  Xuecheng Nie (NUS), Yuncheng Li (Snap), Linjie Luo (Snap Inc), Ning Zhang (UC Berkeley), and Jiashi Feng (NUS)
Single-Stage Multi-Person Pose Machines .6950
SO-HandNet: Self-Organizing Network for 3D Hand Pose Estimation With Semi-Supervised Learning .6960 Yujin Chen (Wuhan University), Zhigang Tu (Wuhan University), Liuhao Ge (Nanyang Technological University), Dejun Zhang (China University of Geosciences. Wuhan), Ruizhi Chen (Wuhan University), and Junsong Yuan (State University of New York at Buffalo. USA)
Adaptive Wing Loss for Robust Face Alignment via Heatmap Regression .697.0.  Xinyao Wang (Oregon State University), Liefeng Bo (JD Finance), and Li Fuxin (Oregon State University)
Single-Network Whole-Body Pose Estimation .6981.  Gines Hidalgo Martinez (Carnegie Mellon University), Yaadhav Raaj (CMU), Haroon Idrees (RetailNext), Donglai Xiang (Carnegie Mellon University), Hanbyul Joo (Facebook AI Research), Tomas Simon (Carnegie Mellon University), and Yaser Sheikh (CMU)
Face Alignment With Kernel Density Deep Neural Network .699.1.  Lisha Chen (RENSSELAER POLYTECHNIC INST), Hui Su (IBM), and Qiang Ji (Rensselaer Polytechnic Institute)
Action & Video
Spatiotemporal Feature Residual Propagation for Action Prediction 7002.  He Zhao (York University) and Rick Wildes (York University)

Identity From Here, Pose From There: Self-Supervised Disentanglement and Generat	
Unlabeled Videos 7012	
University), and Yong Jae Lee (University of California. Davis)	
Relation Distillation Networks for Video Object Detection .7.022	
Video Compression With Rate-Distortion Autoencoders 7032	
Non-Local ConvLSTM for Video Compression Artifact Reduction .7042	
Self-Supervised Moving Vehicle Tracking With Stereo Sound .7052	
Self-Supervised Learning With Geometric Constraints in Monocular Video: Connects Camera .7062	•
Learning Temporal Action Proposals With Fewer Labels .7072	
TSM: Temporal Shift Module for Efficient Video Understanding .7082  Ji Lin (MIT), Chuang Gan (MIT-Watson AI Lab), and Song Han (MIT)	
Graph Convolutional Networks for Temporal Action Localization .7093	
Fast Object Detection in Compressed Video .7.103	
Motion & Tracking	
Predicting 3D Human Dynamics From Video .7.113	

Imitation Learning for Human Pose Prediction .7.123.
Borui Wang (Stanford University), Ehsan Adeli (Stanford University),
Hsu-Kuang Chiu (Stanford University), De-An Huang (Stanford
University), and Juan Carlos Niebles (Stanford University)
Human Motion Prediction via Spatio-Temporal Inpainting .7.133
Structured Prediction Helps 3D Human Motion Modelling .7.143  Emre Aksan (ETH Zurich), Manuel Kaufmann (ETH Zurich), and Otmar  Hilliges (ETH Zurich)
Computational Photography & Graphics
Learning Shape Templates With Structured Implicit Functions .7153.
Kyle Genova (Princeton University), Forrester Cole (Google Research),
Daniel Vlasic (Google), Aaron Sarna (Google), William Freeman (Google), and Thomas Funkhouser (Princeton University)
CompenNet++: End-to-End Full Projector Compensation 7164.
Bingyao Huang (Temple University) and Haibin Ling (Temple University)
Deep Parametric Indoor Lighting Estimation 7174.
Marc-André Gardner (Université Laval), Yannick Hold-Geoffroy (Adobe
Research), Kalyan Sunkavalli (Adobe Research), Christian Gagné
(Université Laval), and Jean-Francois Lalonde (Université Laval)
FSGAN: Subject Agnostic Face Swapping and Reenactment .7.183
Yuval Nirkin (Bar-Ilan University), Yosi Keller (Bar Ilan University),
and Tal Hassner (Open University of Israel)
Deep Single-Image Portrait Relighting .7.19.3.
Hao Zhou (UMD), Sunil Hadap (Adobe), Kalyan Sunkavalli (Adobe
Research), and David Jacobs (University of Maryland. USA)
PU-GAN: A Point Cloud Upsampling Adversarial Network 7202
Ruihui Li (The Chinese University of Hong Kong), Xianzhi Li (The
Chinese University of Hong Kong), Chi-Wing Fu (The Chinese University
of Hong Kong), Daniel Cohen-Or (Tel Aviv University), and Pheng-Ann
Heng (The Chinese Univsersity of Hong Kong)
Neural 3D Morphable Models: Spiral Convolutional Networks for 3D Shape Representation Learning and Generation 7212.
Giorgos Bouritsas (Imperial College London), Sergiy Bokhnyak
(Università della Svizzera italiana), Stylianos Ploumpis (Imperial
College London), Stefanos Zafeiriou (Imperial College Londong), and
Michael Bronstein (Imperial College)
Low-Level & Optimization

Yowards High-Resolution Salient Object Detection 7233	
Event-Based Motion Segmentation by Motion Compensation .7243  Timo Stoffregen (Monash University), Guillermo Gallego (University of Zurich and ETH Zurich), Tom Drummond (Monash University), Lindsay Kleeman (Monash University), and Davide Scaramuzza (University of Zurich & ETH Zurich. Switzerland)	•••••
Pepth-Induced Multi-Scale Recurrent Attention Network for Saliency Detection .725.3	
tacked Cross Refinement Network for Edge-Aware Salient Object Detection .7263	
Motion Guided Attention for Video Salient Object Detection .7273	
emi-Supervised Video Salient Object Detection Using Pseudo-Labels .728.3.  Pengxiang Yan (Sun Yat-sen University), Guanbin Li (Sun Yat-sen University), Yuan Xie (Sun Yat-sen University), Zhen Li (Shenzhen Research Institute of Big Data. the Chinese University of Hong Kong. Shenzhen), Chuan Wang (Face++. Megvii), Tianshui Chen (Sun Yat-Sen University), and Liang Lin (Sun Yat-sen University)	
oint Learning of Semantic Alignment and Object Landmark Detection .7293	
RainFlow: Optical Flow Under Rain Streaks and Rain Veiling Effect .7303	
GridDehazeNet: Attention-Based Multi-Scale Network for Image Dehazing .7313	
earning to See Moving Objects in the Dark .7323	

## **Scene Understanding**

SegSort: Segmentation by Discriminative Sorting of Segments .7333  Jyh-Jing Hwang (International Computer Science Institute), Stella Yu (UC Berkeley / ICSI), Jianbo Shi (University of Pennsylvania), Maxwell Collins (Google Inc.), Tien-Ju Yang (Massachusetts Institute of Technology), Xiao Zhang (Google), and Liang-Chieh Chen (Google Inc.)
What Synthesis Is Missing: Depth Adaptation Integrated With Weak Supervision for Indoor Scene Parsing .7344
AdaptIS: Adaptive Instance Selection Network .7354
DADA: Depth-Aware Domain Adaptation in Semantic Segmentation .7363
Guided Curriculum Model Adaptation and Uncertainty-Aware Evaluation for Semantic Nighttime Image Segmentation .7373  Christos Sakaridis (ETH Zurich), Dengxin Dai (ETH Zurich), and Luc Van Gool (ETH Zurich)
SceneGraphNet: Neural Message Passing for 3D Indoor Scene Augmentation .7383
SkyScapes - Fine-Grained Semantic Understanding of Aerial Scenes .7392.  Seyed Majid Azimi (German Aerospace Center. DLR), Corentin Henry (German Aerospace Center. DLR), Lars Sommer (Fraunhofer IOSB.  Karlsruhe. Germany), Arne Schumann (Fraunhofer IOSB), and Eleonora Vig (DLR)
Language & Reasoning
Transferable Representation Learning in Vision-and-Language Navigation 7403.  Haoshuo Huang (Google), Vihan Jain (Google Research), Harsh Mehta (Google Inc), Alexander Ku (Google), Gabriel Magalhaes (Google AI), Jason Baldridge (Google), and Eugene Ie (Google Research)
Towards Unsupervised Image Captioning With Shared Multimodal Embeddings .7413.  Iro Laina (Technical University of Munich), Christian Rupprecht (University of Oxford), and Nassir Navab (TU Munich. Germany)
ViCo: Word Embeddings From Visual Co-Occurrences .7424

Seq-SG2SL: Inferring Semantic Layout From Scene Graph Through Sequence to Sequence Learning .7.4.3.4  Boren Li (Alibaba AI Labs), Boyu Zhuang (Alibaba AI Labs), Mingyang Li (Alibaba A.I. Labs), and Jian Gu (Alibaba AI Labs)
U-CAM: Visual Explanation Using Uncertainty Based Class Activation Maps .7.4.4.3.  Badri Patro (IIT Kanpur), Mayank Lunayach (IIT Kanpur), Shivansh Patel (IIT Kanpur), and Vinay Namboodiri (IIT Kanpur)
See-Through-Text Grouping for Referring Image Segmentation .7453  Ding-Jie Chen (Academia Sinica), Songhao Jia (National Tsing Hua University), Yi-Chen Lo (National Tsing Hua University), Hwann-Tzong Chen (National Tsing Hua University), and Tyng-Luh Liu (Academia Sinica)
VideoBERT: A Joint Model for Video and Language Representation Learning .7463
Language Features Matter: Effective Language Representations for Vision-Language Tasks .747.3
3D From Multiview & Sensors
Semantic Stereo Matching With Pyramid Cost Volumes .7.483
Spatial Correspondence With Generative Adversarial Network: Learning Depth From Monocular Videos .7.493  Zhenyao Wu (University of South Carolina), Xinyi Wu (University of South Carolina), Xiaoping Zhang (Wuhan University), Song Wang  (University of South Carolina), and Lili Ju (University of South Carolina)
Learning Relationships for Multi-View 3D Object Recognition .7504.  Ze Yang (Peking University) and Liwei Wang (Peking University)
View N-Gram Network for 3D Object Retrieval .7514
Expert Sample Consensus Applied to Camera Re-Localization .7524
Semantic Part Detection via Matching: Learning to Generalize to Novel Viewpoints From Limited Training Data .7534

Dynamic Points Agglomeration for Hierarchical Point Sets Learning .7545  Jinxian Liu (Shanghai Jiao Tong University), Bingbing Ni (Shanghai Jiao Tong University), Caiyuan Li (Shanghai Jiao Tong University), Jiancheng Yang (Shanghai Jiao Tong University), and Qi Tian (Huawei Noah's Ark Lab)
Image & Video Synthesis
Attributing Fake Images to GANs: Learning and Analyzing GAN Fingerprints .7555
Dual Adversarial Inference for Text-to-Image Synthesis .7566  Qicheng Lao (Concordia University), Mohammad Havaei (Imagia), Ahmad Pesaranghader (Dalhousie University), Francis Dutil (Imagia), Lisa Di Jorio (Imagia Cybernetics Inc), and Thomas Fevens (Concordia University)
View-LSTM: Novel-View Video Synthesis Through View Decomposition .757.6.  Mohamed Lakhal (Queen Mary University of London), Oswald Lanz (Fondazione Bruno Kessler. Italy), and Andrea Cavallaro (Queen Mary University of London. UK)
HoloGAN: Unsupervised Learning of 3D Representations From Natural Images .7587.  Thu Nguyen-Phuoc (University of Bath), Chuan Li (Lambda Labs), Lucas Theis (Twitter), Christian Richardt (University of Bath), and Yongliang Yang (University of Bath)
Unpaired Image-to-Speech Synthesis With Multimodal Information Bottleneck .759.7
Improved Conditional VRNNs for Video Prediction .7607
Visualizing the Invisible: Occluded Vehicle Segmentation and Recovery .761.7
Oral 4.1A
Single-View 3D Modeling, Pose Estimation
Learning Single Camera Depth Estimation Using Dual-Pixels .7627

Domain-Adaptive Single-View 3D Reconstruction .7637	
Transformable Bottleneck Networks .7647	
RIO: 3D Object Instance Re-Localization in Changing Indoor Environments .7657	••••
Pix2Pose: Pixel-Wise Coordinate Regression of Objects for 6D Pose Estimation .7667	
CDPN: Coordinates-Based Disentangled Pose Network for Real-Time RGB-Based 6-DoF Object Pose  Estimation 7677.  Zhigang Li (Tsinghua University), Gu Wang (Tsinghua University), and  Xiangyang Ji (Tsinghua University)	
C3DPO: Canonical 3D Pose Networks for Non-Rigid Structure From Motion .7687	
Learning to Reconstruct 3D Manhattan Wireframes From a Single Image .769.7.  Yichao Zhou (UC Berkeley), Haozhi Qi (UC Berkeley), Yuexiang Zhai (UC Berkeley), Qi Sun (Adobe Research), Zhili Chen (ByteDance AI Lab),  Li-Yi Wei (Adobe Research), and Yi Ma (UC Berkeley)	
Soft Rasterizer: A Differentiable Renderer for Image-Based 3D Reasoning .77.07.  Shichen Liu (University of Southern California), Weikai Chen (USC Institute for Creative Technology), Tianye Li (University of Southern California), and Hao Li (Pinscreen/University of Southern California/USC ICT)	
Learnable Triangulation of Human Pose .7.7.1.7	••••
xR-EgoPose: Egocentric 3D Human Pose From an HMD Camera .7.7.27.  Denis Tome (UCL), Patrick Peluse (Facebook), Lourdes Agapito (University College London), and Hernan Badino (Facebook)	
DeepHuman: 3D Human Reconstruction From a Single Image 7.738.  Zerong Zheng (Tsinghua University), Tao Yu (Beihang University),  Yixuan Wei (Tsinghua University), Qionghai Dai (Tsinghua University),  and Yebin Liu (Tsinghua University)	
A Neural Network for Detailed Human Depth Estimation From a Single Image 77.49.  Sicong Tang (Simon Fraser University), Feitong Tan (Simon Fraser University), Kelvin Cheng (Simon Fraser University), Zhaoyang Li (Simon Fraser University), Siyu Zhu (Alibaba A.I. Labs), and Ping Tan (Simon Fraser University)	

DenseRaC: Joint 3D Pose and Shape Estimation by Dense Render-and-Compare 77.59.  Yuanlu Xu (University of California. Los Angeles), Song-Chun Zhu (UCLA), and Tony Tung (Facebook Reality Labs)
Not All Parts Are Created Equal: 3D Pose Estimation by Modeling Bi-Directional Dependencies of Body
Parts 7.770  Jue Wang (University of Technology Sydney), Shaoli Huang (University of Sydney), Xinchao Wang (Stevens Institute of Technology), and Dacheng Tao (University of Sydney)
Oral 4.1B
Computational Photography
Extreme View Synthesis .77.80
View Independent Generative Adversarial Network for Novel View Synthesis .77.90.
Xiaogang Xu (The Chinese University of Hong Kong), Yingcong Chen (Chinese University of Hong Kong), and Jiaya Jia (Chinese University
of Hong Kong)
Cascaded Context Pyramid for Full-Resolution 3D Semantic Scene Completion .7800
View-Consistent 4D Light Field Superpixel Segmentation .781.0.
Numair Khan (Brown University), Qian Zhang (Brown University), Lucas Kasser (Brown University), Henry Stone (Brown University), Min H. Kim
(KAIST), and James Tompkin (Brown University)
GLoSH: Global-Local Spherical Harmonics for Intrinsic Image Decomposition 7819.  Hao Zhou (UMD), Xiang Yu (NEC Labs), and David Jacobs (University of Maryland. USA)
Surface Normals and Shape From Water 7829.
Satoshi Murai (Kyoto University), Meng-Yu Kuo (Kyoto University), Ryo
Kawahara (Kyoto University), Shohei Nobuhara (Kyoto University), and Ko Nishino (Kyoto University)
Restoration of Non-Rigidly Distorted Underwater Images Using a Combination of Compressive Sensing and Local Polynomial Image Representations .7838

Learning Perspective Undistortion of Portraits .7848  Yajie Zhao (Institution for Creative Technologies. University of Southern California), Zeng Huang (University of Southern California), Tianye Li (University of Southern California), Weikai Chen (USC Institute for Creative Technology), Chloe Legendre (USC Institute for Creative Technology), Xinglei Ren (Institution for Creative Technologies. University of Southern California), Ari Shapiro (USC Institute for Creative Technologies), and Hao Li (Pinscreen/University of Southern California/USC ICT)
Towards Photorealistic Reconstruction of Highly Multiplexed Lensless Images .7859.  Salman Siddique Khan (IIT Madras), Adarsh V R (IIT Madras), Vivek  Boominathan (Rice University), Jasper Tan (Rice University), Ashok  Veeraraghavan (Rice University), and Kaushik Mitra (IIT Madras)
Unconstrained Motion Deblurring for Dual-Lens Cameras .7869.  Mahesh Mohan M R (Indian Institute of Technology Madras), Sharath  Girish (IIT Madras), and Rajagopalan Ambasamudram (Indian Institute of  Technology Madras)
Stochastic Exposure Coding for Handling Multi-ToF-Camera Interference .7879.  Jongho Lee (University of Wisconsin-Madison) and Mohit Gupta (University of Wisconsin-Madison. USA)
Convolutional Approximations to the General Non-Line-of-Sight Imaging Operator .7888
Agile Depth Sensing Using Triangulation Light Curtains .7899.  Joseph Bartels (Carnegie Mellon University), Jian Wang (Snap), William  Whittaker (Carnegie Mellon University), and Srinivasa Narasimhan (Carnegie Mellon University)
Asynchronous Single-Photon 3D Imaging .7908
Poster 4.1
Deep Learning
Cross-Dataset Person Re-Identification via Unsupervised Pose Disentanglement and Adaptation .7918
A Learned Representation for Scalable Vector Graphics .7929

ELF: Embedded Localisation of Features in Pre-Trained CNN 7939.  Assia Benbihi (GeorgiaTech Lorraine), Matthieu Geist (Google Brain), and Cedric Pradalier (GeorgiaTech Lorraine)
Joint Group Feature Selection and Discriminative Filter Learning for Robust Visual Object Tracking .7949  Tianyang Xu (Jiangnan University), Zhen-Hua Feng (University of Surrey), Xiao-Jun Wu (Jiangnan University), and Josef Kittler (University of Surrey. UK)
Sampling Wisely: Deep Image Embedding by Top-K Precision Optimization .7960.  Jing Lu (Business Growth BU JD.com), Chaofan Xu (Harbin Institute of Technology), Wei Zhang (JD AI Research), Lingyu Duan (Peking University), and Tao Mei (AI Research of JD.com)
On the Global Optima of Kernelized Adversarial Representation Learning .7970
Addressing Model Vulnerability to Distributional Shifts Over Image Transformation Sets .797.9
Attract or Distract: Exploit the Margin of Open Set .7989.  Qianyu Feng (University of Technology Sydney), Guoliang Kang (UTS),  Hehe Fan (UTS), and Yi Yang (University of Technology. Sydney)
MIC: Mining Interclass Characteristics for Improved Metric Learning .7999.  Biagio Brattoli (Heidelberg University), Karsten Roth (Heidelberg University), and Bjorn Ommer (Heidelberg University)
Self-Supervised Representation Learning via Neighborhood-Relational Encoding .8009.  Mohammad Sabokrou (Institute for Research in fundamental science.  IPM), Mohammad Khalooei (Amirkabir University of Technology), and  Ehsan Adeli (Stanford University)
AWSD: Adaptive Weighted Spatiotemporal Distillation for Video Representation 8019.  Mohammad Tavakolian (University of Oulu), Hamed Rezazadegan Tavakoli  (Aalto University), and Abdenour Hadid (Finland)
Bilinear Attention Networks for Person Retrieval .8029.  Pengfei Fang (The Australian National University), Jieming Zhou (The Australian National University), Soumava Roy (AUSTRALIAN NATIONAL UNIVERSITY), Lars Petersson (Data61/CSIRO), and Mehrtash Harandi (Monash University)
Discriminative Feature Learning With Consistent Attention Regularization for Person  Re-Identification .8039
Semi-Supervised Domain Adaptation via Minimax Entropy 8049.  Kuniaki Saito (Boston University), Donghyun Kim (Boston University),  Stan Sclaroff (Boston University), Trevor Darrell (UC Berkeley), and  Kate Saenko (Boston University)

Boosting Few-Shot Visual Learning With Self-Supervision .8058
FDA: Feature Disruptive Attack .8068
A Novel Unsupervised Camera-Aware Domain Adaptation Framework for Person Re-Identification .807.9  Lei Qi (Nanjing University), Lei Wang (University of Wollongong.  Australia), Jing Huo (Nanjing University), Luping Zhou (University of Sydney), Yinghuan Shi (Nanjing University), and Yang Gao (Nanjing University)  University)
Recover and Identify: A Generative Dual Model for Cross-Resolution Person Re-Identification .8089
Cross-View Policy Learning for Street Navigation .8099. Ang Li (DeepMind. Mountain View), Huiyi Hu (Google), Piotr Mirowski (DeepMind), and Mehrdad Farajtabar (DeepMind)
Learning Across Tasks and Domains .8.109.  Pierluigi Zama Ramirez (University of Bologna), Alessio Tonioni  (University of Bologna), Samuele Salti (University of Bologna), and  Luigi Di Stefano (University of Bologna)
EMPNet: Neural Localisation and Mapping Using Embedded Memory Points <u>8119</u>
AVT: Unsupervised Learning of Transformation Equivariant Representations by Autoencoding Variational Transformations .8.129
Composite Shape Modeling via Latent Space Factorization .8139.  Anastasia Dubrovina (Lyft), Fei Xia (Stanford University), Panos  Achlioptas (Stanford University), Mira Shalah (Stanford University),  Raphael Groscot (PSL Research University), and Leonidas Guibas  (Stanford University)
Deep Comprehensive Correlation Mining for Image Clustering .8.149.  Jianlong Wu (Peking University), Keyu Long (University of Chinese Academy of Sciences), Fei Wang (SenseTime), Chen Qian (SenseTime), Cheng Li (SenseTime Research), Zhouchen Lin (Peking University), and Hongbin Zha (Peking University. China)
Unsupervised Multi-Task Feature Learning on Point Clouds .8.159

Reciprocal Multi-Layer Subspace Learning for Multi-View Clustering .8.17.1.  Ruihuang Li (Tian Jin University), Changqing Zhang (Tianjin university), Huazhu Fu (Inception Institute of Artificial Intelligence), Xi Peng (College of Computer Science. Sichuan University), Joey Tianyi Zhou (IHPC. ASTAR), and Qinghua Hu (Tianjin University)
Geometric Disentanglement for Generative Latent Shape Models .8180.  Tristan Aumentado-Armstrong (University of Toronto), Stavros Tsogkas (University of Toronto), Allan Jepson (Samsung), and Sven Dickinson (University of Toronto)
GAN-Tree: An Incrementally Learned Hierarchical Generative Framework for Multi-Modal Data Distributions ,8190
GODS: Generalized One-Class Discriminative Subspaces for Anomaly Detection .8200.  **Jue Wang (ANU) and Anoop Cherian (MERL)**
Neighborhood Preserving Hashing for Scalable Video Retrieval .821.1
Recognition
Self-Training With Progressive Augmentation for Unsupervised Cross-Domain Person Re-Identification .8221 Xinyu Zhang (Tongji University), Jiewei Cao (The University of Adelaide), Chunhua Shen (University of Adelaide), and Mingyu You (Tongji University)
SCRDet: Towards More Robust Detection for Small, Cluttered and Rotated Objects .823.1
Cross-X Learning for Fine-Grained Visual Categorization .824.1
Maximum-Margin Hamming Hashing .825.1

Conservative Wasserstein Training for Pose Estimation .8261.  Xiaofeng Liu (CMU), Yang Zou (Carnegie Mellon University), Tong Che (MILA), Ping Jia (CIOMP), Peng Ding (Changchun Institute of Optics. Fine Mechanics and Physics), Jane You (HK Poly U), and B. V. K. Vijaya Kumar (CMU. USA)
Learning to Rank Proposals for Object Detection .8272
Vehicle Re-Identification With Viewpoint-Aware Metric Learning .8281.  Ruihang Chu (Beihang Univeristy), Yifan Sun (Tsinghua University),  Yadong Li (Megvii Inc. Face++), Zheng Liu (Megvii Research), Chi Zhang  (Megvii Inc.), and Yichen Wei (Megvii Research Shanghai)
WSOD2: Learning Bottom-Up and Top-Down Objectness Distillation for Weakly-Supervised Object  Detection .8291  Zhaoyang Zeng (Sun Yat-sen University), Bei Liu (Microsoft Research),  Jianlong Fu (Microsoft Research), Hongyang Chao (Sun Yat-sen  University), and Lei Zhang (Microsoft)
Localization of Deep Inpainting Using High-Pass Fully Convolutional Network .8300
Clustered Object Detection in Aerial Images .8310.  Fan Yang (Temple University), Heng Fan (Temple University), Peng Chu (Temple University), Erik Blasch (air force research lab), and Haibin Ling (Temple University)
Unsupervised Graph Association for Person Re-Identification .8320  Jinlin Wu (Institute of Automation. Chinese Academy of Sciences.  Beijing. China), Hao Liu (NLPR. CASIA), Yang Yang (Chinese Academy of Sciences), Zhen Lei (NLPR. CASIA. China), Shengcai Liao (Inception Institute of Artificial Intelligence), and Stan Li (National Lab. of Pattern Recognition. China)
Learning a Mixture of Granularity-Specific Experts for Fine-Grained Categorization .8330.  Lianbo Zhang (University of Technology Sydney), Shaoli Huang (University of Sydney), Wei Liu (UTS), and Dacheng Tao (University of Sydney)
advPattern: Physical-World Attacks on Deep Person Re-Identification via Adversarially Transformable Patterns 8340
ABD-Net: Attentive but Diverse Person Re-Identification ,8350  Tianlong Chen (Texas A&M University), Shaojin Ding (Texas A&M  University), Jingyi Xie (University of Science and Technology of  China), Ye Yuan (Texas A&M University), Wuyang Chen (Texas A&M  University), Yang Yang (Walmart Technology), Zhou Ren (Wormpex AI  Research), and Zhangyang Wang (TAMU)

From Open Set to Closed Set: Counting Objects by Spatial Divide-and-Conquer .8361
Fowards Precise End-to-End Weakly Supervised Object Detection Network .837.1.  Ke Yang (NUDT), Dongsheng Li (School of Computer Science. National  University of Defense Technology), and Yong Dou (National University  of Defense Technology)
Learn to Scale: Generating Multipolar Normalized Density Maps for Crowd Counting .8381
Ground-to-Aerial Image Geo-Localization With a Hard Exemplar Reweighting Triplet Loss <u>8390</u>
Learning to Discover Novel Visual Categories via Deep Transfer Clustering .8400
AM-LFS: AutoML for Loss Function Search .8409
Few-Shot Object Detection via Feature Reweighting .8419.  Bingyi Kang (National University of Singapore), Zhuang Liu (UC  Berkeley), Xin Wang (UC Berkeley), Fisher Yu (UC Berkeley), Jiashi  Feng (NUS), and Trevor Darrell (UC Berkeley)
Objects365: A Large-Scale, High-Quality Dataset for Object Detection .8429.  Shuai Shao (Megvii. Face++), Zeming Li (Megvii Face++ Inc), Tianyuan  Zhang (Peking University), Chao Peng (Megvii Face++ Inc), Gang Yu  (Megvii Inc), Xiangyu Zhang (Megvii Technology), Jing Li (MEGVII), and  Jian Sun (Megvii Technology)
Efficient and Accurate Arbitrary-Shaped Text Detection With Pixel Aggregation Network .843.9.  Wenhai Wang (Nanjing university), Enze Xie (Tongji University), Xiaoge  Song (Nanjing University), Yuhang Zang (University of Electronic  Science and Technology of China), Wenjia Wang (Tongji University),  Tong Lu (Nanjing University), Gang Yu (Megvii Inc), and Chunhua Shen  (University of Adelaide)
Foreground-Aware Pyramid Reconstruction for Alignment-Free Occluded Person Re-Identification .8.449  He Lingxiao (casia), Yinggang Wang (JD AI Research), Wu Liu (AI  Research of JD.com), He Zhao (JD AI Research), Zhenan Sun (Chinese of  Academy of Sciences), and Jiashi Feng (NUS)

Collect and Select: Semantic Alignment Metric Learning for Few-Shot Learning .8459  Fusheng Hao (Shenzhen Institutes of Advanced Technology. Chinese Academy of Sciences), Fengxiang He (The University of Sydney), Jun Cheng (Shenzhen Institutes of Advanced Technology. Chinese Academy of Sciences), Lei Wang (Shenzhen Institutes of Advanced Technology. Chinese Academy of Sciences), Jianzhong Cao (Xi'an Institute of Optics and Precision Mechanics), and Dacheng Tao (University of Sydney)
Segmentation, Grouping, & Shape
Bayesian Adaptive Superpixel Segmentation .8469
Capsule VOS: Semi-Supervised Video Object Segmentation Using Capsule Routing .8.479
BAE-NET: Branched Autoencoder for Shape Co-Segmentation .8489.  Zhiqin Chen (Simon Fraser University), Kangxue Yin (Simon Fraser University), Matthew Fisher (Adobe Research), Siddhartha Chaudhuri (Adobe Research), and Hao Zhang (Simon Fraser University)
VV-Net: Voxel VAE Net With Group Convolutions for Point Cloud Segmentation .8499.  Hsien-Yu Meng (Tsinghua University), Lin Gao (Institute of Computing Technology. Chinese Academy of Sciences), Yu-Kun Lai (Cardiff University), and Dinesh Manocha (UMD)
Miss Detection vs. False Alarm: Adversarial Learning for Small Object Segmentation in Infrared Images .8508.
Huan Wang (Nanjing University of Science & Technology), Luping Zhou (University of Sydney), and Lei Wang (University of Wollongong. Australia)
Group-Wise Deep Object Co-Segmentation With Co-Attention Recurrent Neural Network .8518
Statistics, Physics, Theory & Datasets
Human Attention in Image Captioning: Dataset and Analysis 8528  Sen He (University of Exeter), Hamed Rezazadegan Tavakoli (Aalto University), Ali Borji (University of Central Florida), and Nicolas Pugeault (Exeter)
Variational Uncalibrated Photometric Stereo Under General Lighting .8538.  Zhenzhang Ye (TU Munich), Bjoern Haefner (Technical University of Munich), Maolin Gao (Artisense), Tao Wu (TU Munich), Yvain Queau (CNRS), and Daniel Cremers (TU Munich)

SPLINE-Net: Sparse Photometric Stereo Through Lighting Interpolation at Qian Zheng (Nanyang Technological University), Yiming Jia (Tsinghud University), Boxin Shi (Peking University), Xudong Jiang (Nanyang Technological University), Lingyu Duan (Peking University), and Alex Kot (Nanyang Technological University)	a
Hyperspectral Image Reconstruction Using Deep External and Internal Lea Tao Zhang (Beijing Institute of Technology), Ying Fu (Beijing Institute of Technology), Lizhi Wang (Beijing Institute of Technology), and Hua Huang (Beijing Institute of Technology)	arning .8558
Gravity as a Reference for Estimating a Person's Height From Video .8568 Didier Bieler (EPFL), Semih Günel Günel (EPFL), Pascal Fua (EPFL. Switzerland), and Helge Rhodin (EPFL)	
Shadow Removal via Shadow Image Decomposition .857.7	
OperatorNet: Recovering 3D Shapes From Difference Operators .8587 Ruqi Huang (LIX. Ecole Polytechnique), Marie-Julie Rakotosaona (Ecolopolytechnique), Panos Achlioptas (Stanford University), Leonidas Guibas (Stanford University), and Maks Ovsjanikov (Ecole polytechnique)	
Neural Inverse Rendering of an Indoor Scene From a Single Image .8597  Soumyadip Sengupta (University of Washington), Jinwei Gu (NVIDIA),  Kihwan Kim (NVIDIA), Guilin Liu (NVIDIA), David Jacobs (Universit Maryland. USA), and Jan Kautz (NVIDIA)	,
3D From Single View & RGBD	
ForkNet: Multi-Branch Volumetric Semantic Completion From a Single D Yida Wang (Technische Universität München), David Joseph Tan (God Nassir Navab (TU Munich. Germany), and Federico Tombari (TUM. G	ogle),
Moving Indoor: Unsupervised Video Depth Learning in Challenging Envir Junsheng Zhou (Tsinghua University), Yuwang Wang (Microsoft Resea Kaihuai Qin (Tsinghua University), and Wenjun Zeng (Microsoft Research)	
GraphX-Convolution for Point Cloud Deformation in 2D-to-3D Conversio Duc Nguyen (Yonsei University), Seonghwa Choi (Yonsei University), Woojae Kim (Yonsei University), and Sanghoon Lee (Yonsei University Korea)	
FrameNet: Learning Local Canonical Frames of 3D Surfaces From a Single Jingwei Huang (Stanford University), Yichao Zhou (UC Berkeley), The Funkhouser (Princeton University), and Leonidas Guibas (Stanford University)	_
Holistic++ Scene Understanding: Single-View 3D Holistic Scene Parsing a Human-Object Interaction and Physical Commonsense .8647	

#### **Action & Video**

Quan Kong (Hitac Technology), Ziwe	lle Dataset for Cross Modal Human Action Understanding .865.7	
Hang Zhao (MIT),	n Clips and Segments Dataset for Recognition and Temporal Localization .8667 Antonio Torralba (MIT), Lorenzo Torresani (Dartmouth Cheng Yan (University of Illinois at 1991)	
Sanath Narayan (I Hisham Cholakkal Fahad Shahbaz Kl	unt and Center Loss for Weakly-Supervised Action Localization .867.8	
Tushar Nagarajan	ject Interaction Hotspots From Video .8687	
Lei Wang (Univers	scriptors and I3D Optical Flow Features for Action Recognition With CNNs .8697 sity of Western Australia), Piotr Koniusz ANU), and Du Huynh (University of Western Australia.	••••
Computational	l Photography & Graphics	
Learning to Paint With	I Photography & Graphics  h Model-Based Deep Reinforcement Learning .8708	
Learning to Paint With Zhewei Huang (Pe (Megvii inc.) Neural Re-Simulation Carlo Innamorati	h Model-Based Deep Reinforcement Learning .8708	
Learning to Paint With Zhewei Huang (Pe (Megvii inc.)  Neural Re-Simulation Carlo Innamorati (Research), Danny college london)  Deep Appearance May Maxim Maximov (1990)	h Model-Based Deep Reinforcement Learning .87.08.  eking University), Shuchang Zhou (Megvii), and Wen Heng  for Generating Bounces in Single Images .87.18.  (University College London), Bryan Russell (Adobe	
Learning to Paint With Zhewei Huang (Pe (Megvii inc.)  Neural Re-Simulation Carlo Innamorati (Research), Danny college london)  Deep Appearance Map Maxim Maximov (and Mario Fritz (CarNet: A Two-Stream Erhan Gundogdu (Fision Technology	h Model-Based Deep Reinforcement Learning .87.08	
Learning to Paint With Zhewei Huang (Pe (Megvii inc.)  Neural Re-Simulation Carlo Innamorati Research), Danny college london)  Deep Appearance Map Maxim Maximov (Carlo Fritz (Compared to the Carlo of	h Model-Based Deep Reinforcement Learning .8708	

CompoNet: Learning to Generate the Unseen by Part Synthesis and Composition .8.758
DDSL: Deep Differentiable Simplex Layer for Learning Geometric Signals .87.68.  Chiyu Jiang (UC Berkeley), Dana Lansigan (UC Berkeley), Philip Marcus (UC Berkeley), and Matthias Niessner (Technical University of Munich)
Low-Level & Optimization
EGNet: Edge Guidance Network for Salient Object Detection .8.77.8.  Jiaxing Zhao (Nankai University), Jiang-Jiang Liu (Nankai University), Deng-Ping Fan (Inception Institute of Artificial Intelligence), Yang Cao (Nankai University), Jufeng Yang (Nankai University), and Ming-Ming Cheng (Nankai University)
SID4VAM: A Benchmark Dataset With Synthetic Images for Visual Attention Modeling .8.788
Two-Stream Action Recognition-Oriented Video Super-Resolution .8798.  Haochen Zhang (University of Science and Technology of China), Dong Liu (University of Science and Technology of China), and Zhiwei Xiong (University of Science and Technology of China)
Where Is My Mirror? .8808  Xin Yang (Dalian University of Technology), Haiyang Mei (Dalian  University of Technology), Ke Xu (Dalian University of Technology;  City University of Hong Kong), Xiaopeng Wei (Dalian University of  Technology), Baocai Yin (Dalian University of Technology), and Rynson  Lau (City University of Hong Kong)
Disentangled Image Matting .8818  Shaofan Cai (Megvii Inc. face++), Xiaoshuai Zhang (Peking University),  Haoqiang Fan (Megvii Inc face++), Haibin Huang (Megvii Technology),  Jiangyu Liu (megvii inc), Jiaming Liu (Megvii), Jiaying Liu (Peking  University), Jue Wang (Megvii Technology), and Jian Sun (Megvii  Technology)
Guided Super-Resolution As Pixel-to-Pixel Transformation .8828
Deep Learning for Light Field Saliency Detection .8837.  Tiantian Wang (Dalian University of Technology), Yongri Piao (Dalian University of Technology), Huchuan Lu (Dalian University of Technology), Xiao Li (Dalian University of Technology), and Lihe Zhang (Dalian University of Technology)
Optimizing the F-Measure for Threshold-Free Salient Object Detection .8848.  Kai Zhao (Nankai University), Shanghua Gao (Nankai University),  Wenguan Wang (Inception Institute of Artificial Intelligence), and  Ming-Ming Cheng (Nankai University)

Image Inpainting With Learnable Bidirectional Attention Maps .885.7.  Chaohao Xie (Harbin Institute of Technology), Shaohui Liu (Harbin Institute of Technology), Chao Li (Baidu), Ming-Ming Cheng (Nat University), Wangmeng Zuo (Harbin Institute of Technology. Chin Xiao Liu (Baidu), Shilei Wen (Baidu Research), and Errui Ding (Baidu).	vin nkai na),
Joint Demosaicking and Denoising by Fine-Tuning of Bursts of Raw Thibaud Ehret (CMLA. ENS Cachan), Axel Davy (ENS Paris-Saclay), and Gabriele Facciolo (ENS Paris - Saclay).	lay), Pablo
DeblurGAN-v2: Deblurring (Orders-of-Magnitude) Faster and Better Orest Kupyn (Ukrainian Catholic University), Tetiana Martyniuk (Ukrainian Catholic University), Junru Wu (Texas A&M Universi Zhangyang Wang (TAMU)	
Language & Reasoning	
Reflective Decoding Network for Image Captioning .8887	
Joint Optimization for Cooperative Image Captioning .889.7	v),
Watch, Listen and Tell: Multi-Modal Weakly Supervised Dense Even Tanzila Rahman (University of British Columbia), Bicheng Xu (University of British Columbia), and Leonid Sigal (University of British Columbia)	t Captioning .8907
Joint Syntax Representation Learning and Visual Cue Translation for Jingyi Hou (Beijing Institute of Technology), Xinxiao Wu (Beijing Institute of Technology), Wentian Zhao (Beijing Institute of Technology), Jiebo Luo (University of Rochester), and Yunde Jia (Beijing Institute of Technology)	Video Captioning .891.7
Entangled Transformer for Image Captioning .8927	
Shapeglot: Learning Language for Shape Differentiation .8937	rd
nocaps: novel object captioning at scale .8947	Georgia k AI rie ı), Devi

#### 3D From Multiview & Sensors

Fully Convolutional Geometric Features .895.7.  Christopher Choy (Stanford University), Jaesik Park (POSTECH), and Vladlen Koltun (Intel Labs)
Learning Local RGB-to-CAD Correspondences for Object Pose Estimation 8966.  Georgios Georgakis (GMU), Srikrishna Karanam (Siemens Corporate Technology. Princeton), Ziyan Wu (Siemens Corporation), and Jana Kosecka (George Mason University)
Depth From Videos in the Wild: Unsupervised Monocular Depth Learning From Unknown Cameras .897.6  Ariel Gordon (Google Research), Hanhan Li (Google AI), Rico  Jonschkowski (Google), and Anelia Angelova (Google)
OmniMVS: End-to-End Learning for Omnidirectional Stereo Matching .8986.  Changhee Won (Hanyang University), Jongbin Ryu (Hanyang University), and Jongwoo Lim (Hanyang University)
On the Over-Smoothing Problem of CNN Based Disparity Estimation .899.6.  Chuangrong Chen (Sun Yat-Sen University), Xiaozhi Chen (DJI), and Hui Cheng (Sun Yat-Sen University)
Image & Video Synthesis
Disentangling Propagation and Generation for Video Prediction 9005.  Hang Gao (UC Berkeley), Huazhe Xu (UC Berkeley), Qi-Zhi Cai (Sinovation Ventures AI Institute), Ruth Wang (UC Berkeley), Fisher Yu (UC Berkeley), and Trevor Darrell (UC Berkeley)
Guided Image-to-Image Translation With Bi-Directional Feature Transformation .901.5
Towards Multi-Pose Guided Virtual Try-On Network .9025  Haoye Dong (Sun Yat-sen University), Xiaodan Liang (Sun Yat-sen University), Xiaohui Shen (ByteDance AI Lab), Bochao Wang (Sun Yet-sen University), Hanjiang Lai (Sun Yat-Sen university), Jia Zhu (South China Normal University), Zhiting Hu (CMU), and Jian Yin (Sun Yat-Sen University)
Photorealistic Style Transfer via Wavelet Transforms 9035.  Jaejun Yoo (Clova AI Research. NAVER Corp.), Youngjung Uh (Clova AI Research. NAVER Corp.), Sanghyuk Chun (Clova AI Research. NAVER Corp.), Byeongkyu Kang (Yonsei University), and Jung-Woo Ha (Clova AI Research. NAVER Corp.)
Personalized Fashion Design .9045  Cong Yu (University of Electronic Science and Technology of China),  Yang Hu (University of Electronic Science and Technology of China),  Yan Chen (University of Electronic Science and Technology of China),  and Bing Zeng (University of Electronic Science and Technology of  China)
Tag2Pix: Line Art Colorization Using Text Tag With SECat and Changing Loss .9055.  Hyunsu Kim (Seoul National University), Ho Young Jhoo (Seoul National University), Eunhyeok Park (Seoul National University), and Sungjoo Yoo (Seoul National University)

Free-Form Video Inpainting With 3D Gated Convolution and Temporal PatchGAN .9065	
Applications, Medical & Robotics	
TextDragon: An End-to-End Framework for Arbitrary Shaped Text Spotting .9075	
Chinese Street View Text: Large-Scale Chinese Text Reading With Partially Supervised Learning .9085  Yipeng Sun (Baidu Inc.), Jiaming Liu (Baidu Inc.), Wei Liu (The University of Hong Kong), Junyu Han (Baidu Inc.), Errui Ding (Baidu Inc.), and Jingtuo Liu (baidu)	••
Deep Floor Plan Recognition Using a Multi-Task Network With Room-Boundary-Guided Attention .9095 Zhiliang Zeng (The Chinese University of Hong Kong), Xianzhi Li (The Chinese University of Hong Kong), Ying Kin Yu (The Chinese University of Hong Kong), and Chi-Wing Fu (The Chinese University of Hong Kong)	•••
GA-DAN: Geometry-Aware Domain Adaptation Network for Scene Text Detection and Recognition .9.104.  Fangneng Zhan (Nanyang Technological University), Chuhui Xue (Nanyang Technological University), and Shijian Lu (Nanyang Technological University)	
Large-Scale Tag-Based Font Retrieval With Generative Feature Learning 9.115.  Tianlang Chen (University of Rochester), Zhaowen Wang (Adobe Research), Ning Xu (Adobe Research), Hailin Jin (Adobe Research), and Jiebo Luo (U. Rochester)	, <b></b>
Convolutional Character Networks 9.125.  Linjie Xing (Malong Technologies), Zhi Tian (The University of Adelaide), Weilin Huang (Malong Technologies), and Matthew Scott (Malong Technologies)	•••
Geometry Normalization Networks for Accurate Scene Text Detection 9136.  Jiaqi Duan (Huazhong University of Science and Technology), Youjiang Xu (SenseTime), Zhanghui Kuang (Sensetime Ltd.), Xiaoyu Yue (SenseTime), Hongbin Sun (Sensetime Ltd.), Yue Guan (Huazhong University of Science and Technology), and Wayne Zhang (SenseTime Research)	•••
Symmetry-Constrained Rectification Network for Scene Text Recognition .9.146.  Mingkun Yang (Huazhong University of Science and Technology), Yushuo Guan (Peking University), Minghui Liao (Huazhong University of Science and Technology), Xin He (Megvii), Kaigui Bian (Peking University), Song Bai (University of Oxford), Cong Yao (Megvii. Face++ Inc.), and Xiang Bai (Huazhong University of Science and Technology)	•••

# Oral 4.2A

## **Segmentation, Detection, 3D Scene Understanding**

YOLACT: Real-Time Instance Segmentation 9156.
Daniel Bolya (University of California. Davis), Chong Zhou (University of California. Davis), Fanyi Xiao (University of California Davis), and Yong Jae Lee (University of California. Davis)
Expectation-Maximization Attention Networks for Semantic Segmentation .9.166.
Xia Li (Peking University Shenzhen Graduate School), Zhisheng Zhong
(Peking University), Jianlong Wu (Peking University), Yibo Yang
(Peking University), Zhouchen Lin (Peking University), and Hong Liu
(Peking University Shenzhen Graduate School)
Multi-Class Part Parsing With Joint Boundary-Semantic Awareness .917.6.
Yifan Zhao (Beihang University), Jia Li (Beihang University), Yu Zhang
(Beihang University), and Yonghong Tian (PKU)
Explaining Neural Networks Semantically and Quantitatively .9186.
Runjin Chen (Shanghai Jiao Tong University), Hao Chen (Huazhong
University of Science and Technology), Ge Huang (Shanghai Jiao Tong
University), Jie Ren (Shanghai Jiao Tong University), and Quanshi
Zhang (Shanghai Jiao Tong University)
PANet: Few-Shot Image Semantic Segmentation With Prototype Alignment .9.19.6.
Kaixin Wang (National University of Singapore), Jun Hao Liew (NUS),
Yingtian Zou (National University of Singapore), Daquan Zhou (National
University of Singapore), and Jiashi Feng (NUS)
ShapeMask: Learning to Segment Novel Objects by Refining Shape Priors .9206.
Weicheng Kuo (University of California Berkeley), Anelia Angelova
(Google), Jitendra Malik (University of California at Berkley), and
Tsung-Yi Lin (Google Brain)
Sequence Level Semantics Aggregation for Video Object Detection .9216.
Haiping Wu (McGill University), Yuntao Chen (CASIA), Naiyan Wang
(TuSimple), and Zhao-Xiang Zhang (Chinese Academy of Sciences. China)
Video Object Segmentation Using Space-Time Memory Networks .9225.
Seoung Wug Oh (Yonsei Univeristy), Joon-Young Lee (Adobe Research),
Ning Xu (Adobe Research), and Seon Joo Kim (Yonsei Univ.)
Zero-Shot Video Object Segmentation via Attentive Graph Neural Networks .9235
Wenguan Wang (Inception Institute of Artificial Intelligence), Xiankai
Lu (Inception Institute of Artificial Intelligence), Jianbing Shen
(Inception Institute of Artificial Intelligence), David Crandall
(Indiana University), and Ling Shao (Inception Institute of Artificial
Intelligence)
MeteorNet: Deep Learning on Dynamic 3D Point Cloud Sequences .9245.
Xingyu Liu (Stanford University), Mengyuan Yan (Stanford University),
and Jeannette Bohg (Stanford)
3D Instance Segmentation via Multi-Task Metric Learning .9255.
Jean Lahoud (KAUST), Bernard Ghanem (KAUST), Martin R. Oswald (ETH
Zurich), and Marc Pollefeys (ETH Zurich / Microsoft)

DeepGCNs: Can GCNs Go As Deep As CNNs? 9266.  Guohao Li (King Abdullah University of Science and Technology. KAUST),  Matthias Müller (King Abdullah University of Science and Technology.  KAUST), Ali Thabet (KAUST), and Bernard Ghanem (KAUST)
Deep Hough Voting for 3D Object Detection in Point Clouds .9276
M3D-RPN: Monocular 3D Region Proposal Network for Object Detection .9286.  Garrick Brazil (Michigan State University) and Xiaoming Liu (Michigan State University)
SemanticKITTI: A Dataset for Semantic Scene Understanding of LiDAR Sequences .9296
WoodScape: A Multi-Task, Multi-Camera Fisheye Dataset for Autonomous Driving .9307
Scalable Place Recognition Under Appearance Change for Autonomous Driving .9318
Exploring the Limitations of Behavior Cloning for Autonomous Driving .9328
Habitat: A Platform for Embodied AI Research .9338

### Oral 4.2B

## **Face & Body Modeling**

Towards Interpretable Face Recognition 9347
Co-Mining: Deep Face Recognition With Noisy Labels .9357
Few-Shot Adaptive Gaze Estimation .9367.  Seonwook Park (ETH Zurich), Shalini De Mello (NVIDIA Research), Pavlo  Molchanov (NVIDIA), Umar Iqbal (NVIDIA Research), Otmar Hilliges (ETH  Zurich), and Jan Kautz (NVIDIA)
Live Face De-Identification in Video .937.7.  Oran Gafni (Facebook AI Research), Lior Wolf (Tel Aviv University.  Israel), and Yaniv Taigman (Facebook)
Face Video Deblurring Using 3D Facial Priors .9387.  Wenqi Ren (Institute of Information Engineering. Chinese Academy of Sciences), Jiaolong Yang (Microsoft Research Asia), Senyou Deng (Institute of Information Engineering. Chinese Academy of Sciences), David Wipf (Microsoft Research), Xiaochun Cao (Chinese Academy of Sciences), and Xin Tong (Microsoft)
Semi-Supervised Monocular 3D Face Reconstruction With End-to-End Shape-Preserved Domain Transfer .9397  Jingtan Piao (CUHK MMLab), Chen Qian (SenseTime), and Hongsheng Li  (Chinese University of Hong Kong)
3D Face Modeling From Diverse Raw Scan Data .9407
A Decoupled 3D Facial Shape Model by Adversarial Training .941.8
Photo-Realistic Facial Details Synthesis From Single Image .9428.  Anpei Chen (shanghaitech), Zhang Chen (ShanghaiTech University), Guli Zhang (Shanghaitech University), Kenny Mitchell (Edinburgh Napier University and Disney Research), and Jingyi Yu (Shanghai Tech University)
S2GAN: Share Aging Factors Across Ages and Share Aging Trends Among Individuals .9439.  Zhenliang He (Key Lab of Intelligent Information Processing of Chinese Academy of Sciences. CAS. Institute of Computing Technology. CAS),  Meina Kan (Institute of Computing Technology. Chinese Academy of Sciences), Shiguang Shan (Chinese Academy of Sciences), and Xilin Chen (Institute of Computing Technology. Chinese Academy of Sciences)
PuppetGAN: Cross-Domain Image Manipulation by Demonstration 9449.  Ben Usman (Boston University), Nick Dufour (Google Research), Kate Saenko (Boston University), and Chris Bregler (Google Research)

Few-Shot Adversarial Learning of Realistic Neural Talking Head Models .9458.  Egor Zakharov (Skolkovo Institute of Science and Technology),  Aliaksandra Shysheya (Samsung), Egor Burkov (Skoltech), and Victor  Lempitsky (Samsung)
Pose-Aware Multi-Level Feature Network for Human Object Interaction Detection .9468
TRB: A Novel Triplet Representation for Understanding 2D Human Body .947.8.  Haodong Duan (Peking University), Kwan-Yee Lin (Peking university),  Sheng Jin (Tsinghua University), Wentao Liu (Sensetime), Chen Qian (SenseTime), and Wanli Ouyang (The University of Sydney)
Learning Trajectory Dependencies for Human Motion Prediction .9488.  Wei Mao (the Australian National University), Miaomiao Liu (The Australian National University), Mathieu Salzmann (EPFL), and Hongdong Li (Australian National University. Australia)
Cross-Domain Adaptation for Animal Pose Estimation .9497  Jinkun Cao (Shanghai Jiao Tong University), Hongyang Tang (Shanghai Jiao Tong university), Hao-Shu Fang (SJTU), Xiaoyong Shen (Tencent), Yu-Wing Tai (Tencent), and Cewu Lu (Shanghai Jiao Tong University)
Poster 4.2
Recognition
NOTE-RCNN: NOise Tolerant Ensemble RCNN for Semi-Supervised Object Detection .9507
Unsupervised Out-of-Distribution Detection by Maximum Classifier Discrepancy .9517
SBSGAN: Suppression of Inter-Domain Background Shift for Person Re-Identification .9526
Enriched Feature Guided Refinement Network for Object Detection .9536.  Jing Nie (Tianjin University), Rao Muhammad Anwer (Inception Institute of Artificial Intelligence), Hisham Cholakkal (Inception Institute of Artificial Intelligence), Fahad Shahbaz Khan (Inception Institute of Artificial Intelligence), Yanwei Pang (Tianjin University), and Ling Shao (Inception Institute of Artificial Intelligence)
Deep Meta Metric Learning .9546.  Guangyi Chen (Tsinghua University), Tianren Zhang (Tsinghua University), Jiwen Lu (Tsinghua University), and Jie Zhou (Tsinghua University)

Discriminative Feature Transformation for Occluded Pedestrian Detection .9556
Contextual Attention for Hand Detection in the Wild .9566
Meta R-CNN: Towards General Solver for Instance-Level Low-Shot Learning .957.6
Pyramid Graph Networks With Connection Attentions for Region-Based One-Shot Semantic Segmentation .9586  Chi Zhang (Nanyang Technological University), Guosheng Lin (Nanyang Technological University), Fayao Liu (Institute for Infocomm Research.  ASTAR), Jiushuang Guo (Stanford University), Qingyao Wu (South China University of Technology), and Rui Yao (China University of Mining and Technology)
Presence-Only Geographical Priors for Fine-Grained Image Classification .9595
POD: Practical Object Detection With Scale-Sensitive Network .9606.  Junran Peng (Chinese Academy of Sciences), Ming Sun (sensetime.com),  Zhao-Xiang Zhang (Chinese Academy of Sciences. China), Tieniu Tan  (NLPR. China), and Junjie Yan (Sensetime Group Limited)
Human Uncertainty Makes Classification More Robust .961.6
FCOS: Fully Convolutional One-Stage Object Detection <u>9626</u>
Self-Critical Attention Learning for Person Re-Identification .963.6
Temporal Knowledge Propagation for Image-to-Video Person Re-Identification .9646.  Xinqian Gu (University of Chinese Academy of Sciences), Bingpeng Ma (University of Chinese Academy of Sciences), Hong Chang (Chinese Academy of Sciences), Shiguang Shan (Chinese Academy of Sciences), and Xilin Chen (Institute of Computing Technology. Chinese Academy of Sciences)
RepPoints: Point Set Representation for Object Detection .9656

SegEQA: Video Segmentation Based Visual Attention for Embodied Question Answering .9666
No-Frills Human-Object Interaction Detection: Factorization, Layout Encodings, and Training Techniques .9676
Cap2Det: Learning to Amplify Weak Caption Supervision for Object Detection .9685  Keren Ye (University of Pittsburgh), Mingda Zhang (University of Pittsburgh), Adriana Kovashka (University of Pittsburgh), Wei Li (Facebook), Danfeng Qin (Google), and Jesse Berent (Google)
No Fear of the Dark: Image Retrieval Under Varying Illumination Conditions .9695.  Tomas Jenicek (CMP. FEE. Czech Technical University in Prague) and Ondrej Chum (Vision Recognition Group. Czech Technical University in Prague)
Hierarchical Shot Detector <u>97.04</u> .  Jiale Cao (Tianjin University), Yanwei Pang (Tianjin University),  Jungong Han (Lancaster University), and Xuelong Li (Northwestern  Polytechnical University)
Few-Shot Learning With Global Class Representations 97.14
Better to Follow, Follow to Be Better: Towards Precise Supervision of Feature Super-Resolution for Small Object Detection 9.7.24
Weakly Supervised Object Detection With Segmentation Collaboration 9.734.  Xiaoyan Li (University of the Chinese Academy of Sciences), Meina Kan (Institute of Computing Technology. Chinese Academy of Sciences), Shiguang Shan (Chinese Academy of Sciences), and Xilin Chen (Institute of Computing Technology. Chinese Academy of Sciences)
AutoFocus: Efficient Multi-Scale Inference 97.44.  Mahyar Najibi (University of Maryland), Bharat Singh (Amazon), and  Larry Davis (University of Maryland)
Leveraging Long-Range Temporal Relationships Between Proposals for Video Object Detection <u>.97.55</u>
Transferable Contrastive Network for Generalized Zero-Shot Learning .97.64.  Huajie Jiang (ICT. CAS), Ruiping Wang (ICT. CAS), Shiguang Shan (Chinese Academy of Sciences), and Xilin Chen (Institute of Computing Technology. Chinese Academy of Sciences)

Fast Point R-CNN .9.7.7.4
Mesh R-CNN 9.784Georgia Gkioxari (Facebook), Justin Johnson (Facebook AI Research), and Jitendra Malik (University of California at Berkley)
Deep Supervised Hashing With Anchor Graph 97.95.  Yudong Chen (Shenzhen University), Zhihui Lai (Shenzhen University),  Yujuan Ding (the Hong Kong Polytechnic University), Kaiyi Lin (Peking  University), and Waikeung Wong (Institute of Textiles and Clothing.  The Hong Kong Polytechnic University)
Detecting 11K Classes: Large Scale Object Detection Without Fine-Grained Bounding Boxes .9804
Re-ID Driven Localization Refinement for Person Search .9813
Hierarchical Encoding of Sequential Data With Compact and Sub-Linear Storage Cost .9823
C-MIDN: Coupled Multiple Instance Detection Network With Segmentation Guidance for Weakly Supervised Object Detection .9833
Learning Feature-to-Feature Translator by Alternating Back-Propagation for Generative Zero-Shot  Learning 9843  Yizhe Zhu (Rutgers University), Jianwen Xie (Hikvision), Bingchen Liu  (Rutgers. The State University of New Jersey), and Ahmed Elgammal  (Rutgers University)
Deep Constrained Dominant Sets for Person Re-Identification 9854.  Leulseged Tesfaye Alemu (Ca' Foscari University of Venice), Mubarak  Shah (University of Central Florida), and Marcello Pelillo (University of Venice)
Invariant Information Clustering for Unsupervised Image Classification and Segmentation .9864

#### Statistics, Physics, Theory & Datasets

ubspace Structure-Aware Spectral Clustering for Robust Subspace Clustering .987.4.  Masataka Yamaguchi (NTT Corporation), Go Irie (NTT Communication Science Laboratories), Takahito Kawanishi (NTT Corporation), and Kunio Kashino (NTT Corporation)
rder-Preserving Wasserstein Discriminant Analysis 9884.  Bing Su (Institute of Software Chinese Academy of Sciences), Jiahuan  Zhou (Northwestern University), and Ying Wu (Northwestern University)
ayoutVAE: Stochastic Scene Layout Generation From a Label Set .9894.  Akash Abdu Jyothi (Simon Fraser University), Thibaut Durand (Simon Fraser University), Jiawei He (Simon Fraser University), Leonid Sigal  (University of British Columbia), and Greg Mori (Simon Fraser  University)
obust Variational Bayesian Point Set Registration .9904.  Jie Zhou (Yunnan Normal University), Xinke Ma (Yunnan Normal  University), Li Liang (Yunnan Normal University), Liu Yuhe (312),  Shijin Xu (Yun nan Normal University), Sim-Heng Ong (NUS), and Yang  Yang (Yunnan Normal University)
an Affine Constraint Needed for Affine Subspace Clustering? 9914  Chong You (University of California. Berkeley), Chun-Guang Li (Beijing University of Posts & Telecommunications), Daniel Robinson (Johns Hopkins University), and Rene Vidal (Johns Hopkins University)
leta-Learning to Detect Rare Objects .9924
ew Convex Relaxations for MRF Inference With Unknown Graphs .9934.  Zhenhua Wang (Zhejiang University of Technology), Tong Liu (Zhejiang University of Technology), Qinfeng Shi (University of Adelaide), M.  Pawan Kumar (University of Oxford), and Jianhua Zhang (Zhejiang University of Technology)
luster Alignment With a Teacher for Unsupervised Domain Adaptation 9943.  Zhijie Deng (Tsinghua University), Yucen Luo (Tsinghua University), and Jun Zhu (Tsinghua University)
nalyzing the Variety Loss in the Context of Probabilistic Trajectory Prediction .9953 Luca Thiede (University of Göttingen) and Pratik Brahma (Volkswagen Electronics Research Lab)

#### 3D From Single View & RGBD

Snavely (Cornell University and Google AI), Matthew Fisher (Adobe Research), Jonathan Eisenman (Adobe Systems), and Eli Shechtman (Adobe Research. US)	••
scaping Plato's Cave: 3D Shape From Adversarial Rendering .9983.  Philipp Henzler (University College London), Niloy Mitra (University  College London), and Tobias Ritschel (UCL)	••
Deep End-to-End Alignment and Refinement for Time-of-Flight RGB-D Module .9993	
GEOBIT: A Geodesic-Based Binary Descriptor Invariant to Non-Rigid Deformations for RGB-D Images .18 Erickson Nascimento (UFMG), Guilherme Potje (UFMG), Renato Martins (UFMG & INRIA), Felipe Chamone (UFMG), Mario Campos (UFMG), and Ruzena Bajcsy (UC Berkeley)	)003
EDTB: A Color and Depth Visual Object Tracking Dataset and Benchmark .10012	
earning Joint 2D-3D Representations for Depth Completion 10022  Yun Chen (Uber ATG), Bin Yang (Uber ATG & University of Toronto), Ming  Liang (Uber ATG), and Raquel Urtasun (Uber ATG)	
Face & Body	
ace to Boay	
Make a Face: Towards Arbitrary High Fidelity Face Manipulation .10032	
Make a Face: Towards Arbitrary High Fidelity Face Manipulation .10032	

Face De-Occlusion Using 3D Morphable Model and Generative Adversarial Network .10061
Detecting Photoshopped Faces by Scripting Photoshop .10071.  Sheng-Yu Wang (University of California. Berkeley), Oliver Wang (Adobe Systems Inc), Richard Zhang (Adobe), Andrew Owens (UC Berkeley), and Alexei Efros (UC Berkeley)
Ego-Pose Estimation and Forecasting As Real-Time PD Control .1008.1.  Ye Yuan (Carnegie Mellon University) and Kris Kitani (CMU)
End-to-End Learning for Graph Decomposition .10092.  Jie Song (ETH Zurich), Bjoern Andres (University of Tübingen. Bosch Center for AI), Michael Black (Max Planck Institute for Intelligent Systems), Otmar Hilliges (ETH Zurich), and Siyu Tang (MPI for Intelligent Systems)
Laplace Landmark Localization .10102
Through-Wall Human Mesh Recovery Using Radio Signals 10112.  Mingmin Zhao (MIT), Yingcheng Liu (MIT), Aniruddh Raghu (MIT), Hang Zhao (MIT), Tianhong Li (MIT), Antonio Torralba (MIT), and Dina Katabi (Massachusetts Institute of Technology)
Discriminatively Learned Convex Models for Set Based Face Recognition .10122
Camera Distance-Aware Top-Down Approach for 3D Multi-Person Pose Estimation From a Single RGB Image 10132  Gyeongsik Moon (Seoul National University), Ju Yong Chang (Kwangwoon University), and Kyoung Mu Lee (Seoul National University)
Context-Aware Emotion Recognition Networks 10142
Aggregation via Separation: Boosting Facial Landmark Detector With Semi-Supervised Style Translation.10152  Shengju Qian (Chinese University of Hong Kong), Keqiang Sun (Tsinghua  University), Wayne Wu (Tsinghua University. SenseTime Research), Chen  Qian (SenseTime), and Jiaya Jia (Chinese University of Hong Kong)
Deep Head Pose Estimation Using Synthetic Images and Partial Adversarial Domain Adaption for Continuous Label Spaces .101.63
Computational Photography & Graphics
Flare in Interference-Based Hyperspectral Cameras .101.73

Computational Hyperspectral Imaging Based on Dimension-Discriminative Low-Rank Tensor Recovery .10182 Shipeng Zhang (Xi'an Jiaotong University), Lizhi Wang (Beijing Institute of Technology), Ying Fu (Beijing Institute of Technology), Xiaoming Zhong (Beijing Institute of Space Mechanics and Electricity), and Hua Huang (Beijing Institute of Technology)		
Deep Optics for Monocular Depth Estimation and 3D Object Detection .10192.  Julie Chang (Stanford University) and Gordon Wetzstein (Stanford University)		
Physics-Based Rendering for Improving Robustness to Rain 10202.  Shirsendu Halder (INRIA), Jean-Francois Lalonde (Université Laval), and Raoul De Charette (Inria)		
ARGAN: Attentive Recurrent Generative Adversarial Network for Shadow Detection and Removal .10212  Bin Ding (Wuhan University), Chengjiang Long (Kitware Inc), Ling Zhang (Wuhan University of Science and Technology), and Chunxia Xiao (Wuhan University)		
Deep Tensor ADMM-Net for Snapshot Compressive Imaging .10222.  Jiawei Ma (Columbia University), Xiao-Yang Liu (Columbia University),  Zheng Shou (Columbia University), and Xin Yuan (Bell Labs)		
Low-Level & Optimization		
Convex Relaxations for Consensus and Non-Minimal Problems in 3D Vision 10232		
Pareto Meets Huber: Efficiently Avoiding Poor Minima in Robust Estimation .10242		
K-Best Transformation Synchronization 10251.  Yifan Sun (UT Austin), Jiacheng Zhuo (The University of Texas at Austin), Arnav Mohan (Liberal Arts and Science Academy. LASA High School), and Qixing Huang (The University of Texas at Austin)		
Parametric Majorization for Data-Driven Energy Minimization Methods .1.026.1		
A Bayesian Optimization Framework for Neural Network Compression .10273		
HiPPI: Higher-Order Projected Power Iterations for Scalable Multi-Matching .10283		

# Language & Reasoning

Language-Conditioned Graph Networks for Relational Reasoning 10293
Tell, Draw, and Repeat: Generating and Modifying Images Based on Continual Linguistic Instruction .10303 Alaaeldin El-Nouby (University of Guelph), Shikhar Sharma (Microsoft Research), Hannes Schulz (Microsoft), R Devon Hjelm (Microsoft Research), Layla El Asri (Microsoft), Samira Ebrahimi Kahou (McGill/Mila), Yoshua Bengio (Mila), and Graham Taylor (University of Guelph)
Relation-Aware Graph Attention Network for Visual Question Answering .10312.  Linjie Li (Microsoft), Zhe Gan (Microsoft), Yu Cheng (Microsoft), and  Jingjing Liu (Microsoft)
Unpaired Image Captioning via Scene Graph Alignments .10322
Modeling Inter and Intra-Class Relations in the Triplet Loss for Zero-Shot Learning .103.32
Occlusion-Shared and Feature-Separated Network for Occlusion Relationship Reasoning .10342
Compositional Video Prediction 10352  Yufei Ye (Carnegie Mellon University), Maneesh Singh (Verisk Analytics), Abhinav Gupta (CMU/FAIR), and Shubham Tulsiani (Facebook AI Research)
Mixture-Kernel Graph Attention Network for Situation Recognition .103.62
Learning Similarity Conditions Without Explicit Supervision .10372  Reuben Tan (Boston University), Mariya Vasileva (University of Illinois at Urbana-Champaign), Kate Saenko (Boston University), and Bryan Plummer (Boston University)
Joint Prediction for Kinematic Trajectories in Vehicle-Pedestrian-Mixed Scenes .10382

Learning to Caption Images Through a Lifetime by Asking Questions 10392. Tingke Shen (University of Toronto), Amlan Kar (University of Toronto), and Sanja Fidler (University of Toronto. NVIDIA) VrR-VG: Refocusing Visually-Relevant Relationships 10402 Yuanzhi Liang (Xi'an Jiaotong university), Yalong Bai (JD AI Research), Wei Zhang (JD AI Research), Xueming Qian (Xi'an Jiaotong University), Li Zhu (Xi'an Jiaotong University), and Tao Mei (AI Research of JD.com) 3D From Multiview & Sensors TAPA-MVS: Textureless-Aware PAtchMatch Multi-View Stereo .10412..... Andrea Romanoni (Politecnico di Milano) and Matteo Matteucci (Politecnico di Milano) U4D: Unsupervised 4D Dynamic Scene Understanding 10422. Armin Mustafa (University of Surrey), Chris Russell (The Alan Turing Institute/University of Surrey), and Adrian Hilton (University of Surrey) Hierarchical Point-Edge Interaction Network for Point Cloud Semantic Segmentation .10432..... Li Jiang (The Chinese University of Hong Kong), Hengshuang Zhao (The Chinese University of Hong Kong), Shu Liu (Tencent), Xiaoyong Shen (Tencent), Chi-Wing Fu (The Chinese University of Hong Kong), and Jiaya Jia (Chinese University of Hong Kong) Multi-Angle Point Cloud-VAE: Unsupervised Feature Learning for 3D Point Clouds From Multiple Angles by Joint Self-Reconstruction and Half-to-Half Prediction 10441 Zhizhong Han (University of Maryland. College Park), Xiyang Wang (Tsinghua University), Yu-Shen Liu (Tsinghua University), and Matthias Zwicker (University of Maryland) P-MVSNet: Learning Patch-Wise Matching Confidence Aggregation for Multi-View Stereo .10451...... Keyang Luo (Huazhong University of Science and Technology), Tao Guan (Huazhong University of Science and Technology), Lili Ju (University of South Carolina), Haipeng Huang (Farsee2 Science and Technology Ltd), and Yawei Luo (University of Technology Sydney) **Image & Video Synthesis** SME-Net: Sparse Motion Estimation for Parametric Video Prediction Through Reinforcement Learning .10461 Yung-Han Ho (NCTU), Chuan-Yuan Cho (NCTU), Guo-Lun Jin (NCTU), and Wen-Hsiao Peng (National Chiao Tung University) ClothFlow: A Flow-Based Model for Clothed Person Generation .10470..... Xintong Han (Malong Technologies), Weilin Huang (Malong Technologies), Xiaojun Hu (Malong Technologies), and Matthew Scott (Malong Technologies)

LADN: Local Adversarial Disentangling Network for Facial Makeup and De-Makeup .10480
Point-to-Point Video Generation 10490.  Tsun-Hsuan Wang (National Tsing Hua University), Yen-Chi Cheng (National Tsing Hua University), Chieh Hubert Lin (National Tsing Hua University), Hwann-Tzong Chen (National Tsing Hua University), and Min Sun (NTHU)
Semantics-Enhanced Adversarial Nets for Text-to-Image Synthesis .10500.  Hongchen Tan (Dalian University of Technology), Xiuping Liu (Dalian University of Technology), Xin Li (Louisiana State University), Yi Zhang (Dalian University of Technology), and Baocai Yin (Dalian University of Technology)
VTNFP: An Image-Based Virtual Try-On Network With Body and Clothing Feature Preservation .105.10 Ruiyun Yu (Northeastern University), Xiaoqi Wang (Northeastern University), and Xiaohui Xie (University of California. Irvine)
Boundless: Generative Adversarial Networks for Image Extension .10520.  Dilip Krishnan (Google), Piotr Teterwak (Google), Aaron Sarna (Google), Aaron Maschinot (Google Research), Ce Liu (Google), David Belanger (Google), and William Freeman (Google)
Image Synthesis From Reconfigurable Layout and Style .10530
Attribute Manipulation Generative Adversarial Networks for Fashion Images .10540
Few-Shot Unsupervised Image-to-Image Translation .10550
Very Long Natural Scenery Image Prediction by Outpainting .10560
Applications, Medical & Robotics
Scaling Recurrent Models via Orthogonal Approximations in Tensor Trains .105.70
A Deep Cybersickness Predictor Based on Brain Signal Analysis for Virtual Reality Contents .105.79  Jinwoo Kim (Yonsei University), Woojae Kim (Yonsei University),  Heeseok Oh (Electronics & Telecommunications Research Institute),  Seongmin Lee (Yonsei University), and Sanghoon Lee (Yonsei University.  Korea)

Learning With Unsure Data for Medical Image Diagnosis .10589.
Botong Wu (Peking University), Xinwei Sun (Peking University), Lingjing Hu (Capital Medical University), and Yizhou Wang (PKU)
Recursive Cascaded Networks for Unsupervised Medical Image Registration 10599.  Shengyu Zhao (Tsinghua University), Yue Dong (Tsinghua University), Eric Chang (Microsoft Asia), and Yan Xu (Beihang University)
DUAL-GLOW: Conditional Flow-Based Generative Model for Modality Transfer .10610
Dilated Convolutional Neural Networks for Sequential Manifold-Valued Data 10620
Align, Attend and Locate: Chest X-Ray Diagnosis via Contrast Induced Attention Network With Limited Supervision .10631
Joint Acne Image Grading and Counting via Label Distribution Learning 10641  Xiaoping Wu (Nankai University), Ni Wen (Beijing Tsinghua Changgung  Hospital), Jie Liang (Nankai University), Yu-Kun Lai (Cardiff  University), Dongyu She (Nankai University), Ming-Ming Cheng (Nankai  University), and Jufeng Yang (Nankai University)
An Alarm System for Segmentation Algorithm Based on Shape Model 10651  Fengze Liu (Johns Hopkins University), Yingda Xia (Johns Hopkins University), Dong Yang (NVIDIA Corporation), Alan Yuille (Johns Hopkins University), and Daguang Xu (NVIDIA Corporation)
HistoSegNet: Semantic Segmentation of Histological Tissue Type in Whole Slide Images 10661
Prior-Aware Neural Network for Partially-Supervised Multi-Organ Segmentation .10671.  Yuyin Zhou (Johns Hopkins University), Zhe Li (Google), Song Bai (University of Oxford), Xinlei Chen (Facebook AI Research), Mei Han (paii-labs.com), Chong Wang (ByteDance Inc.), Elliot Fishman (JHMI), and Alan Yuille (Johns Hopkins University)

CAMEL: A Weakly Supervised Learning Framework f Gang Xu (School of Life Sciences. Tsinghua Univer (Department of Pathology. The Chinese PLA Gener (Thorough Images), Calvin Ku (Thorough Images), of Physics. Tsinghua University), Cancheng Liu (The Shuhao Wang (Thorough Images), Jianpeng Ma (M Institute for Complex Systems. Fudan University), a (Institute for Interdisciplinary Information Sciences University)	sity), Zhigang Song val Hospital), Zhuo Sun Zhe Yang (Department norough Images), vultiscale Research und Wei Xu
Conditional Recurrent Flow: Conditional Generation of Neuroimaging .10691	n), Zirui Tao niversity of
Multi-Stage Pathological Image Classification Using So Shusuke Takahama (The University of Tokyo), Yusu University of Tokyo), Yusuke Mukuta (The Universi Hiroyuki Abe (The University of Tokyo), Masashi F University of Tokyo), Akihiko Yoshizawa (Kyoto Un Kitagawa (Tokyo Medical and Dental University), o (The University of Tokyo / RIKEN)	oke Kurose (The ty of Tokyo), iukayama (The iiversity), Masanobu
Semantic-Transferable Weakly-Supervised Endoscopic Jiahua Dong (Chinese Academy of Sciences), Yang of Sciences), Gan Sun (State Key Laboratory of Rol Institute of Automation. Institutes for Robotics and Manufacturing. Chinese Academy of Sciences), and (University of Chinese Academy of Sciences)	Cong (Chinese Academy potics. Shenyang Intelligent
Unsupervised Microvascular Image Segmentation Usin Shir Gur (Tel Aviv University), Lior Wolf (Tel Aviv Israel), Lior Golgher (Tel Aviv University), and Pai Aviv University)	·
GLAMpoints: Greedily Learned Accurate Match Points Prune Truong (RetinAI Medical AG / ETHZ), Stefan (RetinAI Medical AG), Agata Mosinska (RetinAI Medical), (RetinAI Medical), Carlos Ciller (RetinAI Medical), Zanet (RetinAI Medical)	nos Apostolopoulos edical), Samuel Stucky

#### **Author Index**