

TITLE: Searching for a Robust Neural Architecture in Four GPU Hours  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Dong\\_Searching\\_for\\_a\\_Robust\\_Neural\\_Architecture\\_in\\_Four\\_GPU\\_Hours\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Dong_Searching_for_a_Robust_Neural_Architecture_in_Four_GPU_Hours_CVPR_2019_paper.html)

AUTHORS: Xuanyi Dong, Yi Yang

HIGHLIGHT: We propose an efficient NAS approach, which learns the searching approach by gradient descent.

TITLE: Hierarchy Denoising Recursive Autoencoders for 3D Scene Layout Prediction  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Shi\\_Hierarchy\\_Denoising\\_Recursive\\_Autoencoders\\_for\\_3D\\_Scene\\_Layout\\_Prediction\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Shi_Hierarchy_Denoising_Recursive_Autoencoders_for_3D_Scene_Layout_Prediction_CVPR_2019_paper.html)

AUTHORS: Yifei Shi, Angel X. Chang, Zhelun Wu, Manolis Savva, Kai Xu

HIGHLIGHT: We present a variational denoising recursive autoencoder (VDRAE) that generates and iteratively refines a hierarchical representation of 3D object layouts, interleaving bottom-up encoding for context aggregation and top-down decoding for propagation.

TITLE: Adaptively Connected Neural Networks

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Adaptively\\_Connected\\_Neural\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Adaptively_Connected_Neural_Networks_CVPR_2019_paper.html)

AUTHORS: Guangrun Wang, Keze Wang, Liang Lin

HIGHLIGHT: This paper presents a novel adaptively connected neural network (ACNet) to improve the traditional convolutional neural networks (CNNs) in two aspects.

TITLE: CrDoCo: Pixel-Level Domain Transfer With Cross-Domain Consistency

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_CrDoCo\\_Pixel-Level\\_Domain\\_Transfer\\_With\\_Cross-Domain\\_Consistency\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_CrDoCo_Pixel-Level_Domain_Transfer_With_Cross-Domain_Consistency_CVPR_2019_paper.html)

AUTHORS: Yun-Chun Chen, Yen-Yu Lin, Ming-Hsuan Yang, Jia-Bin Huang

HIGHLIGHT: In this paper, we present a novel pixel-wise adversarial domain adaptation algorithm.

TITLE: Temporal Cycle-Consistency Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Dwibedi\\_Temporal\\_Cycle-Consistency\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Dwibedi_Temporal_Cycle-Consistency_Learning_CVPR_2019_paper.html)

AUTHORS: Debidatta Dwibedi, Yusuf Aytar, Jonathan Tompson, Pierre Sermanet, Andrew Zisserman

HIGHLIGHT: We introduce a self-supervised representation learning method based on the task of temporal alignment between videos.

TITLE: Predicting Future Frames Using Retrospective Cycle GAN

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kwon\\_Predicting\\_Future\\_Frames\\_Using\\_Retrospective\\_Cycle\\_GAN\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kwon_Predicting_Future_Frames_Using_Retrospective_Cycle_GAN_CVPR_2019_paper.html)

AUTHORS: Yong-Hoon Kwon, Min-Gyu Park

HIGHLIGHT: In this paper, we propose a unified generative adversarial network for predicting accurate and temporally consistent future frames over time, even in a challenging environment.

TITLE: Density Map Regression Guided Detection Network for RGB-D Crowd Counting and Localization

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Lian\\_Density\\_Map\\_Regression\\_Guided\\_Detection\\_Network\\_for\\_RGB-D\\_Crowd\\_Counting\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Lian_Density_Map_Regression_Guided_Detection_Network_for_RGB-D_Crowd_Counting_CVPR_2019_paper.html)

AUTHORS: Dongze Lian, Jing Li, Jia Zheng, Weixin Luo, Shenghua Gao

HIGHLIGHT: Specifically, to improve the robustness of detection-based approaches for small/tiny heads, we leverage density map to improve the head/non-head classification in detection network where density map serves as the probability of a pixel being a head.

TITLE: TAFE-Net: Task-Aware Feature Embeddings for Low Shot Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_TAFE-Net\\_Task-Aware\\_Feature\\_Embeddings\\_for\\_Low\\_Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_TAFE-Net_Task-Aware_Feature_Embeddings_for_Low_Shot_Learning_CVPR_2019_paper.html)

AUTHORS: Xin Wang, Fisher Yu, Ruth Wang, Trevor Darrell, Joseph E. Gonzalez

HIGHLIGHT: In this work, we propose Task Aware Feature Embedding Networks (TAFE-Nets) to learn how to adapt the image representation to a new task in a meta learning fashion.

TITLE: Learning Semantic Segmentation From Synthetic Data: A Geometrically Guided Input-Output Adaptation Approach

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Learning\\_Semantic\\_Segmentation\\_From\\_Synthetic\\_Data\\_A\\_Geometrically\\_Guided\\_Input-Output\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Learning_Semantic_Segmentation_From_Synthetic_Data_A_Geometrically_Guided_Input-Output_CVPR_2019_paper.html)

AUTHORS: Yuhua Chen, Wen Li, Xiaoran Chen, Luc Van Gool

HIGHLIGHT: In this work, we propose an approach to cross-domain semantic segmentation with the auxiliary geometric information, which can also be easily obtained from virtual environments.

TITLE: Attentive Single-Tasking of Multiple Tasks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Maninis\\_Attentive\\_Single-Tasking\\_of\\_Multiple\\_Tasks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Maninis_Attentive_Single-Tasking_of_Multiple_Tasks_CVPR_2019_paper.html)  
AUTHORS: Kevis-Kokitsi Maninis, Ilija Radosavovic, Iasonas Kokkinos  
HIGHLIGHT: In this work we address task interference in universal networks by considering that a network is trained on multiple tasks, but performs one task at a time, an approach we refer to as "single-tasking multiple tasks".

TITLE: Deep Metric Learning to Rank  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cakir\\_Deep\\_Metric\\_Learning\\_to\\_Rank\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cakir_Deep_Metric_Learning_to_Rank_CVPR_2019_paper.html)  
AUTHORS: Fatih Cakir, Kun He, Xide Xia, Brian Kulis, Stan Sclaroff  
HIGHLIGHT: We propose a novel deep metric learning method by revisiting the learning to rank approach.

TITLE: End-To-End Multi-Task Learning With Attention  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_End-To-End\\_Multi-Task\\_Learning\\_With\\_Attention\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_End-To-End_Multi-Task_Learning_With_Attention_CVPR_2019_paper.html)  
AUTHORS: Shikun Liu, Edward Johns, Andrew J. Davison  
HIGHLIGHT: We propose a novel multi-task learning architecture, which allows learning of task-specific feature-level attention.

TITLE: Self-Supervised Learning via Conditional Motion Propagation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhan\\_Self-Supervised\\_Learning\\_via\\_Conditional\\_Motion\\_Propagation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhan_Self-Supervised_Learning_via_Conditional_Motion_Propagation_CVPR_2019_paper.html)  
AUTHORS: Xiaohang Zhan, Xingang Pan, Ziwei Liu, Dahua Lin, Chen Change Loy  
HIGHLIGHT: In this work, we design a new learning-from-motion paradigm to bridge these gaps.

TITLE: Bridging Stereo Matching and Optical Flow via Spatiotemporal Correspondence  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Lai\\_Bridging\\_Stereo\\_Matching\\_and\\_Optical\\_Flow\\_via\\_Spatiotemporal\\_Correspondence\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Lai_Bridging_Stereo_Matching_and_Optical_Flow_via_Spatiotemporal_Correspondence_CVPR_2019_paper.html)  
AUTHORS: Hsueh-Ying Lai, Yi-Hsuan Tsai, Wei-Chen Chiu  
HIGHLIGHT: In this paper, we propose a single and principled network to jointly learn spatiotemporal correspondence for stereo matching and flow estimation, with a newly designed geometric connection as the unsupervised signal for temporally adjacent stereo pairs.

TITLE: All About Structure: Adapting Structural Information Across Domains for Boosting Semantic Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chang\\_All\\_About\\_Structure\\_Adapting\\_Structural\\_Information\\_Across\\_Domains\\_for\\_Boosting\\_Semantic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chang_All_About_Structure_Adapting_Structural_Information_Across_Domains_for_Boosting_Semantic_Segmentation_CVPR_2019_paper.html)  
AUTHORS: Wei-Lun Chang, Hui-Po Wang, Wen-Hsiao Peng, Wei-Chen Chiu  
HIGHLIGHT: In this paper we tackle the problem of unsupervised domain adaptation for the task of semantic segmentation, where we attempt to transfer the knowledge learned upon synthetic datasets with ground-truth labels to real-world images without any annotation.

TITLE: Iterative Reorganization With Weak Spatial Constraints: Solving Arbitrary Jigsaw Puzzles for Unsupervised Representation Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wei\\_Iterative\\_Reorganization\\_With\\_Weak\\_Spatial\\_Constraints\\_Solving\\_Arbitrary\\_Jigsaw\\_Puzzles\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wei_Iterative_Reorganization_With_Weak_Spatial_Constraints_Solving_Arbitrary_Jigsaw_Puzzles_CVPR_2019_paper.html)  
AUTHORS: Chen Wei, Lingxi Xie, Xutong Ren, Yingda Xia, Chi Su, Jiaying Liu, Qi Tian, Alan L. Yuille  
HIGHLIGHT: This paper presents a novel approach which applies to jigsaw puzzles with an arbitrary grid size and dimensionality.

TITLE: Revisiting Self-Supervised Visual Representation Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kolesnikov\\_Revisiting\\_Self-Supervised\\_Visual\\_Representation\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kolesnikov_Revisiting_Self-Supervised_Visual_Representation_Learning_CVPR_2019_paper.html)  
AUTHORS: Alexander Kolesnikov, Xiaohua Zhai, Lucas Beyer  
HIGHLIGHT: Therefore, we revisit numerous previously proposed self-supervised models, conduct a thorough large scale study and, as a result, uncover multiple crucial insights.

TITLE: d-SNE: Domain Adaptation Using Stochastic Neighborhood Embedding  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xu\\_d-SNE\\_Domain\\_Adaptation\\_Using\\_Stochastic\\_Neighborhood\\_Embedding\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xu_d-SNE_Domain_Adaptation_Using_Stochastic_Neighborhood_Embedding_CVPR_2019_paper.html)  
AUTHORS: Xiang Xu, Xiong Zhou, Ragav Venkatesan, Gurumurthy Swaminathan, Orchid Majumder  
HIGHLIGHT: In this paper, we propose a new technique (d-SNE) of domain adaptation that cleverly uses stochastic neighborhood embedding techniques and a novel modified-Hausdorff distance.

TITLE: Taking a Closer Look at Domain Shift: Category-Level Adversaries for Semantics Consistent Domain Adaptation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Luo\\_Taking\\_a\\_Closer\\_Look\\_at\\_Domain\\_Shift\\_Category-Level\\_Adversaries\\_for\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Luo_Taking_a_Closer_Look_at_Domain_Shift_Category-Level_Adversaries_for_CVPR_2019_paper.html)

AUTHORS: Yawei Luo, Liang Zheng, Tao Guan, Junqing Yu, Yi Yang

HIGHLIGHT: To address this problem, this paper introduces a category-level adversarial network, aiming to enforce local semantic consistency during the trend of global alignment.

TITLE: ADVENT: Adversarial Entropy Minimization for Domain Adaptation in Semantic Segmentation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Vu\\_ADVENT\\_Adversarial\\_Entropy\\_Minimization\\_for\\_Domain\\_Adaptation\\_in\\_Semantic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Vu_ADVENT_Adversarial_Entropy_Minimization_for_Domain_Adaptation_in_Semantic_Segmentation_CVPR_2019_paper.html)

AUTHORS: Tuan-Hung Vu, Himalaya Jain, Maxime Bucher, Matthieu Cord, Patrick Perez

HIGHLIGHT: In this work, we address the task of unsupervised domain adaptation in semantic segmentation with losses based on the entropy of the pixel-wise predictions.

TITLE: ContextDesc: Local Descriptor Augmentation With Cross-Modality Context

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Luo\\_ContextDesc\\_Local\\_Descriptor\\_Augmentation\\_With\\_Cross-Modality\\_Context\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Luo_ContextDesc_Local_Descriptor_Augmentation_With_Cross-Modality_Context_CVPR_2019_paper.html)

AUTHORS: Zixin Luo, Tianwei Shen, Lei Zhou, Jiahui Zhang, Yao Yao, Shiwei Li, Tian Fang, Long Quan

HIGHLIGHT: In this paper, we go beyond the local detail representation by introducing context awareness to augment off-the-shelf local feature descriptors.

TITLE: Large-Scale Long-Tailed Recognition in an Open World

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Large-Scale\\_Long-Tailed\\_Recognition\\_in\\_an\\_Open\\_World\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Large-Scale_Long-Tailed_Recognition_in_an_Open_World_CVPR_2019_paper.html)

AUTHORS: Ziwei Liu, Zhongqi Miao, Xiaohang Zhan, Jiayun Wang, Boqing Gong, Stella X. Yu

HIGHLIGHT: We develop an integrated OLTR algorithm that maps an image to a feature space such that visual concepts can easily relate to each other based on a learned metric that respects the closed-world classification while acknowledging the novelty of the open world.

TITLE: SDC - Stacked Dilated Convolution: A Unified Descriptor Network for Dense Matching Tasks

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Schuster\\_SDC\\_-\\_Stacked\\_Dilated\\_Convolution\\_A\\_Unified\\_Descriptor\\_Network\\_for\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Schuster_SDC_-_Stacked_Dilated_Convolution_A_Unified_Descriptor_Network_for_CVPR_2019_paper.html)

AUTHORS: Rene Schuster, Oliver Wasenmüller, Christian Unger, Didier Stricker

HIGHLIGHT: We present a robust, unified descriptor network that considers a large context region with high spatial variance.

TITLE: Learning Correspondence From the Cycle-Consistency of Time

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Learning\\_Correspondence\\_From\\_the\\_Cycle-Consistency\\_of\\_Time\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Learning_Correspondence_From_the_Cycle-Consistency_of_Time_CVPR_2019_paper.html)

AUTHORS: Xiaolong Wang, Allan Jabri, Alexei A. Efros

HIGHLIGHT: We introduce a self-supervised method for learning visual correspondence from unlabeled video.

TITLE: AE2-Nets: Autoencoder in Autoencoder Networks

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_AE2-Nets\\_Autoencoder\\_in\\_Autoencoder\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_AE2-Nets_Autoencoder_in_Autoencoder_Networks_CVPR_2019_paper.html)

AUTHORS: Changqing Zhang, Yeqing Liu, Huazhu Fu

HIGHLIGHT: Differently, in this paper, we focus on unsupervised representation learning and propose a novel framework termed Autoencoder in Autoencoder Networks (AE<sup>2</sup>-Nets), which integrates information from heterogeneous sources into an intact representation by the nested autoencoder framework.

TITLE: Mitigating Information Leakage in Image Representations: A Maximum Entropy Approach

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Roy\\_Mitigating\\_Information\\_Leakage\\_in\\_Image\\_Representations\\_A\\_Maximum\\_Entropy\\_Approach\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Roy_Mitigating_Information_Leakage_in_Image_Representations_A_Maximum_Entropy_Approach_CVPR_2019_paper.html)

AUTHORS: Proteek Chandan Roy, Vishnu Naresh Boddeti

HIGHLIGHT: We formulate the problem as an adversarial non-zero sum game of finding a good embedding function with two competing goals: to retain as much task dependent discriminative image information as possible, while simultaneously minimizing the amount of information, as measured by entropy, about other sensitive attributes of the user.

TITLE: Learning Spatial Common Sense With Geometry-Aware Recurrent Networks

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Tung\\_Learning\\_Spatial\\_Common\\_Sense\\_With\\_Geometry-Aware\\_Recurrent\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Tung_Learning_Spatial_Common_Sense_With_Geometry-Aware_Recurrent_Networks_CVPR_2019_paper.html)

**AUTHORS:** Hsiao-Yu Fish Tung, Ricson Cheng, Katerina Fragkiadaki  
**HIGHLIGHT:** We integrate two powerful ideas, geometry and deep visual representation learning, into recurrent network architectures for mobile visual scene understanding.

**TITLE:** Structured Knowledge Distillation for Semantic Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Structured\\_Knowledge\\_Distillation\\_for\\_Semantic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Structured_Knowledge_Distillation_for_Semantic_Segmentation_CVPR_2019_paper.html)

**AUTHORS:** Yifan Liu, Ke Chen, Chris Liu, Zengchang Qin, Zhenbo Luo, Jingdong Wang  
**HIGHLIGHT:** In this paper, we investigate the issue of knowledge distillation for training compact semantic segmentation networks by making use of cumbersome networks.

**TITLE:** Scan2CAD: Learning CAD Model Alignment in RGB-D Scans  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Avetisyan\\_Scan2CAD\\_Learning\\_CAD\\_Model\\_Alignment\\_in\\_RGB-D\\_Scans\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Avetisyan_Scan2CAD_Learning_CAD_Model_Alignment_in_RGB-D_Scans_CVPR_2019_paper.html)

**AUTHORS:** Armen Avetisyan, Manuel Dahnert, Angela Dai, Manolis Savva, Angel X. Chang, Matthias Niessner  
**HIGHLIGHT:** We present Scan2CAD, a novel data-driven method that learns to align clean 3D CAD models from a shape database to the noisy and incomplete geometry of a commodity RGB-D scan.

**TITLE:** Towards Scene Understanding: Unsupervised Monocular Depth Estimation With Semantic-Aware Representation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Towards\\_Scene\\_Understanding\\_Unsupervised\\_Monocular\\_Depth\\_Estimation\\_With\\_Semantic-Aware\\_Representation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Towards_Scene_Understanding_Unsupervised_Monocular_Depth_Estimation_With_Semantic-Aware_Representation_CVPR_2019_paper.html)

**AUTHORS:** Po-Yi Chen, Alexander H. Liu, Yen-Cheng Liu, Yu-Chiang Frank Wang  
**HIGHLIGHT:** In this paper, we propose SceneNet to overcome this limitation with the aid of semantic understanding from segmentation.

**TITLE:** Tell Me Where I Am: Object-Level Scene Context Prediction  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Qiao\\_Tell\\_Me\\_Where\\_I\\_Am\\_Object-Level\\_Scene\\_Context\\_Prediction\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Qiao_Tell_Me_Where_I_Am_Object-Level_Scene_Context_Prediction_CVPR_2019_paper.html)

**AUTHORS:** Xiaotian Qiao, Quanlong Zheng, Ying Cao, Rynson W.H. Lau  
**HIGHLIGHT:** In this paper, we consider an inverse problem of how to hallucinate missing contextual information from the properties of a few standalone objects.

**TITLE:** Normalized Object Coordinate Space for Category-Level 6D Object Pose and Size Estimation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Normalized\\_Object\\_Coordinate\\_Space\\_for\\_Category-Level\\_6D\\_Object\\_Pose\\_and\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Normalized_Object_Coordinate_Space_for_Category-Level_6D_Object_Pose_and_CVPR_2019_paper.html)

**AUTHORS:** He Wang, Srinath Sridhar, Jingwei Huang, Julien Valentin, Shuran Song, Leonidas J. Guibas  
**HIGHLIGHT:** The goal of this paper is to estimate the 6D pose and dimensions of unseen object instances in an RGB-D image.

**TITLE:** Supervised Fitting of Geometric Primitives to 3D Point Clouds  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Supervised\\_Fitting\\_of\\_Geometric\\_Primitives\\_to\\_3D\\_Point\\_Clouds\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Supervised_Fitting_of_Geometric_Primitives_to_3D_Point_Clouds_CVPR_2019_paper.html)

**AUTHORS:** Lingxiao Li, Minhyuk Sung, Anastasia Dubrovina, Li Yi, Leonidas J. Guibas  
**HIGHLIGHT:** In this work, we introduce Supervised Primitive Fitting Network (SPFN), an end-to-end neural network that can robustly detect a varying number of primitives at different scales without any user control.

**TITLE:** Do Better ImageNet Models Transfer Better?  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kornblith\\_Do\\_Better\\_ImageNet\\_Models\\_Transfer\\_Better\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kornblith_Do_Better_ImageNet_Models_Transfer_Better_CVPR_2019_paper.html)

**AUTHORS:** Simon Kornblith, Jonathon Shlens, Quoc V. Le  
**HIGHLIGHT:** Here, we compare the performance of 16 classification networks on 12 image classification datasets.

**TITLE:** GSPN: Generative Shape Proposal Network for 3D Instance Segmentation in Point Cloud  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yi\\_GSPN\\_Generative\\_Shape\\_Proposal\\_Network\\_for\\_3D\\_Instance\\_Segmentation\\_in\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yi_GSPN_Generative_Shape_Proposal_Network_for_3D_Instance_Segmentation_in_CVPR_2019_paper.html)

**AUTHORS:** Li Yi, Wang Zhao, He Wang, Minhyuk Sung, Leonidas J. Guibas  
**HIGHLIGHT:** We introduce a novel 3D object proposal approach named Generative Shape Proposal Network (GSPN) for instance segmentation in point cloud data.

**TITLE:** Attentive Relational Networks for Mapping Images to Scene Graphs

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Qi\\_Attentive\\_Relational\\_Networks\\_for\\_Mapping\\_Images\\_to\\_Scene\\_Graphs\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Qi_Attentive_Relational_Networks_for_Mapping_Images_to_Scene_Graphs_CVPR_2019_paper.html)

AUTHORS: Mengshi Qi, Weijian Li, Zhengyuan Yang, Yunhong Wang, Jiebo Luo

HIGHLIGHT: In this study, we propose a novel Attentive Relational Network that consists of two key modules with an object detection backbone to approach this problem.

TITLE: Relational Knowledge Distillation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Park\\_Relational\\_Knowledge\\_Distillation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Park_Relational_Knowledge_Distillation_CVPR_2019_paper.html)

AUTHORS: Wonpyo Park, Dongju Kim, Yan Lu, Minsu Cho

HIGHLIGHT: We introduce a novel approach, dubbed relational knowledge distillation (RKD), that transfers mutual relations of data examples instead.

TITLE: Compressing Convolutional Neural Networks via Factorized Convolutional Filters

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Compressing\\_Convolutional\\_Neural\\_Networks\\_via\\_Factorized\\_Convolutional\\_Filters\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Compressing_Convolutional_Neural_Networks_via_Factorized_Convolutional_Filters_CVPR_2019_paper.html)

AUTHORS: Tuanhui Li, Baoyuan Wu, Yujiu Yang, Yanbo Fan, Yong Zhang, Wei Liu

HIGHLIGHT: In this work, we propose to conduct filter selection and filter learning simultaneously, in a unified model.

TITLE: On the Intrinsic Dimensionality of Image Representations

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Gong\\_On\\_the\\_Intrinsic\\_Dimensionality\\_of\\_Image\\_Representations\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Gong_On_the_Intrinsic_Dimensionality_of_Image_Representations_CVPR_2019_paper.html)

AUTHORS: Sixue Gong, Vishnu Naresh Boddeti, Anil K. Jain

HIGHLIGHT: This paper addresses the following questions pertaining to the intrinsic dimensionality of any given image representation: (i) estimate its intrinsic dimensionality, (ii) develop a deep neural network based non-linear mapping, dubbed DeepMDS, that transforms the ambient representation to the minimal intrinsic space, and (iii) validate the veracity of the mapping through image matching in the intrinsic space.

TITLE: Part-Regularized Near-Duplicate Vehicle Re-Identification

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/He\\_Part-Regularized\\_Near-Duplicate\\_Vehicle\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/He_Part-Regularized_Near-Duplicate_Vehicle_Re-Identification_CVPR_2019_paper.html)

AUTHORS: Bing He, Jia Li, Yifan Zhao, Yonghong Tian

HIGHLIGHT: In this paper, we proposed a simple but efficient part-regularized discriminative feature preserving method which enhances the perceptive ability of subtle discrepancies.

TITLE: Self-Supervised Spatio-Temporal Representation Learning for Videos by Predicting Motion and Appearance Statistics

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Self-Supervised\\_Spatio-Temporal\\_Representation\\_Learning\\_for\\_Videos\\_by\\_Predicting\\_Motion\\_and\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Self-Supervised_Spatio-Temporal_Representation_Learning_for_Videos_by_Predicting_Motion_and_CVPR_2019_paper.html)

AUTHORS: Jiangliu Wang, Jianbo Jiao, Linchao Bao, Shengfeng He, Yunhui Liu, Wei Liu

HIGHLIGHT: In this paper we propose a novel self-supervised approach to learn spatio-temporal features for video representation.

TITLE: Classification-Reconstruction Learning for Open-Set Recognition

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yoshihashi\\_Classification-Reconstruction\\_Learning\\_for\\_Open-Set\\_Recognition\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yoshihashi_Classification-Reconstruction_Learning_for_Open-Set_Recognition_CVPR_2019_paper.html)

AUTHORS: Ryota Yoshihashi, Wen Shao, Rei Kawakami, Shaodi You, Makoto Iida, Takeshi Naemura

HIGHLIGHT: In contrast, we train networks for joint classification and reconstruction of input data.

TITLE: Emotion-Aware Human Attention Prediction

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cordel\\_Emotion-Aware\\_Human\\_Attention\\_Prediction\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cordel_Emotion-Aware_Human_Attention_Prediction_CVPR_2019_paper.html)

AUTHORS: Macario O. Cordel II, Shaojing Fan, Zhiqi Shen, Mohan S. Kankanhalli

HIGHLIGHT: In this work, we investigate the relation between object sentiment and human attention.

TITLE: Residual Regression With Semantic Prior for Crowd Counting

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wan\\_Residual\\_Regression\\_With\\_Semantic\\_Prior\\_for\\_Crowd\\_Counting\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wan_Residual_Regression_With_Semantic_Prior_for_Crowd_Counting_CVPR_2019_paper.html)

AUTHORS: Jia Wan, Wenhan Luo, Baoyuan Wu, Antoni B. Chan, Wei Liu

HIGHLIGHT: In this paper, a residual regression framework is proposed for crowd counting utilizing the correlation information among samples.

TITLE: Context-Reinforced Semantic Segmentation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhou\\_Context-Reinforced\\_Semantic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhou_Context-Reinforced_Semantic_Segmentation_CVPR_2019_paper.html)  
AUTHORS: Yizhou Zhou, Xiaoyan Sun, Zheng-Jun Zha, Wenjun Zeng  
HIGHLIGHT: In this paper, we propose a dedicated module, Context Net, to better explore the context information in p-maps.

TITLE: Adversarial Structure Matching for Structured Prediction Tasks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hwang\\_Adversarial\\_Structure\\_Matching\\_for\\_Structured\\_Prediction\\_Tasks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hwang_Adversarial_Structure_Matching_for_Structured_Prediction_Tasks_CVPR_2019_paper.html)  
AUTHORS: Jyh-Jing Hwang, Tsung-Wei Ke, Jianbo Shi, Stella X. Yu  
HIGHLIGHT: We, on the other hand, approach this problem from an opposing angle and propose a new framework, Adversarial Structure Matching (ASM), for training such structured prediction networks via an adversarial process, in which we train a structure analyzer that provides the supervisory signals, the ASM loss.

TITLE: Deep Spectral Clustering Using Dual Autoencoder Network  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yang\\_Deep\\_Spectral\\_Clustering\\_Using\\_Dual\\_Autoencoder\\_Network\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yang_Deep_Spectral_Clustering_Using_Dual_Autoencoder_Network_CVPR_2019_paper.html)  
AUTHORS: Xu Yang, Cheng Deng, Feng Zheng, Junchi Yan, Wei Liu  
HIGHLIGHT: In this paper, we propose a joint learning framework for discriminative embedding and spectral clustering.

TITLE: Deep Asymmetric Metric Learning via Rich Relationship Mining  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xu\\_Deep\\_Asymmetric\\_Metric\\_Learning\\_via\\_Rich\\_Relationship\\_Mining\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xu_Deep_Asymmetric_Metric_Learning_via_Rich_Relationship_Mining_CVPR_2019_paper.html)  
AUTHORS: Xinyi Xu, Yanhua Yang, Cheng Deng, Feng Zheng  
HIGHLIGHT: This motivates us to propose a novel framework, named deep asymmetric metric learning via rich relationship mining (DAMLRRM), to mine rich relationship under satisfying sampling size.

TITLE: Did It Change? Learning to Detect Point-Of-Interest Changes for Proactive Map Updates  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Revaud\\_Did\\_It\\_Change\\_Learning\\_to\\_Detect\\_Point-Of-Interest\\_Changes\\_for\\_Proactive\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Revaud_Did_It_Change_Learning_to_Detect_Point-Of-Interest_Changes_for_Proactive_CVPR_2019_paper.html)  
AUTHORS: Jerome Revaud, Minhyeok Heo, Rafael S. Rezende, Chanmi You, Seong-Gyun Jeong  
HIGHLIGHT: Motivated by the broad availability of geo-tagged street-view images, we propose a new task aiming to make the map update process more proactive.

TITLE: Associatively Segmenting Instances and Semantics in Point Clouds  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Associatively\\_Segmenting\\_Instances\\_and\\_Semantics\\_in\\_Point\\_Clouds\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Associatively_Segmenting_Instances_and_Semantics_in_Point_Clouds_CVPR_2019_paper.html)  
AUTHORS: Xinlong Wang, Shu Liu, Xiaoyong Shen, Chunhua Shen, Jiaya Jia  
HIGHLIGHT: Specifically, we make instance segmentation benefit from semantic segmentation through learning semantic-aware point-level instance embedding.

TITLE: Pattern-Affinitive Propagation Across Depth, Surface Normal and Semantic Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_Pattern-Affinitive\\_Propagation\\_Across\\_Depth\\_Surface\\_Normal\\_and\\_Semantic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_Pattern-Affinitive_Propagation_Across_Depth_Surface_Normal_and_Semantic_Segmentation_CVPR_2019_paper.html)  
AUTHORS: Zhenyu Zhang, Zhen Cui, Chunyan Xu, Yan Yan, Nicu Sebe, Jian Yang  
HIGHLIGHT: In this paper, we propose a novel Pattern-Affinitive Propagation (PAP) framework to jointly predict depth, surface normal and semantic segmentation.

TITLE: Scene Categorization From Contours: Medial Axis Based Saliency Measures  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Rezanejad\\_Scene\\_Categorization\\_From\\_Contours\\_Medial\\_Axis\\_Based\\_Saliency\\_Measures\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Rezanejad_Scene_Categorization_From_Contours_Medial_Axis_Based_Saliency_Measures_CVPR_2019_paper.html)  
AUTHORS: Morteza Rezanejad, Gabriel Downs, John Wilder, Dirk B. Walther, Allan Jepson, Sven Dickinson, Kaleem Siddiqi  
HIGHLIGHT: Specifically, we use off-the-shelf pre-trained Convolutional Neural Networks (CNNs) to perform scene classification given only contour information as input, and find performance levels well above chance.

TITLE: Polynomial Representation for Persistence Diagram  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Polynomial\\_Representation\\_for\\_Persistence\\_Diagram\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Polynomial_Representation_for_Persistence_Diagram_CVPR_2019_paper.html)  
AUTHORS: Zhichao Wang, Qian Li, Gang Li, Guandong Xu  
HIGHLIGHT: In this work, we discover a set of general polynomials that vanish on vectorized PDs and extract the task-adapted feature representation from these polynomials.

**TITLE:** Crowd Counting and Density Estimation by Trellis Encoder-Decoder Networks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Jiang\\_Crowd\\_Counting\\_and\\_Density\\_Estimation\\_by\\_Trellis\\_Encoder-Decoder\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Jiang_Crowd_Counting_and_Density_Estimation_by_Trellis_Encoder-Decoder_Networks_CVPR_2019_paper.html)  
**AUTHORS:** Xiaolong Jiang, Zehao Xiao, Baochang Zhang, Xiantong Zhen, Xianbin Cao, David Doermann, Ling Shao  
**HIGHLIGHT:** In this paper, we propose a trellis encoder-decoder network (TEDnet) for crowd counting, which focuses on generating high-quality density estimation maps.

**TITLE:** Cross-Atlas Convolution for Parameterization Invariant Learning on Textured Mesh Surface  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Cross-Atlas\\_Convolution\\_for\\_Parameterization\\_Invariant\\_Learning\\_on\\_Textured\\_Mesh\\_Surface\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Cross-Atlas_Convolution_for_Parameterization_Invariant_Learning_on_Textured_Mesh_Surface_CVPR_2019_paper.html)  
**AUTHORS:** Shiwei Li, Zixin Luo, Mingmin Zhen, Yao Yao, Tianwei Shen, Tian Fang, Long Quan  
**HIGHLIGHT:** We present a convolutional network architecture for direct feature learning on mesh surfaces through their atlases of texture maps.

**TITLE:** Deep Surface Normal Estimation With Hierarchical RGB-D Fusion  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zeng\\_Deep\\_Surface\\_Normal\\_Estimation\\_With\\_Hierarchical\\_RGB-D\\_Fusion\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zeng_Deep_Surface_Normal_Estimation_With_Hierarchical_RGB-D_Fusion_CVPR_2019_paper.html)  
**AUTHORS:** Jin Zeng, Yanfeng Tong, Yunmu Huang, Qiong Yan, Wenxiu Sun, Jing Chen, Yongtian Wang  
**HIGHLIGHT:** In this paper, a hierarchical fusion network with adaptive feature re-weighting is proposed for surface normal estimation from a single RGB-D image.

**TITLE:** Knowledge-Embedded Routing Network for Scene Graph Generation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Knowledge-Embedded\\_Routing\\_Network\\_for\\_Scene\\_Graph\\_Generation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Knowledge-Embedded_Routing_Network_for_Scene_Graph_Generation_CVPR_2019_paper.html)  
**AUTHORS:** Tianshui Chen, Weihao Yu, Riquan Chen, Liang Lin  
**HIGHLIGHT:** In this work, we find that the statistical correlations between object pairs and their relationships can effectively regularize semantic space and make prediction less ambiguous, and thus well address the unbalanced distribution issue.

**TITLE:** An End-To-End Network for Panoptic Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_An\\_End-To-End\\_Network\\_for\\_Panoptic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_An_End-To-End_Network_for_Panoptic_Segmentation_CVPR_2019_paper.html)  
**AUTHORS:** Huanyu Liu, Chao Peng, Changqian Yu, Jingbo Wang, Xu Liu, Gang Yu, Wei Jiang  
**HIGHLIGHT:** To address the problems, we propose a novel end-to-end Occlusion Aware Network (OANet) for panoptic segmentation, which can efficiently and effectively predict both the instance and stuff segmentation in a single network.

**TITLE:** Fast and Flexible Indoor Scene Synthesis via Deep Convolutional Generative Models  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ritchie\\_Fast\\_and\\_Flexible\\_Indoor\\_Scene\\_Synthesis\\_via\\_Deep\\_Convolutional\\_Generative\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ritchie_Fast_and_Flexible_Indoor_Scene_Synthesis_via_Deep_Convolutional_Generative_CVPR_2019_paper.html)  
**AUTHORS:** Daniel Ritchie, Kai Wang, Yu-An Lin  
**HIGHLIGHT:** We present a new, fast and flexible pipeline for indoor scene synthesis that is based on deep convolutional generative models.

**TITLE:** Marginalized Latent Semantic Encoder for Zero-Shot Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ding\\_Marginalized\\_Latent\\_Semantic\\_Encoder\\_for\\_Zero-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ding_Marginalized_Latent_Semantic_Encoder_for_Zero-Shot_Learning_CVPR_2019_paper.html)  
**AUTHORS:** Zhengming Ding, Hongfu Liu  
**HIGHLIGHT:** In this paper, we attempt to exploit the intrinsic relationship in the semantic manifold when given semantics are not enough to describe the visual objects, and enhance the generalization ability of the visual-semantic function with marginalized strategy.

**TITLE:** Scale-Adaptive Neural Dense Features: Learning via Hierarchical Context Aggregation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Spencer\\_Scale-Adaptive\\_Neural\\_Dense\\_Features\\_Learning\\_via\\_Hierarchical\\_Context\\_Aggregation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Spencer_Scale-Adaptive_Neural_Dense_Features_Learning_via_Hierarchical_Context_Aggregation_CVPR_2019_paper.html)  
**AUTHORS:** Jaime Spencer, Richard Bowden, Simon Hadfield  
**HIGHLIGHT:** Instead, we propose SAND features, a dedicated deep learning solution to feature extraction capable of providing hierarchical context information.

**TITLE:** Unsupervised Embedding Learning via Invariant and Spreading Instance Feature  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ye\\_Unsupervised\\_Embedding\\_Learning\\_via\\_Invariant\\_and\\_Spreading\\_Instance\\_Feature\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ye_Unsupervised_Embedding_Learning_via_Invariant_and_Spreading_Instance_Feature_CVPR_2019_paper.html)  
**AUTHORS:** Mang Ye, Xu Zhang, Pong C. Yuen, Shih-Fu Chang

**HIGHLIGHT:** Motivated by the positive concentrated and negative separated properties observed from category-wise supervised learning, we propose to utilize the instance-wise supervision to approximate these properties, which aims at learning data augmentation invariant and instance spread-out features.

**TITLE:** AOGNets: Compositional Grammatical Architectures for Deep Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_AOGNets\\_Compositional\\_Grammatical\\_Architectures\\_for\\_Deep\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_AOGNets_Compositional_Grammatical_Architectures_for_Deep_Learning_CVPR_2019_paper.html)

**AUTHORS:** Xilai Li, Xi Song, Tianfu Wu

**HIGHLIGHT:** This paper presents deep compositional grammatical architectures which harness the best of two worlds: grammar models and DNNs.

**TITLE:** A Robust Local Spectral Descriptor for Matching Non-Rigid Shapes With Incompatible Shape Structures  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_A\\_Robust\\_Local\\_Spectral\\_Descriptor\\_for\\_Matching\\_Non-Rigid\\_Shapes\\_With\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_A_Robust_Local_Spectral_Descriptor_for_Matching_Non-Rigid_Shapes_With_CVPR_2019_paper.html)

**AUTHORS:** Yiqun Wang, Jianwei Guo, Dong-Ming Yan, Kai Wang, Xiaopeng Zhang

**HIGHLIGHT:** We utilize a remeshing approach to generate modified shapes with different structures.

**TITLE:** Exploring Context and Visual Pattern of Relationship for Scene Graph Generation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Exploring\\_Context\\_and\\_Visual\\_Pattern\\_of\\_Relationship\\_for\\_Scene\\_Graph\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Exploring_Context_and_Visual_Pattern_of_Relationship_for_Scene_Graph_CVPR_2019_paper.html)

**AUTHORS:** Wenbin Wang, Ruiping Wang, Shiguang Shan, Xilin Chen

**HIGHLIGHT:** Therefore, we present our so-called Relationship Context - InterSeCtion Region (CISC) method.

**TITLE:** Learning From Synthetic Data for Crowd Counting in the Wild  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Learning\\_From\\_Synthetic\\_Data\\_for\\_Crowd\\_Counting\\_in\\_the\\_Wild\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Learning_From_Synthetic_Data_for_Crowd_Counting_in_the_Wild_CVPR_2019_paper.html)

**AUTHORS:** Qi Wang, Junyu Gao, Wei Lin, Yuan Yuan

**HIGHLIGHT:** Based on it, we build a large-scale, diverse synthetic dataset.

**TITLE:** A Local Block Coordinate Descent Algorithm for the CSC Model  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zisselman\\_A\\_Local\\_Block\\_Coordinate\\_Descent\\_Algorithm\\_for\\_the\\_CSC\\_Model\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zisselman_A_Local_Block_Coordinate_Descent_Algorithm_for_the_CSC_Model_CVPR_2019_paper.html)

**AUTHORS:** Ev Zisselman, Jeremias Sulam, Michael Elad

**HIGHLIGHT:** In this work we propose a new and simple approach that adopts a localized strategy, based on the Block Coordinate Descent algorithm.

**TITLE:** Not Using the Car to See the Sidewalk -- Quantifying and Controlling the Effects of Context in Classification and Segmentation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Shetty\\_Not\\_Using\\_the\\_Car\\_to\\_See\\_the\\_Sidewalk\\_-\\_Quantifying\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Shetty_Not_Using_the_Car_to_See_the_Sidewalk_-_Quantifying_CVPR_2019_paper.html)

**AUTHORS:** Rakshith Shetty, Bernt Schiele, Mario Fritz

**HIGHLIGHT:** We propose a method to quantify the sensitivity of black-box vision models to visual context by editing images to remove selected objects and measuring the response of the target models.

**TITLE:** Discovering Fair Representations in the Data Domain  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Quadrianto\\_Discovering\\_Fair\\_Representations\\_in\\_the\\_Data\\_Domain\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Quadrianto_Discovering_Fair_Representations_in_the_Data_Domain_CVPR_2019_paper.html)

**AUTHORS:** Novi Quadrianto, Viktoriia Sharmanska, Oliver Thomas

**HIGHLIGHT:** We propose to cast this problem as data-to-data translation, i.e. learning a mapping from an input domain to a fair target domain, where a fairness definition is being enforced.

**TITLE:** Actor-Critic Instance Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Araslanov\\_Actor-Critic\\_Instance\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Araslanov_Actor-Critic_Instance_Segmentation_CVPR_2019_paper.html)

**AUTHORS:** Nikita Araslanov, Constantin A. Rothkopf, Stefan Roth

**HIGHLIGHT:** In this work, we revisit the recurrent formulation of this challenging problem in the context of reinforcement learning.

**TITLE:** Generalized Zero- and Few-Shot Learning via Aligned Variational Autoencoders  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Schonfeld\\_Generalized\\_Zero-\\_and\\_Few-Shot\\_Learning\\_via\\_Aligned\\_Variational\\_Autoencoders\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Schonfeld_Generalized_Zero-_and_Few-Shot_Learning_via_Aligned_Variational_Autoencoders_CVPR_2019_paper.html)

**AUTHORS:** Edgar Schonfeld, Sayna Ebrahimi, Samarth Sinha, Trevor Darrell, Zeynep Akata

**HIGHLIGHT:** In this work, we take feature generation one step further and propose a model where a shared latent space of image features and class embeddings is learned by modality-specific aligned variational autoencoders.

**TITLE:** Semantic Projection Network for Zero- and Few-Label Semantic Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xian\\_Semantic\\_Projection\\_Network\\_for\\_Zero\\_and\\_Few-Label\\_Semantic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xian_Semantic_Projection_Network_for_Zero_and_Few-Label_Semantic_Segmentation_CVPR_2019_paper.html)

**AUTHORS:** Yongqin Xian, Subhabrata Choudhury, Yang He, Bernt Schiele, Zeynep Akata  
**HIGHLIGHT:** Hence, there have been several attempts to reduce the annotation effort such as learning from image level labels and bounding box annotations.

**TITLE:** GCAN: Graph Convolutional Adversarial Network for Unsupervised Domain Adaptation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ma\\_GCAN\\_Graph\\_Convolutional\\_Adversarial\\_Network\\_for\\_Unsupervised\\_Domain\\_Adaptation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ma_GCAN_Graph_Convolutional_Adversarial_Network_for_Unsupervised_Domain_Adaptation_CVPR_2019_paper.html)

**AUTHORS:** Xinhong Ma, Tianzhu Zhang, Changsheng Xu  
**HIGHLIGHT:** Different from existing methods, we propose an end-to-end Graph Convolutional Adversarial Network (GCAN) for unsupervised domain adaptation by jointly modeling data structure, domain label, and class label in a unified deep framework.

**TITLE:** Seamless Scene Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Porzi\\_Seamless\\_Scene\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Porzi_Seamless_Scene_Segmentation_CVPR_2019_paper.html)

**AUTHORS:** Lorenzo Porzi, Samuel Rota Buló, Aleksander Colovic, Peter Kotschieder  
**HIGHLIGHT:** In this work we introduce a novel, CNN-based architecture that can be trained end-to-end to deliver seamless scene segmentation results.

**TITLE:** Unsupervised Image Matching and Object Discovery as Optimization  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Vo\\_Unsupervised\\_Image\\_Matching\\_and\\_Object\\_Discovery\\_as\\_Optimization\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Vo_Unsupervised_Image_Matching_and_Object_Discovery_as_Optimization_CVPR_2019_paper.html)

**AUTHORS:** Huy V. Vo, Francis Bach, Minsu Cho, Kai Han, Yann LeCun, Patrick Perez, Jean Ponce  
**HIGHLIGHT:** We focus here on the unsupervised discovery and matching of object categories among images in a collection, following the work of Cho et al. [12].

**TITLE:** Wide-Area Crowd Counting via Ground-Plane Density Maps and Multi-View Fusion CNNs  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_Wide-Area\\_Crowd\\_Counting\\_via\\_Ground-Plane\\_Density\\_Maps\\_and\\_Multi-View\\_Fusion\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_Wide-Area_Crowd_Counting_via_Ground-Plane_Density_Maps_and_Multi-View_Fusion_CVPR_2019_paper.html)

**AUTHORS:** Qi Zhang, Antoni B. Chan  
**HIGHLIGHT:** In this paper, we propose a deep neural network framework for multi-view crowd counting, which fuses information from multiple camera views to predict a scene-level density map on the ground-plane of the 3D world.

**TITLE:** F-VAEGAN-D2: A Feature Generating Framework for Any-Shot Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xian\\_F-VAEGAN-D2\\_A\\_Feature\\_Generating\\_Framework\\_for\\_Any-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xian_F-VAEGAN-D2_A_Feature_Generating_Framework_for_Any-Shot_Learning_CVPR_2019_paper.html)

**AUTHORS:** Yongqin Xian, Saurabh Sharma, Bernt Schiele, Zeynep Akata  
**HIGHLIGHT:** In this paper, we tackle any-shot learning problems i.e. zero-shot and few-shot, in a unified feature generating framework that operates in both inductive and transductive learning settings.

**TITLE:** Sliced Wasserstein Discrepancy for Unsupervised Domain Adaptation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Lee\\_Sliced\\_Wasserstein\\_Discrepancy\\_for\\_Unsupervised\\_Domain\\_Adaptation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Lee_Sliced_Wasserstein_Discrepancy_for_Unsupervised_Domain_Adaptation_CVPR_2019_paper.html)

**AUTHORS:** Chen-Yu Lee, Tanmay Batra, Mohammad Haris Baig, Daniel Ulbricht  
**HIGHLIGHT:** In this work, we connect two distinct concepts for unsupervised domain adaptation: feature distribution alignment between domains by utilizing the task-specific decision boundary and the Wasserstein metric.

**TITLE:** Graph Attention Convolution for Point Cloud Semantic Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Graph\\_Attention\\_Convolution\\_for\\_Point\\_Cloud\\_Semantic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Graph_Attention_Convolution_for_Point_Cloud_Semantic_Segmentation_CVPR_2019_paper.html)

**AUTHORS:** Lei Wang, Yuchun Huang, Yaolin Hou, Shenman Zhang, Jie Shan  
**HIGHLIGHT:** This paper proposes a novel graph attention convolution (GAC), whose kernels can be dynamically carved into specific shapes to adapt to the structure of an object.

**TITLE:** Normalized Diversification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Normalized\\_Diversification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Normalized_Diversification_CVPR_2019_paper.html)

**AUTHORS:** Shaohui Liu, Xiao Zhang, Jianqiao Wang, Jianbo Shi

**HIGHLIGHT:** We introduce the concept of normalized diversity which force the model to preserve the normalized pairwise distance between the sparse samples from a latent parametric distribution and their corresponding high-dimensional outputs.

**TITLE:** Learning to Localize Through Compressed Binary Maps  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wei\\_Learning\\_to\\_Localize\\_Through\\_Compressed\\_Binary\\_Maps\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wei_Learning_to_Localize_Through_Compressed_Binary_Maps_CVPR_2019_paper.html)

**AUTHORS:** Xinkai Wei, Ioan Andrei Barsan, Shenlong Wang, Julieta Martinez, Raquel Urtasun

**HIGHLIGHT:** In this paper we propose to learn to compress the map representation such that it is optimal for the localization task.

**TITLE:** A Parametric Top-View Representation of Complex Road Scenes  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_A\\_Parametric\\_Top-View\\_Representation\\_of\\_Complex\\_Road\\_Scenes\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_A_Parametric_Top-View_Representation_of_Complex_Road_Scenes_CVPR_2019_paper.html)

**AUTHORS:** Ziyang Wang, Buyu Liu, Samuel Schulter, Manmohan Chandraker

**HIGHLIGHT:** In this paper, we address the problem of inferring the layout of complex road scenes given a single camera as input.

**TITLE:** Self-Supervised Spatiotemporal Learning via Video Clip Order Prediction

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xu\\_Self-Supervised\\_Spatiotemporal\\_Learning\\_via\\_Video\\_Clip\\_Order\\_Prediction\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xu_Self-Supervised_Spatiotemporal_Learning_via_Video_Clip_Order_Prediction_CVPR_2019_paper.html)

**AUTHORS:** Dejing Xu, Jun Xiao, Zhou Zhao, Jian Shao, Di Xie, Yueting Zhuang

**HIGHLIGHT:** We propose a self-supervised spatiotemporal learning technique which leverages the chronological order of videos.

**TITLE:** Superquadrics Revisited: Learning 3D Shape Parsing Beyond Cuboids

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Paschalidou\\_Superquadrics\\_Revisited\\_Learning\\_3D\\_Shape\\_Parsing\\_Beyond\\_Cuboids\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Paschalidou_Superquadrics_Revisited_Learning_3D_Shape_Parsing_Beyond_Cuboids_CVPR_2019_paper.html)

**AUTHORS:** Despoina Paschalidou, Ali Osman Ulusoy, Andreas Geiger

**HIGHLIGHT:** This paper presents a learning-based solution to this problem which goes beyond the traditional 3D cuboid representation by exploiting superquadrics as atomic elements.

**TITLE:** Unsupervised Disentangling of Appearance and Geometry by Deformable Generator Network

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xing\\_Unsupervised\\_Disentangling\\_of\\_Appearance\\_and\\_Geometry\\_by\\_Deformable\\_Generator\\_Network\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xing_Unsupervised_Disentangling_of_Appearance_and_Geometry_by_Deformable_Generator_Network_CVPR_2019_paper.html)

**AUTHORS:** Xianglei Xing, Tian Han, Ruiqi Gao, Song-Chun Zhu, Ying Nian Wu

**HIGHLIGHT:** We present a deformable generator model to disentangle the appearance and geometric information in purely unsupervised manner.

**TITLE:** Self-Supervised Representation Learning by Rotation Feature Decoupling

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Feng\\_Self-Supervised\\_Representation\\_Learning\\_by\\_Rotation\\_Feature\\_Decoupling\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Feng_Self-Supervised_Representation_Learning_by_Rotation_Feature_Decoupling_CVPR_2019_paper.html)

**AUTHORS:** Zeyu Feng, Chang Xu, Dacheng Tao

**HIGHLIGHT:** We introduce a self-supervised learning method that focuses on beneficial properties of representation and their abilities in generalizing to real-world tasks.

**TITLE:** Weakly Supervised Deep Image Hashing Through Tag Embeddings

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Gattupalli\\_Weakly\\_Supervised\\_Deep\\_Image\\_Hashing\\_Through\\_Tag\\_Embeddings\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Gattupalli_Weakly_Supervised_Deep_Image_Hashing_Through_Tag_Embeddings_CVPR_2019_paper.html)

**AUTHORS:** Vijetha Gattupalli, Yaoxin Zhuo, Baoxin Li

**HIGHLIGHT:** Motivated by this scenario, we formulate the problem of semantic image hashing as a weakly-supervised learning problem.

**TITLE:** Improved Road Connectivity by Joint Learning of Orientation and Segmentation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Batra\\_Improved\\_Road\\_Connectivity\\_by\\_Joint\\_Learning\\_of\\_Orientation\\_and\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Batra_Improved_Road_Connectivity_by_Joint_Learning_of_Orientation_and_Segmentation_CVPR_2019_paper.html)

**AUTHORS:** Anil Batra, Suriya Singh, Guan Pang, Saikat Basu, C.V. Jawahar, Manohar Paluri

**HIGHLIGHT:** In this paper, we propose a connectivity task called Orientation Learning, motivated by the human behavior of annotating roads by tracing it at a specific orientation.

**TITLE:** Deep Supervised Cross-Modal Retrieval

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhen\\_Deep\\_Supervised\\_Cross-Modal\\_Retrieval\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhen_Deep_Supervised_Cross-Modal_Retrieval_CVPR_2019_paper.html)

AUTHORS: Liangli Zhen, Peng Hu, Xu Wang, Dezhong Peng  
HIGHLIGHT: In this paper, we present a novel cross-modal retrieval method, called Deep Supervised Cross-modal Retrieval (DSCMR).

TITLE: A Theoretically Sound Upper Bound on the Triplet Loss for Improving the Efficiency of Deep Distance Metric Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Do\\_A\\_Theoretically\\_Sound\\_Upper\\_Bound\\_on\\_the\\_Triplet\\_Loss\\_for\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Do_A_Theoretically_Sound_Upper_Bound_on_the_Triplet_Loss_for_CVPR_2019_paper.html)

AUTHORS: Thanh-Toan Do, Toan Tran, Ian Reid, Vijay Kumar, Tuan Hoang, Gustavo Carneiro  
HIGHLIGHT: We propose a method that substantially improves the efficiency of deep distance metric learning based on the optimization of the triplet loss function.

TITLE: Data Representation and Learning With Graph Diffusion-Embedding Networks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Jiang\\_Data\\_Representation\\_and\\_Learning\\_With\\_Graph\\_Diffusion-Embedding\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Jiang_Data_Representation_and_Learning_With_Graph_Diffusion-Embedding_Networks_CVPR_2019_paper.html)

AUTHORS: Bo Jiang, Doudou Lin, Jin Tang, Bin Luo  
HIGHLIGHT: In this paper, we present Graph Diffusion-Embedding networks (GDENs), a new model for graph-structured data representation and learning.

TITLE: Putting Humans in a Scene: Learning Affordance in 3D Indoor Environments

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Putting\\_Humans\\_in\\_a\\_Scene\\_Learning\\_Affordance\\_in\\_3D\\_Indoor\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Putting_Humans_in_a_Scene_Learning_Affordance_in_3D_Indoor_CVPR_2019_paper.html)

AUTHORS: Xueting Li, Sifei Liu, Kihwan Kim, Xiaolong Wang, Ming-Hsuan Yang, Jan Kautz  
HIGHLIGHT: In this paper, we aim to predict affordances of 3D indoor scenes, specifically what human poses are afforded by a given indoor environment, such as sitting on a chair or standing on the floor.

TITLE: PIEs: Pose Invariant Embeddings

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ho\\_PIEs\\_Pose\\_Invariant\\_Embeddings\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ho_PIEs_Pose_Invariant_Embeddings_CVPR_2019_paper.html)

AUTHORS: Chih-Hui Ho, Pedro Morgado, Amir Persekian, Nuno Vasconcelos  
HIGHLIGHT: A taxonomic classification of embeddings, according to their level of invariance, is introduced and used to clarify connections between existing embeddings, identify missing approaches, and propose invariant generalizations.

TITLE: Representation Similarity Analysis for Efficient Task Taxonomy & Transfer Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Dwivedi\\_Representation\\_Similarity\\_Analysis\\_for\\_Efficient\\_Task\\_Taxonomy\\_Transfer\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Dwivedi_Representation_Similarity_Analysis_for_Efficient_Task_Taxonomy_Transfer_Learning_CVPR_2019_paper.html)

AUTHORS: Kshitij Dwivedi, Gemma Roig  
HIGHLIGHT: We address this problem by proposing an approach to assess the relationship between visual tasks and their task-specific models.

TITLE: Object Counting and Instance Segmentation With Image-Level Supervision

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cholakkal\\_Object\\_Counting\\_and\\_Instance\\_Segmentation\\_With\\_Image-Level\\_Supervision\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cholakkal_Object_Counting_and_Instance_Segmentation_With_Image-Level_Supervision_CVPR_2019_paper.html)

AUTHORS: Hisham Cholakkal, Guolei Sun, Fahad Shahbaz Khan, Ling Shao  
HIGHLIGHT: We propose an image-level supervised approach that provides both the global object count and the spatial distribution of object instances by constructing an object category density map.

TITLE: Variational Autoencoders Pursue PCA Directions (by Accident)

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Rolinek\\_Variational\\_Autoencoders\\_Pursue\\_PCA\\_Directions\\_by\\_Accident\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Rolinek_Variational_Autoencoders_Pursue_PCA_Directions_by_Accident_CVPR_2019_paper.html)

AUTHORS: Michal Rolinek, Dominik Zietlow, Georg Martius  
HIGHLIGHT: Alongside providing an intuitive understanding, we justify the statement with full theoretical analysis as well as with experiments.

TITLE: A Relation-Augmented Fully Convolutional Network for Semantic Segmentation in Aerial Scenes

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Mou\\_A\\_Relation-Augmented\\_Fully\\_Convolutional\\_Network\\_for\\_Semantic\\_Segmentation\\_in\\_Aerial\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Mou_A_Relation-Augmented_Fully_Convolutional_Network_for_Semantic_Segmentation_in_Aerial_CVPR_2019_paper.html)

AUTHORS: Lichao Mou, Yuansheng Hua, Xiao Xiang Zhu  
HIGHLIGHT: In this work, we introduce two simple yet effective network units, the spatial relation module and the channel relation module, to learn and reason about global relationships between any two spatial positions or feature maps, and then produce relation-augmented feature representations.

TITLE: Temporal Transformer Networks: Joint Learning of Invariant and Discriminative Time Warping

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Lohit\\_Temporal\\_Transformer\\_Networks\\_Joint\\_Learning\\_of\\_Invariant\\_and\\_Discriminative\\_Time\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Lohit_Temporal_Transformer_Networks_Joint_Learning_of_Invariant_and_Discriminative_Time_CVPR_2019_paper.html)

AUTHORS: Suhas Lohit, Qiao Wang, Pavan Turaga

HIGHLIGHT: In this paper, we propose a hybrid model-based and data-driven approach to learn warping functions that not just reduce intra-class variability, but also increase inter-class separation.

TITLE: PCAN: 3D Attention Map Learning Using Contextual Information for Point Cloud Based Retrieval

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_PCAN\\_3D\\_Attention\\_Map\\_Learning\\_Using\\_Contextual\\_Information\\_for\\_Point\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_PCAN_3D_Attention_Map_Learning_Using_Contextual_Information_for_Point_CVPR_2019_paper.html)

AUTHORS: Wenxiao Zhang, Chunxia Xiao

HIGHLIGHT: In this paper, we propose a Point Contextual Attention Network (PCAN), which can predict the significance of each local point feature based on point context.

TITLE: Depth Coefficients for Depth Completion

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Imran\\_Depth\\_Coefficients\\_for\\_Depth\\_Completion\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Imran_Depth_Coefficients_for_Depth_Completion_CVPR_2019_paper.html)

AUTHORS: Saif Imran, Yunfei Long, Xiaoming Liu, Daniel Morris

HIGHLIGHT: We propose a new representation for depth called Depth Coefficients (DC) to address this problem.

TITLE: Diversify and Match: A Domain Adaptive Representation Learning Paradigm for Object Detection

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kim\\_Diversify\\_and\\_Match\\_A\\_Domain\\_Adaptive\\_Representation\\_Learning\\_Paradigm\\_for\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kim_Diversify_and_Match_A_Domain_Adaptive_Representation_Learning_Paradigm_for_CVPR_2019_paper.html)

AUTHORS: Taekyung Kim, Minki Jeong, Seunghyeon Kim, Seokeon Choi, Changick Kim

HIGHLIGHT: We introduce a novel unsupervised domain adaptation approach for object detection.

TITLE: AET vs. AED: Unsupervised Representation Learning by Auto-Encoding Transformations rather than Data

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_AET\\_vs.\\_AED\\_Unsupervised\\_Representation\\_Learning\\_by\\_Auto-Encoding\\_Transformations\\_Rather\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_AET_vs._AED_Unsupervised_Representation_Learning_by_Auto-Encoding_Transformations_Rather_CVPR_2019_paper.html)

AUTHORS: Liheng Zhang, Guo-Jun Qi, Liqiang Wang, Jiebo Luo

HIGHLIGHT: In this paper, we present a novel paradigm of unsupervised representation learning by Auto-Encoding Transformation (AET) in contrast to the conventional Auto-Encoding Data (AED) approach.