

TITLE: Invariance Matters: Exemplar Memory for Domain Adaptive Person Re-Identification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhong\\_Invariance\\_Matters\\_Exemplar\\_Memory\\_for\\_Domain\\_Adaptive\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhong_Invariance_Matters_Exemplar_Memory_for_Domain_Adaptive_Person_Re-Identification_CVPR_2019_paper.html)  
AUTHORS: Zhun Zhong, Liang Zheng, Zhiming Luo, Shaozi Li, Yi Yang  
HIGHLIGHT: In this work, we comprehensively investigate into the intra-domain variations of the target domain and propose to generalize the re-ID model w.r.t three types of the underlying invariance, i.e., exemplar-invariance, camera-invariance and neighborhood-invariance.

TITLE: Dissecting Person Re-Identification From the Viewpoint of Viewpoint  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Sun\\_Dissecting\\_Person\\_Re-Identification\\_From\\_the\\_Viewpoint\\_of\\_Viewpoint\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Sun_Dissecting_Person_Re-Identification_From_the_Viewpoint_of_Viewpoint_CVPR_2019_paper.html)  
AUTHORS: Xiaoxiao Sun, Liang Zheng  
HIGHLIGHT: To derive insights in this scientific campaign, this paper makes an early attempt in studying a particular factor, viewpoint.

TITLE: Learning to Reduce Dual-Level Discrepancy for Infrared-Visible Person Re-Identification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Learning\\_to\\_Reduce\\_Dual-Level\\_Discrepancy\\_for\\_Infrared-Visible\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Learning_to_Reduce_Dual-Level_Discrepancy_for_Infrared-Visible_Person_Re-Identification_CVPR_2019_paper.html)  
AUTHORS: Zhixiang Wang, Zheng Wang, Yinqiang Zheng, Yung-Yu Chuang, Shin'ichi Satoh  
HIGHLIGHT: To address the problem, this paper introduces a novel Dual-level Discrepancy Reduction Learning (D<sup>2</sup>RL) scheme which handles the two discrepancies separately.

TITLE: Progressive Feature Alignment for Unsupervised Domain Adaptation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Progressive\\_Feature\\_Alignment\\_for\\_Unsupervised\\_Domain\\_Adaptation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Progressive_Feature_Alignment_for_Unsupervised_Domain_Adaptation_CVPR_2019_paper.html)  
AUTHORS: Chaoqi Chen, Weiping Xie, Wenbing Huang, Yu Rong, Xinghao Ding, Yue Huang, Tingyang Xu, Junzhou Huang  
HIGHLIGHT: In this paper, we propose the Progressive Feature Alignment Network (PFAN) to align the discriminative features across domains progressively and effectively, via exploiting the intra-class variation in the target domain.

TITLE: Feature-Level Frankenstein: Eliminating Variations for Discriminative Recognition  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Feature-Level\\_Frankenstein\\_Eliminating\\_Variations\\_for\\_Discriminative\\_Recognition\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Feature-Level_Frankenstein_Eliminating_Variations_for_Discriminative_Recognition_CVPR_2019_paper.html)  
AUTHORS: Xiaofeng Liu, Site Li, Lingsheng Kong, Wanqing Xie, Ping Jia, Jane You, B.V.K. Kumar  
HIGHLIGHT: In this paper, we cast these problems as an adversarial minimax game in the latent space.

TITLE: Learning a Deep ConvNet for Multi-Label Classification With Partial Labels  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Durand\\_Learning\\_a\\_Deep\\_ConvNet\\_for\\_Multi-Label\\_Classification\\_With\\_Partial\\_Labels\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Durand_Learning_a_Deep_ConvNet_for_Multi-Label_Classification_With_Partial_Labels_CVPR_2019_paper.html)  
AUTHORS: Thibaut Durand, Nazanin Mehrasa, Greg Mori  
HIGHLIGHT: To reduce the annotation cost, we propose to train a model with partial labels i.e. only some labels are known per image.

TITLE: Generalized Intersection Over Union: A Metric and a Loss for Bounding Box Regression  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Rezatofighi\\_Generalized\\_Intersection\\_Over\\_Union\\_A\\_Metric\\_and\\_a\\_Loss\\_for\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Rezatofighi_Generalized_Intersection_Over_Union_A_Metric_and_a_Loss_for_CVPR_2019_paper.html)  
AUTHORS: Hamid Rezatofighi, Nathan Tsoi, JunYoung Gwak, Amir Sadeghian, Ian Reid, Silvio Savarese  
HIGHLIGHT: In this paper, we address the this weakness by introducing a generalized version of IoU as both a new loss and a new metric.

TITLE: Densely Semantically Aligned Person Re-Identification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_Densely\\_Semantically\\_Aligned\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_Densely_Semantically_Aligned_Person_Re-Identification_CVPR_2019_paper.html)  
AUTHORS: Zhizheng Zhang, Cuiling Lan, Wenjun Zeng, Zhibo Chen  
HIGHLIGHT: We propose a densely semantically aligned person re-identification (re-ID) framework.

TITLE: Generalising Fine-Grained Sketch-Based Image Retrieval  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Pang\\_Generalising\\_Fine-Grained\\_Sketch-Based\\_Image\\_Retrieval\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Pang_Generalising_Fine-Grained_Sketch-Based_Image_Retrieval_CVPR_2019_paper.html)  
AUTHORS: Kaiyue Pang, Ke Li, Yongxin Yang, Honggang Zhang, Timothy M. Hospedales, Tao Xiang, Yi-Zhe Song  
HIGHLIGHT: In this paper, we identify cross-category generalisation for FG-SBIR as a domain generalisation problem, and propose the first solution.

TITLE: Adapting Object Detectors via Selective Cross-Domain Alignment  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhu\\_Adapting\\_Object\\_Detectors\\_via\\_Selective\\_Cross-Domain\\_Alignment\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhu_Adapting_Object_Detectors_via_Selective_Cross-Domain_Alignment_CVPR_2019_paper.html)  
AUTHORS: Xinge Zhu, Jiangmiao Pang, Ceyuan Yang, Jianping Shi, Dahua Lin  
HIGHLIGHT: Motivated by this, we propose a novel approach to domain adaption for object detection to handle the issues in "where to look" and "how to align".

TITLE: Cyclic Guidance for Weakly Supervised Joint Detection and Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Shen\\_Cyclic\\_Guidance\\_for\\_Weakly\\_Supervised\\_Joint\\_Detection\\_and\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Shen_Cyclic_Guidance_for_Weakly_Supervised_Joint_Detection_and_Segmentation_CVPR_2019_paper.html)  
AUTHORS: Yunhang Shen, Rongrong Ji, Yan Wang, Yongjian Wu, Liujuan Cao  
HIGHLIGHT: In particular, we present an efficient and effective framework termed Weakly Supervised Joint Detection and Segmentation (WS-JDS).

TITLE: Thinking Outside the Pool: Active Training Image Creation for Relative Attributes  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yu\\_Thinking\\_Outside\\_the\\_Pool\\_Active\\_Training\\_Image\\_Creation\\_for\\_Relative\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yu_Thinking_Outside_the_Pool_Active_Training_Image_Creation_for_Relative_CVPR_2019_paper.html)  
AUTHORS: Aron Yu, Kristen Grauman  
HIGHLIGHT: We propose an active image generation approach to address this issue.

TITLE: Generalizable Person Re-Identification by Domain-Invariant Mapping Network  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Song\\_Generalizable\\_Person\\_Re-Identification\\_by\\_Domain-Invariant\\_Mapping\\_Network\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Song_Generalizable_Person_Re-Identification_by_Domain-Invariant_Mapping_Network_CVPR_2019_paper.html)  
AUTHORS: Jifei Song, Yongxin Yang, Yi-Zhe Song, Tao Xiang, Timothy M. Hospedales  
HIGHLIGHT: In this work, a novel deep ReID model termed Domain-Invariant Mapping Network (DIMN) is proposed.

TITLE: Visual Attention Consistency Under Image Transforms for Multi-Label Image Classification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Guo\\_Visual\\_Attention\\_Consistency\\_Under\\_Image\\_Transforms\\_for\\_Multi-Label\\_Image\\_Classification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Guo_Visual_Attention_Consistency_Under_Image_Transforms_for_Multi-Label_Image_Classification_CVPR_2019_paper.html)  
AUTHORS: Hao Guo, Kang Zheng, Xiaochuan Fan, Hongkai Yu, Song Wang  
HIGHLIGHT: To address this problem, we propose a two-branch network with an original image and its transformed image as inputs and introduce a new attention consistency loss that measures the attention heatmap consistency between two branches.

TITLE: Re-Ranking via Metric Fusion for Object Retrieval and Person Re-Identification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Bai\\_Re-Ranking\\_via\\_Metric\\_Fusion\\_for\\_Object\\_Retrieval\\_and\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Bai_Re-Ranking_via_Metric_Fusion_for_Object_Retrieval_and_Person_Re-Identification_CVPR_2019_paper.html)  
AUTHORS: Song Bai, Peng Tang, Philip H.S. Torr, Longin Jan Latecki  
HIGHLIGHT: Based on the analysis, we propose a unified yet robust algorithm which inherits their advantages and discards their disadvantages.

TITLE: Unsupervised Open Domain Recognition by Semantic Discrepancy Minimization  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhuo\\_Unsupervised\\_Open\\_Domain\\_Recognition\\_by\\_Semantic\\_Discrepancy\\_Minimization\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhuo_Unsupervised_Open_Domain_Recognition_by_Semantic_Discrepancy_Minimization_CVPR_2019_paper.html)  
AUTHORS: Junbao Zhuo, Shuhui Wang, Shuhao Cui, Qingming Huang  
HIGHLIGHT: We address the unsupervised open domain recognition (UODR) problem, where categories in labeled source domain  $S$  is only a subset of those in unlabeled target domain  $T$ .

TITLE: Weakly Supervised Person Re-Identification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Meng\\_Weakly\\_Supervised\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Meng_Weakly_Supervised_Person_Re-Identification_CVPR_2019_paper.html)  
AUTHORS: Jingke Meng, Sheng Wu, Wei-Shi Zheng  
HIGHLIGHT: We cast this weakly supervised person re-id challenge into a multi-instance multi-label learning (MIML) problem.

TITLE: PointRCNN: 3D Object Proposal Generation and Detection From Point Cloud  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Shi\\_PointRCNN\\_3D\\_Object\\_Proposal\\_Generation\\_and\\_Detection\\_From\\_Point\\_Cloud\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Shi_PointRCNN_3D_Object_Proposal_Generation_and_Detection_From_Point_Cloud_CVPR_2019_paper.html)  
AUTHORS: Shaoshuai Shi, Xiaogang Wang, Hongsheng Li  
HIGHLIGHT: In this paper, we propose PointRCNN for 3D object detection from raw point cloud.

TITLE: Automatic Adaptation of Object Detectors to New Domains Using Self-Training  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/RoyChowdhury\\_Automatic\\_Adaptation\\_of\\_Object\\_Detectors\\_to\\_New\\_Domains\\_Using\\_Self-Training\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/RoyChowdhury_Automatic_Adaptation_of_Object_Detectors_to_New_Domains_Using_Self-Training_CVPR_2019_paper.html)  
AUTHORS: Aruni RoyChowdhury, Prithvijit Chakrabarty, Ashish Singh, SouYoung Jin, Huaizu Jiang, Liangliang Cao, Erik Learned-Miller  
HIGHLIGHT: A modified knowledge distillation loss is proposed, and we investigate several ways of assigning soft-labels to the training examples from the target domain.

TITLE: Deep Sketch-Shape Hashing With Segmented 3D Stochastic Viewing  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Deep\\_Sketch-Shape\\_Hashing\\_With\\_Segmented\\_3D\\_Stochastic\\_Viewing\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Deep_Sketch-Shape_Hashing_With_Segmented_3D_Stochastic_Viewing_CVPR_2019_paper.html)  
AUTHORS: Jiaxin Chen, Jie Qin, Li Liu, Fan Zhu, Fumin Shen, Jin Xie, Ling Shao  
HIGHLIGHT: In this paper, we propose a novel framework for efficient sketch-based 3D shape retrieval, i.e., Deep Sketch-Shape Hashing (DSSH), which tackles the challenging problem from two perspectives.

TITLE: Generative Dual Adversarial Network for Generalized Zero-Shot Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Huang\\_Generative\\_Dual\\_Adversarial\\_Network\\_for\\_Generalized\\_Zero-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Huang_Generative_Dual_Adversarial_Network_for_Generalized_Zero-Shot_Learning_CVPR_2019_paper.html)  
AUTHORS: He Huang, Changhu Wang, Philip S. Yu, Chang-Dong Wang  
HIGHLIGHT: In this paper, we propose a novel model that provides a unified framework for three different approaches: visual-&gt;semantic mapping, semantic-&gt;visual mapping, and metric learning.

TITLE: Query-Guided End-To-End Person Search  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Munjaj\\_Query-Guided\\_End-To-End\\_Person\\_Search\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Munjaj_Query-Guided_End-To-End_Person_Search_CVPR_2019_paper.html)  
AUTHORS: Bharti Munjal, Sikandar Amin, Federico Tombari, Fabio Galasso  
HIGHLIGHT: We introduce a novel query-guided end-to-end person search network (QEEPS) to address both aspects.

TITLE: Libra R-CNN: Towards Balanced Learning for Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Pang\\_Libra\\_R-CNN\\_Towards\\_Balanced\\_Learning\\_for\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Pang_Libra_R-CNN_Towards_Balanced_Learning_for_Object_Detection_CVPR_2019_paper.html)  
AUTHORS: Jiangmiao Pang, Kai Chen, Jianping Shi, Huajun Feng, Wanli Ouyang, Dahua Lin  
HIGHLIGHT: In this work, we carefully revisit the standard training practice of detectors, and find that the detection performance is often limited by the imbalance during the training process, which generally consists in three levels - sample level, feature level, and objective level.

TITLE: Learning a Unified Classifier Incrementally via Rebalancing  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hou\\_Learning\\_a\\_Unified\\_Classifier\\_Incrementally\\_via\\_Rebalancing\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hou_Learning_a_Unified_Classifier_Incrementally_via_Rebalancing_CVPR_2019_paper.html)  
AUTHORS: Saihui Hou, Xinyu Pan, Chen Change Loy, Zilei Wang, Dahua Lin  
HIGHLIGHT: In this work, we develop a new framework for incrementally learning a unified classifier, e.g. a classifier that treats both old and new classes uniformly.

TITLE: Feature Selective Anchor-Free Module for Single-Shot Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhu\\_Feature\\_Selective\\_Anchor-Free\\_Module\\_for\\_Single-Shot\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhu_Feature_Selective_Anchor-Free_Module_for_Single-Shot_Object_Detection_CVPR_2019_paper.html)  
AUTHORS: Chenchen Zhu, Yihui He, Marios Savvides  
HIGHLIGHT: And the resulting best model can achieve a state-of-the-art 44.6% mAP, outperforming all existing single-shot detectors on COCO.

TITLE: Bottom-Up Object Detection by Grouping Extreme and Center Points  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhou\\_Bottom-Up\\_Object\\_Detection\\_by\\_Grouping\\_Extreme\\_and\\_Center\\_Points\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhou_Bottom-Up_Object_Detection_by_Grouping_Extreme_and_Center_Points_CVPR_2019_paper.html)  
AUTHORS: Xingyi Zhou, Jiacheng Zhuo, Philipp Krahenbuhl  
HIGHLIGHT: In this paper, we show that bottom-up approaches still perform competitively.

TITLE: Feature Distillation: DNN-Oriented JPEG Compression Against Adversarial Examples  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Feature\\_Distillation\\_DNN-Oriented\\_JPEG\\_Compression\\_Against\\_Adversarial\\_Examples\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Feature_Distillation_DNN-Oriented_JPEG_Compression_Against_Adversarial_Examples_CVPR_2019_paper.html)  
AUTHORS: Zihao Liu, Qi Liu, Tao Liu, Nuo Xu, Xue Lin, Yanzhi Wang, Wujie Wen

**HIGHLIGHT:** To overcome these limitations, we propose a JPEG-based defensive compression framework, namely "feature distillation", to effectively rectify adversarial examples without impacting classification accuracy on benign data.

**TITLE:** Joint Discriminative and Generative Learning for Person Re-Identification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zheng\\_Joint\\_Discriminative\\_and\\_Generative\\_Learning\\_for\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zheng_Joint_Discriminative_and_Generative_Learning_for_Person_Re-Identification_CVPR_2019_paper.html)

**AUTHORS:** Zhedong Zheng, Xiaodong Yang, Zhiding Yu, Liang Zheng, Yi Yang, Jan Kautz

**HIGHLIGHT:** In this paper, we seek to improve learned re-id embeddings by better leveraging the generated data.

**TITLE:** Unsupervised Person Re-Identification by Soft Multilabel Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yu\\_Unsupervised\\_Person\\_Re-Identification\\_by\\_Soft\\_Multilabel\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yu_Unsupervised_Person_Re-Identification_by_Soft_Multilabel_Learning_CVPR_2019_paper.html)

**AUTHORS:** Hong-Xing Yu, Wei-Shi Zheng, Ancong Wu, Xiaowei Guo, Shaogang Gong, Jian-Huang Lai

**HIGHLIGHT:** To overcome this problem, we propose a deep model for the soft multilabel learning for unsupervised RE-ID.

**TITLE:** Learning Context Graph for Person Search  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yan\\_Learning\\_Context\\_Graph\\_for\\_Person\\_Search\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yan_Learning_Context_Graph_for_Person_Search_CVPR_2019_paper.html)

**AUTHORS:** Yichao Yan, Qiang Zhang, Bingbing Ni, Wendong Zhang, Minghao Xu, Xiaokang Yang

**HIGHLIGHT:** In this work, we take a step further and consider employing context information for person search.

**TITLE:** Gradient Matching Generative Networks for Zero-Shot Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Sariyildiz\\_Gradient\\_Matching\\_Generative\\_Networks\\_for\\_Zero-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Sariyildiz_Gradient_Matching_Generative_Networks_for_Zero-Shot_Learning_CVPR_2019_paper.html)

**AUTHORS:** Mert Bulent Sariyildiz, Ramazan Gokberk Cinbis

**HIGHLIGHT:** In contrast, we propose a generative model that can naturally learn from unsupervised examples, and synthesize training examples for unseen classes purely based on their class embeddings, and therefore, reduce the zero-shot learning problem into a supervised classification task.

**TITLE:** Doodle to Search: Practical Zero-Shot Sketch-Based Image Retrieval  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Dey\\_Doodle\\_to\\_Search\\_Practical\\_Zero-Shot\\_Sketch-Based\\_Image\\_Retrieval\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Dey_Doodle_to_Search_Practical_Zero-Shot_Sketch-Based_Image_Retrieval_CVPR_2019_paper.html)

**AUTHORS:** Soumik Dey, Pau Riba, Anjan Dutta, Josep Lladós, Yi-Zhe Song

**HIGHLIGHT:** In this paper, we investigate the problem of zero-shot sketch-based image retrieval (ZS-SBIR), where human sketches are used as queries to conduct retrieval of photos from unseen categories.

**TITLE:** Zero-Shot Task Transfer  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Pal\\_Zero-Shot\\_Task\\_Transfer\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Pal_Zero-Shot_Task_Transfer_CVPR_2019_paper.html)

**AUTHORS:** Arghya Pal, Vineeth N Balasubramanian

**HIGHLIGHT:** In this work, we present a novel meta-learning algorithm that regresses model parameters for novel tasks for which no ground truth is available (zero-shot tasks).

**TITLE:** C-MIL: Continuation Multiple Instance Learning for Weakly Supervised Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wan\\_C-MIL\\_Continuation\\_Multiple\\_Instance\\_Learning\\_for\\_Weakly\\_Supervised\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wan_C-MIL_Continuation_Multiple_Instance_Learning_for_Weakly_Supervised_Object_Detection_CVPR_2019_paper.html)

**AUTHORS:** Fang Wan, Chang Liu, Wei Ke, Xiangyang Ji, Jianbin Jiao, Qixiang Ye

**HIGHLIGHT:** In this paper, we introduce a continuation optimization method into MIL and thereby creating continuation multiple instance learning (C-MIL), with the intention of alleviating the non-convexity problem in a systematic way.

**TITLE:** Weakly Supervised Learning of Instance Segmentation With Inter-Pixel Relations  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ahn\\_Weakly\\_Supervised\\_Learning\\_of\\_Instance\\_Segmentation\\_With\\_Inter-Pixel\\_Relations\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ahn_Weakly_Supervised_Learning_of_Instance_Segmentation_With_Inter-Pixel_Relations_CVPR_2019_paper.html)

**AUTHORS:** Jiwoon Ahn, Sunghyun Cho, Suha Kwak

**HIGHLIGHT:** This paper presents a novel approach for learning instance segmentation with image-level class labels as supervision.

**TITLE:** Attention-Based Dropout Layer for Weakly Supervised Object Localization  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Choe\\_Attention-Based\\_Dropout\\_Layer\\_for\\_Weakly\\_Supervised\\_Object\\_Localization\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Choe_Attention-Based_Dropout_Layer_for_Weakly_Supervised_Object_Localization_CVPR_2019_paper.html)

**AUTHORS:** Junsuk Choe, Hyunjung Shim

**HIGHLIGHT:** To address this problem, we propose an Attention-based Dropout Layer (ADL), which utilizes the self-attention mechanism to process the feature maps of the model.

TITLE: Domain Generalization by Solving Jigsaw Puzzles  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Carlucci\\_Domain\\_Generalization\\_by\\_Solving\\_Jigsaw\\_Puzzles\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Carlucci_Domain_Generalization_by_Solving_Jigsaw_Puzzles_CVPR_2019_paper.html)  
AUTHORS: Fabio M. Carlucci, Antonio D'Innocente, Silvia Bucci, Barbara Caputo, Tatiana Tommasi  
HIGHLIGHT: In this paper we propose to apply a similar approach to the task of object recognition across domains: our model learns the semantic labels in a supervised fashion, and broadens its understanding of the data by learning from self-supervised signals how to solve a jigsaw puzzle on the same images.

TITLE: Transferrable Prototypical Networks for Unsupervised Domain Adaptation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Pan\\_Transferrable\\_Prototypical\\_Networks\\_for\\_Unsupervised\\_Domain\\_Adaptation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Pan_Transferrable_Prototypical_Networks_for_Unsupervised_Domain_Adaptation_CVPR_2019_paper.html)  
AUTHORS: Yingwei Pan, Ting Yao, Yehao Li, Yu Wang, Chong-Wah Ngo, Tao Mei  
HIGHLIGHT: In this paper, we introduce a new idea for unsupervised domain adaptation via a remold of Prototypical Networks, which learn an embedding space and perform classification via a remold of the distances to the prototype of each class.

TITLE: Blending-Target Domain Adaptation by Adversarial Meta-Adaptation Networks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Blending-Target\\_Domain\\_Adaptation\\_by\\_Adversarial\\_Meta-Adaptation\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Blending-Target_Domain_Adaptation_by_Adversarial_Meta-Adaptation_Networks_CVPR_2019_paper.html)  
AUTHORS: Ziliang Chen, Jingyu Zhuang, Xiaodan Liang, Liang Lin  
HIGHLIGHT: In this paper, we consider a more realistic transfer scenario: our target domain is comprised of multiple sub-targets implicitly blended with each other so that learners could not identify which sub-target each unlabeled sample belongs to.

TITLE: ELASTIC: Improving CNNs With Dynamic Scaling Policies  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_ELASTIC\\_Improving\\_CNNs\\_With\\_Dynamic\\_Scaling\\_Policies\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_ELASTIC_Improving_CNNs_With_Dynamic_Scaling_Policies_CVPR_2019_paper.html)  
AUTHORS: Huiyu Wang, Aniruddha Kembhavi, Ali Farhadi, Alan L. Yuille, Mohammad Rastegari  
HIGHLIGHT: In this paper, we introduce Elastic, a simple, efficient and yet very effective approach to learn a dynamic scale policy from data.

TITLE: ScratchDet: Training Single-Shot Object Detectors From Scratch  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhu\\_ScratchDet\\_Training\\_Single-Shot\\_Object\\_Detectors\\_From\\_Scratch\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhu_ScratchDet_Training_Single-Shot_Object_Detectors_From_Scratch_CVPR_2019_paper.html)  
AUTHORS: Rui Zhu, Shifeng Zhang, Xiaobo Wang, Longyin Wen, Hailin Shi, Liefeng Bo, Tao Mei  
HIGHLIGHT: In this paper, we explore to train object detectors from scratch robustly.

TITLE: SFNet: Learning Object-Aware Semantic Correspondence  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Lee\\_SFNet\\_Learning\\_Object-Aware\\_Semantic\\_Correspondence\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Lee_SFNet_Learning_Object-Aware_Semantic_Correspondence_CVPR_2019_paper.html)  
AUTHORS: Junghyup Lee, Dohyung Kim, Jean Ponce, Bumsuh Ham  
HIGHLIGHT: We propose a new CNN architecture, dubbed SFNet, which implements this idea.

TITLE: Deep Metric Learning Beyond Binary Supervision  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kim\\_Deep\\_Metric\\_Learning\\_Beyond\\_Binary\\_Supervision\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kim_Deep_Metric_Learning_Beyond_Binary_Supervision_CVPR_2019_paper.html)  
AUTHORS: Sungyeon Kim, Minkyoo Seo, Ivan Laptev, Minsu Cho, Suha Kwak  
HIGHLIGHT: Motivated by this, we present a novel method for deep metric learning using continuous labels.

TITLE: Learning to Cluster Faces on an Affinity Graph  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yang\\_Learning\\_to\\_Cluster\\_Faces\\_on\\_an\\_Affinity\\_Graph\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yang_Learning_to_Cluster_Faces_on_an_Affinity_Graph_CVPR_2019_paper.html)  
AUTHORS: Lei Yang, Xiaohang Zhan, Dapeng Chen, Junjie Yan, Chen Change Loy, Dahua Lin  
HIGHLIGHT: Specifically, we propose a framework based on graph convolutional network, which combines a detection and a segmentation module to pinpoint face clusters.

TITLE: C2AE: Class Conditioned Auto-Encoder for Open-Set Recognition  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Oza\\_C2AE\\_Class\\_Conditioned\\_Auto-Encoder\\_for\\_Open-Set\\_Recognition\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Oza_C2AE_Class_Conditioned_Auto-Encoder_for_Open-Set_Recognition_CVPR_2019_paper.html)  
AUTHORS: Poojan Oza, Vishal M. Patel  
HIGHLIGHT: In this paper, we propose an open-set recognition algorithm using class conditioned auto-encoders with novel training and testing methodologies.

TITLE: K-Nearest Neighbors Hashing  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/He\\_K-Nearest\\_Neighbors\\_Hashing\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/He_K-Nearest_Neighbors_Hashing_CVPR_2019_paper.html)  
AUTHORS: Xiangyu He, Peisong Wang, Jian Cheng  
HIGHLIGHT: In this work, we revisit the  $\text{sign}()$  function from the perspective of space partitioning.

TITLE: Learning RoI Transformer for Oriented Object Detection in Aerial Images  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ding\\_Learning\\_RoI\\_Transformer\\_for\\_Oriented\\_Object\\_Detection\\_in\\_Aerial\\_Images\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ding_Learning_RoI_Transformer_for_Oriented_Object_Detection_in_Aerial_Images_CVPR_2019_paper.html)  
AUTHORS: Jian Ding, Nan Xue, Yang Long, Gui-Song Xia, Qikai Lu  
HIGHLIGHT: In this paper, we propose a RoI Transformer to address these problems.

TITLE: Snapshot Distillation: Teacher-Student Optimization in One Generation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yang\\_Snapshot\\_Distillation\\_Teacher-Student\\_Optimization\\_in\\_One\\_Generation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yang_Snapshot_Distillation_Teacher-Student_Optimization_in_One_Generation_CVPR_2019_paper.html)  
AUTHORS: Chenglin Yang, Lingxi Xie, Chi Su, Alan L. Yuille  
HIGHLIGHT: This paper presents snapshot distillation (SD), the first framework which enables teacher-student optimization in one generation.

TITLE: Geometry-Aware Distillation for Indoor Semantic Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Jiao\\_Geometry-Aware\\_Distillation\\_for\\_Indoor\\_Semantic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Jiao_Geometry-Aware_Distillation_for_Indoor_Semantic_Segmentation_CVPR_2019_paper.html)  
AUTHORS: Jianbo Jiao, Yunchao Wei, Zequn Jie, Honghui Shi, Rynson W.H. Lau, Thomas S. Huang  
HIGHLIGHT: In this paper, we propose to jointly infer the semantic and depth information by distilling geometry-aware embedding to eliminate such strong constraint while still exploiting the helpful depth domain information.

TITLE: LiveSketch: Query Perturbations for Guided Sketch-Based Visual Search  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Collomosse\\_LiveSketch\\_Query\\_Perturbations\\_for\\_Guided\\_Sketch-Based\\_Visual\\_Search\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Collomosse_LiveSketch_Query_Perturbations_for_Guided_Sketch-Based_Visual_Search_CVPR_2019_paper.html)  
AUTHORS: John Collomosse, Tu Bui, Hailin Jin  
HIGHLIGHT: Our technical contributions are: a triplet convnet architecture that incorporates an RNN based variational autoencoder to search for images using vector (stroke-based) queries; real-time clustering to identify likely search intents (and so, targets within the search embedding); and the use of backpropagation from those targets to perturb the input stroke sequence, so suggesting alterations to the query in order to guide the search.

TITLE: Bounding Box Regression With Uncertainty for Accurate Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/He\\_Bounding\\_Box\\_Regression\\_With\\_Uncertainty\\_for\\_Accurate\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/He_Bounding_Box_Regression_With_Uncertainty_for_Accurate_Object_Detection_CVPR_2019_paper.html)  
AUTHORS: Yihui He, Chenchen Zhu, Jianren Wang, Marios Savvides, Xiangyu Zhang  
HIGHLIGHT: In this paper, we propose a novel bounding box regression loss for learning bounding box transformation and localization variance together.

TITLE: OCGAN: One-Class Novelty Detection Using GANs With Constrained Latent Representations  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Perera\\_OCGAN\\_One-Class\\_Novelty\\_Detection\\_Using\\_GANs\\_With\\_Constrained\\_Latent\\_Representations\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Perera_OCGAN_One-Class_Novelty_Detection_Using_GANs_With_Constrained_Latent_Representations_CVPR_2019_paper.html)  
AUTHORS: Pramuditha Perera, Ramesh Nallapati, Bing Xiang  
HIGHLIGHT: We present a novel model called OCGAN for the classical problem of one-class novelty detection, where, given a set of examples from a particular class, the goal is to determine if a query example is from the same class.

TITLE: Learning Metrics From Teachers: Compact Networks for Image Embedding  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yu\\_Learning\\_Metrics\\_From\\_Teachers\\_Compact\\_Networks\\_for\\_Image\\_Embedding\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yu_Learning_Metrics_From_Teachers_Compact_Networks_for_Image_Embedding_CVPR_2019_paper.html)  
AUTHORS: Lu Yu, Vacit Oguz Yazici, Xialei Liu, Joost van de Weijer, Yongmei Cheng, Arnau Ramisa  
HIGHLIGHT: In this paper, we propose to use network distillation to efficiently compute image embeddings with small networks.

TITLE: Activity Driven Weakly Supervised Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yang\\_Activity\\_Driven\\_Weakly\\_Supervised\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yang_Activity_Driven_Weakly_Supervised_Object_Detection_CVPR_2019_paper.html)  
AUTHORS: Zhenheng Yang, Dhruv Mahajan, Deepti Ghadiyaram, Ram Nevatia, Vignesh Ramanathan

**HIGHLIGHT:** Weakly supervised object detection aims at reducing the amount of supervision required to train detection models.

**TITLE:** Separate to Adapt: Open Set Domain Adaptation via Progressive Separation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Separate\\_to\\_Adapt\\_Open\\_Set\\_Domain\\_Adaptation\\_via\\_Progressive\\_Separation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Separate_to_Adapt_Open_Set_Domain_Adaptation_via_Progressive_Separation_CVPR_2019_paper.html)

**AUTHORS:** Hong Liu, Zhangjie Cao, Mingsheng Long, Jianmin Wang, Qiang Yang

**HIGHLIGHT:** To this end, this paper presents Separate to Adapt (STA), an end-to-end approach to open set domain adaptation.

**TITLE:** Layout-Graph Reasoning for Fashion Landmark Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yu\\_Layout-Graph\\_Reasoning\\_for\\_Fashion\\_Landmark\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yu_Layout-Graph_Reasoning_for_Fashion_Landmark_Detection_CVPR_2019_paper.html)

**AUTHORS:** Weijiang Yu, Xiaodan Liang, Ke Gong, Chenhan Jiang, Nong Xiao, Liang Lin

**HIGHLIGHT:** In this paper, we propose to seamlessly enforce structural layout relationships among landmarks on the intermediate representations via multiple stacked layout-graph reasoning layers.

**TITLE:** DistillHash: Unsupervised Deep Hashing by Distilling Data Pairs

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yang\\_DistillHash\\_Unsupervised\\_Deep\\_Hashing\\_by\\_Distilling\\_Data\\_Pairs\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yang_DistillHash_Unsupervised_Deep_Hashing_by_Distilling_Data_Pairs_CVPR_2019_paper.html)

**AUTHORS:** Erkun Yang, Tongliang Liu, Cheng Deng, Wei Liu, Dacheng Tao

**HIGHLIGHT:** To address this problem, in this paper, we propose a new deep unsupervised hashing model, called DistillHash, which can learn a distilled data set, where data pairs have confident similarity signals.

**TITLE:** Mind Your Neighbours: Image Annotation With Metadata Neighbourhood Graph Co-Attention Networks

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_Mind\\_Your\\_Neighbours\\_Image\\_Annotation\\_With\\_Metadata\\_Neighbourhood\\_Graph\\_Co-Attention\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_Mind_Your_Neighbours_Image_Annotation_With_Metadata_Neighbourhood_Graph_Co-Attention_CVPR_2019_paper.html)

**AUTHORS:** Junjie Zhang, Qi Wu, Jian Zhang, Chunhua Shen, Jianfeng Lu

**HIGHLIGHT:** In this paper, we propose a Metadata Neighbourhood Graph Co-Attention Network (MangoNet) to model the correlations between each target image and its neighbours.

**TITLE:** Region Proposal by Guided Anchoring

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Region\\_Proposal\\_by\\_Guided\\_Anchoring\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Region_Proposal_by_Guided_Anchoring_CVPR_2019_paper.html)

**AUTHORS:** Jiaqi Wang, Kai Chen, Shuo Yang, Chen Change Loy, Dahua Lin

**HIGHLIGHT:** In this paper, we revisit this foundational stage.

**TITLE:** Distant Supervised Centroid Shift: A Simple and Efficient Approach to Visual Domain Adaptation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liang\\_Distant\\_Supervised\\_Centroid\\_Shift\\_A\\_Simple\\_and\\_Efficient\\_Approach\\_to\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liang_Distant_Supervised_Centroid_Shift_A_Simple_and_Efficient_Approach_to_CVPR_2019_paper.html)

**AUTHORS:** Jian Liang, Ran He, Zhenan Sun, Tieniu Tan

**HIGHLIGHT:** This paper provides a simple and efficient solution, which could be regarded as a well-performing baseline for domain adaptation tasks.

**TITLE:** Learning to Transfer Examples for Partial Domain Adaptation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cao\\_Learning\\_to\\_Transfer\\_Examples\\_for\\_Partial\\_Domain\\_Adaptation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cao_Learning_to_Transfer_Examples_for_Partial_Domain_Adaptation_CVPR_2019_paper.html)

**AUTHORS:** Zhangjie Cao, Kaichao You, Mingsheng Long, Jianmin Wang, Qiang Yang

**HIGHLIGHT:** In this work, we propose a unified approach to PDA, Example Transfer Network (ETN), which jointly learns domain-invariant representations across domains and a progressive weighting scheme to quantify the transferability of source examples.

**TITLE:** Generalized Zero-Shot Recognition Based on Visually Semantic Embedding

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhu\\_Generalized\\_Zero-Shot\\_Recognition\\_Based\\_on\\_Visually\\_Semantic\\_Embedding\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhu_Generalized_Zero-Shot_Recognition_Based_on_Visually_Semantic_Embedding_CVPR_2019_paper.html)

**AUTHORS:** Pengkai Zhu, Hanxiao Wang, Venkatesh Saligrama

**HIGHLIGHT:** We propose a novel Generalized Zero-Shot learning (GZSL) method that is agnostic to both unseen images and unseen semantic vectors during training.

**TITLE:** Towards Visual Feature Translation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hu\\_Towards\\_Visual\\_Feature\\_Translation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hu_Towards_Visual_Feature_Translation_CVPR_2019_paper.html)

**AUTHORS:** Jie Hu, Rongrong Ji, Hong Liu, Shengchuan Zhang, Cheng Deng, Qi Tian

**HIGHLIGHT:** In this paper, we make the first attempt towards visual feature translation to break through the barrier of using features across different visual search systems.

**TITLE:** Amodal Instance Segmentation With KINS Dataset  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Qi\\_Amodal\\_Instance\\_Segmentation\\_With\\_KINS\\_Dataset\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Qi_Amodal_Instance_Segmentation_With_KINS_Dataset_CVPR_2019_paper.html)

**AUTHORS:** Lu Qi, Li Jiang, Shu Liu, Xiaoyong Shen, Jiaya Jia

**HIGHLIGHT:** In this paper, we augment KITTI with more instance pixel-level annotation for 8 categories, which we call KITTI INstance dataset (KINS).

**TITLE:** Global Second-Order Pooling Convolutional Networks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Gao\\_Global\\_Second-Order\\_Pooling\\_Convolutional\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Gao_Global_Second-Order_Pooling_Convolutional_Networks_CVPR_2019_paper.html)

**AUTHORS:** Zilin Gao, Jiangtao Xie, Qilong Wang, Peihua Li

**HIGHLIGHT:** In this paper, we propose a novel network model introducing GSoP across from lower to higher layers for exploiting holistic image information throughout a network.

**TITLE:** Weakly Supervised Complementary Parts Models for Fine-Grained Image Classification From the Bottom Up  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ge\\_Weakly\\_Supervised\\_Complementary\\_Parts\\_Models\\_for\\_Fine-Grained\\_Image\\_Classification\\_From\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ge_Weakly_Supervised_Complementary_Parts_Models_for_Fine-Grained_Image_Classification_From_CVPR_2019_paper.html)

**AUTHORS:** Weifeng Ge, Xiangru Lin, Yizhou Yu

**HIGHLIGHT:** In this paper, we approach this problem from a different perspective.

**TITLE:** NetTailor: Tuning the Architecture, Not Just the Weights  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Morgado\\_NetTailor\\_Tuning\\_the\\_Architecture\\_Not\\_Just\\_the\\_Weights\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Morgado_NetTailor_Tuning_the_Architecture_Not_Just_the_Weights_CVPR_2019_paper.html)

**AUTHORS:** Pedro Morgado, Nuno Vasconcelos

**HIGHLIGHT:** To address these problems, we propose a transfer learning procedure, denoted NetTailor, in which layers of a pre-trained CNN are used as universal blocks that can be combined with small task-specific layers to generate new networks.

**TITLE:** Deep Embedding Learning With Discriminative Sampling Policy  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Duan\\_Deep\\_Embedding\\_Learning\\_With\\_Discriminative\\_Sampling\\_Policy\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Duan_Deep_Embedding_Learning_With_Discriminative_Sampling_Policy_CVPR_2019_paper.html)

**AUTHORS:** Yueqi Duan, Lei Chen, Jiwen Lu, Jie Zhou

**HIGHLIGHT:** In this paper, we propose a deep embedding with discriminative sampling policy (DE-DSP) learning framework by simultaneously training two models: a deep sampler network that learns effective sampling strategies, and a feature embedding that maps samples to the feature space.

**TITLE:** Hybrid Task Cascade for Instance Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Hybrid\\_Task\\_Cascade\\_for\\_Instance\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Hybrid_Task_Cascade_for_Instance_Segmentation_CVPR_2019_paper.html)

**AUTHORS:** Kai Chen, Jiangmiao Pang, Jiaqi Wang, Yu Xiong, Xiaoxiao Li, Shuyang Sun, Wansen Feng, Ziwei Liu, Jianping Shi, Wanli Ouyang, Chen Change Loy, Dahua Lin

**HIGHLIGHT:** In this work, we propose a new framework, Hybrid Task Cascade (HTC), which differs in two important aspects: (1) instead of performing cascaded refinement on these two tasks separately, it interweaves them for a joint multi-stage processing; (2) it adopts a fully convolutional branch to provide spatial context, which can help distinguishing hard foreground from cluttered background.

**TITLE:** Multi-Task Self-Supervised Object Detection via Recycling of Bounding Box Annotations  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Lee\\_Multi-Task\\_Self-Supervised\\_Object\\_Detection\\_via\\_Recycling\\_of\\_Bounding\\_Box\\_Annotations\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Lee_Multi-Task_Self-Supervised_Object_Detection_via_Recycling_of_Bounding_Box_Annotations_CVPR_2019_paper.html)

**AUTHORS:** Wonhee Lee, Joonil Na, Gunhee Kim

**HIGHLIGHT:** To make better use of given limited labels, we propose a novel object detection approach that takes advantage of both multi-task learning (MTL) and self-supervised learning (SSL).

**TITLE:** ClusterNet: Deep Hierarchical Cluster Network With Rigorously Rotation-Invariant Representation for Point Cloud Analysis  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_ClusterNet\\_Deep\\_Hierarchical\\_Cluster\\_Network\\_With\\_Rigorously\\_Rotation-Invariant\\_Representation\\_for\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_ClusterNet_Deep_Hierarchical_Cluster_Network_With_Rigorously_Rotation-Invariant_Representation_for_CVPR_2019_paper.html)

**AUTHORS:** Chao Chen, Guanbin Li, Ruijia Xu, Tianshui Chen, Meng Wang, Liang Lin

**HIGHLIGHT:** In this paper, we address the issue by introducing a novel point cloud representation that can be mathematically proved rigorously rotation-invariant, i.e., identical point clouds in different orientations are unified as a unique and consistent representation.

**TITLE:** Learning to Learn Relation for Important People Detection in Still Images  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Learning\\_to\\_Learn\\_Relation\\_for\\_Important\\_People\\_Detection\\_in\\_Still\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Learning_to_Learn_Relation_for_Important_People_Detection_in_Still_CVPR_2019_paper.html)

**AUTHORS:** Wei-Hong Li, Fa-Ting Hong, Wei-Shi Zheng

**HIGHLIGHT:** In this work, we propose a deep importance relation Network (POINT) that combines both relation modeling and feature learning.

**TITLE:** Looking for the Devil in the Details: Learning Trilinear Attention Sampling Network for Fine-Grained Image Recognition  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zheng\\_Looking\\_for\\_the\\_Devil\\_in\\_the\\_Details\\_Learning\\_Trilinear\\_Attention\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zheng_Looking_for_the_Devil_in_the_Details_Learning_Trilinear_Attention_CVPR_2019_paper.html)

**AUTHORS:** Heliang Zheng, Jianlong Fu, Zheng-Jun Zha, Jiebo Luo

**HIGHLIGHT:** In this paper, we propose to learn such fine-grained features from hundreds of part proposals by Trilinear Attention Sampling Network (TASN) in an efficient teacher-student manner.

**TITLE:** Multi-Similarity Loss With General Pair Weighting for Deep Metric Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Multi-Similarity\\_Loss\\_With\\_General\\_Pair\\_Weighting\\_for\\_Deep\\_Metric\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Multi-Similarity_Loss_With_General_Pair_Weighting_for_Deep_Metric_Learning_CVPR_2019_paper.html)

**AUTHORS:** Xun Wang, Xintong Han, Weilin Huang, Dengke Dong, Matthew R. Scott

**HIGHLIGHT:** Our contributions are three-fold: (1) we establish a General Pair Weighting (GPW) framework, which casts the sampling problem of deep metric learning into a unified view of pair weighting through gradient analysis, providing a powerful tool for understanding recent pair-based loss functions; (2) we show that with GPW, various existing pair-based methods can be compared and discussed comprehensively, with clear differences and key limitations identified; (3) we propose a new loss called multi-similarity loss (MS loss) under the GPW, which is implemented in two iterative steps (i.e., mining and weighting).

**TITLE:** Domain-Symmetric Networks for Adversarial Domain Adaptation

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_Domain-Symmetric\\_Networks\\_for\\_Adversarial\\_Domain\\_Adaptation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_Domain-Symmetric_Networks_for_Adversarial_Domain_Adaptation_CVPR_2019_paper.html)

**AUTHORS:** Yabin Zhang, Hui Tang, Kui Jia, Mingkui Tan

**HIGHLIGHT:** To train the SymNet, we propose a novel adversarial learning objective whose key design is based on a two-level domain confusion scheme, where the category-level confusion loss improves over the domain-level one by driving the learning of intermediate network features to be invariant at the corresponding categories of the two domains.

**TITLE:** End-To-End Supervised Product Quantization for Image Search and Retrieval

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Klein\\_End-To-End\\_Supervised\\_Product\\_Quantization\\_for\\_Image\\_Search\\_and\\_Retrieval\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Klein_End-To-End_Supervised_Product_Quantization_for_Image_Search_and_Retrieval_CVPR_2019_paper.html)

**AUTHORS:** Benjamin Klein, Lior Wolf

**HIGHLIGHT:** This work presents Deep Product Quantization (DPQ), a technique that leads to more accurate retrieval and classification than the latest state of the art methods, while having similar computational complexity and memory footprint as the Product Quantization method.

**TITLE:** Learning to Learn From Noisy Labeled Data

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Learning\\_to\\_Learn\\_From\\_Noisy\\_Labeled\\_Data\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Learning_to_Learn_From_Noisy_Labeled_Data_CVPR_2019_paper.html)

**AUTHORS:** Junnan Li, Yongkang Wong, Qi Zhao, Mohan S. Kankanhalli

**HIGHLIGHT:** To overcome this problem, we propose a noise-tolerant training algorithm, where a meta-learning update is performed prior to conventional gradient update.

**TITLE:** DSFD: Dual Shot Face Detector

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_DSFD\\_Dual\\_Shot\\_Face\\_Detector\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_DSFD_Dual_Shot_Face_Detector_CVPR_2019_paper.html)

**AUTHORS:** Jian Li, Yabiao Wang, Changan Wang, Ying Tai, Jianjun Qian, Jian Yang, Chengjie Wang, Jilin Li, Feiyue Huang

**HIGHLIGHT:** In this Paper, we propose a novel detection network named Dual Shot face Detector(DSFD).

**TITLE:** Label Propagation for Deep Semi-Supervised Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Isken\\_Label\\_Propagation\\_for\\_Deep\\_Semi-Supervised\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Isken_Label_Propagation_for_Deep_Semi-Supervised_Learning_CVPR_2019_paper.html)

**AUTHORS:** Ahmet Iscen, Giorgos Tolias, Yannis Avrithis, Ondrej Chum

**HIGHLIGHT:** In this work, we employ a transductive label propagation method that is based on the manifold assumption to make predictions on the entire dataset and use these predictions to generate pseudo-labels for the unlabeled data and train a deep neural network.

**TITLE:** Deep Global Generalized Gaussian Networks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Deep\\_Global\\_Generalized\\_Gaussian\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Deep_Global_Generalized_Gaussian_Networks_CVPR_2019_paper.html)

**AUTHORS:** Qilong Wang, Peihua Li, Qinghua Hu, Pengfei Zhu, Wangmeng Zuo

**HIGHLIGHT:** To handle this issue, this paper proposes a novel deep global generalized Gaussian network (3G-Net), whose core is to estimate a global covariance of generalized Gaussian for modeling the last convolutional activations.

**TITLE:** Semantically Tied Paired Cycle Consistency for Zero-Shot Sketch-Based Image Retrieval  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Dutta\\_Semantically\\_Tied\\_Paired\\_Cycle\\_Consistency\\_for\\_Zero-Shot\\_Sketch-Based\\_Image\\_Retrieval\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Dutta_Semantically_Tied_Paired_Cycle_Consistency_for_Zero-Shot_Sketch-Based_Image_Retrieval_CVPR_2019_paper.html)

**AUTHORS:** Anjan Dutta, Zeynep Akata

**HIGHLIGHT:** In this work, we propose a semantically aligned paired cycle-consistent generative (SEM-PCYC) model for zero-shot SBIR, where each branch maps the visual information to a common semantic space via an adversarial training.

**TITLE:** Context-Aware Crowd Counting  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Context-Aware\\_Crowd\\_Counting\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Context-Aware_Crowd_Counting_CVPR_2019_paper.html)

**AUTHORS:** Weizhe Liu, Mathieu Salzmann, Pascal Fua

**HIGHLIGHT:** In this paper, we introduce an end-to-end trainable deep architecture that combines features obtained using multiple receptive field sizes and learns the importance of each such feature at each image location.

**TITLE:** Detect-To-Retrieve: Efficient Regional Aggregation for Image Search  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Teichmann\\_Detect-To-Retrieve\\_Efficient\\_Regional\\_Aggregation\\_for\\_Image\\_Search\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Teichmann_Detect-To-Retrieve_Efficient_Regional_Aggregation_for_Image_Search_CVPR_2019_paper.html)

**AUTHORS:** Marvin Teichmann, Andre Araujo, Menglong Zhu, Jack Sim

**HIGHLIGHT:** In this paper, we first fill the void by providing a new dataset of landmark bounding boxes, based on the Google Landmarks dataset, that includes 94k images with manually curated boxes from 15k unique landmarks.

**TITLE:** Towards Accurate One-Stage Object Detection With AP-Loss  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Towards\\_Accurate\\_One-Stage\\_Object\\_Detection\\_With\\_AP-Loss\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Towards_Accurate_One-Stage_Object_Detection_With_AP-Loss_CVPR_2019_paper.html)

**AUTHORS:** Kean Chen, Jianguo Li, Weiyao Lin, John See, Ji Wang, Lingyu Duan, Zhibo Chen, Changwei He, Junni Zou

**HIGHLIGHT:** This paper alleviates this issue by proposing a novel framework to replace the classification task in one-stage detectors with a ranking task, and adopting the Average-Precision loss (AP-loss) for the ranking problem.

**TITLE:** On Exploring Undetermined Relationships for Visual Relationship Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhan\\_On\\_Exploring\\_Undetermined\\_Relationships\\_for\\_Visual\\_Relationship\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhan_On_Exploring_Undetermined_Relationships_for_Visual_Relationship_Detection_CVPR_2019_paper.html)

**AUTHORS:** Yibing Zhan, Jun Yu, Ting Yu, Dacheng Tao

**HIGHLIGHT:** In this paper, we explore the beneficial effect of undetermined relationships on visual relationship detection.

**TITLE:** Learning Without Memorizing  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Dhar\\_Learning\\_Without\\_Memorizing\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Dhar_Learning_Without_Memorizing_CVPR_2019_paper.html)

**AUTHORS:** Prithviraj Dhar, Rajat Vikram Singh, Kuan-Chuan Peng, Ziyang Wu, Rama Chellappa

**HIGHLIGHT:** Hence, we propose a novel approach, called 'Learning without Memorizing (LwM)', to preserve the information about existing (base) classes, without storing any of their data, while making the classifier progressively learn the new classes.

**TITLE:** Dynamic Recursive Neural Network  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Guo\\_Dynamic\\_Recursive\\_Neural\\_Network\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Guo_Dynamic_Recursive_Neural_Network_CVPR_2019_paper.html)

**AUTHORS:** Qiushan Guo, Zhipeng Yu, Yichao Wu, Ding Liang, Haoyu Qin, Junjie Yan

**HIGHLIGHT:** This paper proposes the dynamic recursive neural network (DRNN), which simplifies the duplicated building blocks in deep neural network.

**TITLE:** Destruction and Construction Learning for Fine-Grained Image Recognition  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Destruction\\_and\\_Construction\\_Learning\\_for\\_Fine-Grained\\_Image\\_Recognition\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Destruction_and_Construction_Learning_for_Fine-Grained_Image_Recognition_CVPR_2019_paper.html)

**AUTHORS:** Yue Chen, Yalong Bai, Wei Zhang, Tao Mei

**HIGHLIGHT:** In this paper, we propose a novel "Destruction and Construction Learning" (DCL) method to enhance the difficulty of fine-grained recognition and exercise the classification model to acquire expert knowledge.

**TITLE:** Distraction-Aware Shadow Detection

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zheng\\_Distraction-Aware\\_Shadow\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zheng_Distraction-Aware_Shadow_Detection_CVPR_2019_paper.html)

**AUTHORS:** Quanlong Zheng, Xiaotian Qiao, Ying Cao, Rynson W.H. Lau

**HIGHLIGHT:** In this paper, we propose a Distraction-aware Shadow Detection Network (DSDNet) by explicitly learning and integrating the semantics of visual distraction regions in an end-to-end framework.

**TITLE:** Multi-Label Image Recognition With Graph Convolutional Networks

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_Multi-Label\\_Image\\_Recognition\\_With\\_Graph\\_Convolutional\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_Multi-Label_Image_Recognition_With_Graph_Convolutional_Networks_CVPR_2019_paper.html)

**AUTHORS:** Zhao-Min Chen, Xiu-Shen Wei, Peng Wang, Yanwen Guo

**HIGHLIGHT:** To capture and explore such important dependencies, we propose a multi-label classification model based on Graph Convolutional Network (GCN).

**TITLE:** High-Level Semantic Feature Detection: A New Perspective for Pedestrian Detection

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_High-Level\\_Semantic\\_Feature\\_Detection\\_A\\_New\\_Perspective\\_for\\_Pedestrian\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_High-Level_Semantic_Feature_Detection_A_New_Perspective_for_Pedestrian_Detection_CVPR_2019_paper.html)

**AUTHORS:** Wei Liu, Shengcai Liao, Weiqiang Ren, Weidong Hu, Yinan Yu

**HIGHLIGHT:** In this paper, taking pedestrian detection as an example, we provide a new perspective where detecting objects is motivated as a high-level semantic feature detection task.

**TITLE:** RepMet: Representative-Based Metric Learning for Classification and Few-Shot Object Detection

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Karlinsky\\_RepMet\\_Representative-Based\\_Metric\\_Learning\\_for\\_Classification\\_and\\_Few-Shot\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Karlinsky_RepMet_Representative-Based_Metric_Learning_for_Classification_and_Few-Shot_Object_Detection_CVPR_2019_paper.html)

**AUTHORS:** Leonid Karlinsky, Joseph Shtok, Sivan Harary, Eli Schwartz, Amit Aides, Rogerio Feris, Raja Giryes, Alex M. Bronstein

**HIGHLIGHT:** In this work, we propose a new method for DML that simultaneously learns the backbone network parameters, the embedding space, and the multi-modal distribution of each of the training categories in that space, in a single end-to-end training process.

**TITLE:** Ranked List Loss for Deep Metric Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Ranked\\_List\\_Loss\\_for\\_Deep\\_Metric\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Ranked_List_Loss_for_Deep_Metric_Learning_CVPR_2019_paper.html)

**AUTHORS:** Xinshao Wang, Yang Hua, Elyor Kodirov, Guosheng Hu, Romain Garnier, Neil M. Robertson

**HIGHLIGHT:** In this work, we present two limitations of existing ranking-motivated structured losses and propose a novel ranked list loss to solve both of them.

**TITLE:** CANet: Class-Agnostic Segmentation Networks With Iterative Refinement and Attentive Few-Shot Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_CANet\\_Class-Agnostic\\_Segmentation\\_Networks\\_With\\_Iterative\\_Refinement\\_and\\_Attentive\\_Few-Shot\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_CANet_Class-Agnostic_Segmentation_Networks_With_Iterative_Refinement_and_Attentive_Few-Shot_CVPR_2019_paper.html)

**AUTHORS:** Chi Zhang, Guosheng Lin, Fayao Liu, Rui Yao, Chunhua Shen

**HIGHLIGHT:** In this paper, we present CANet, a class-agnostic segmentation network that performs few-shot segmentation on new classes with only a few annotated images available.

**TITLE:** Precise Detection in Densely Packed Scenes

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Goldman\\_Precise\\_Detection\\_in\\_Densely\\_Packed\\_Scenes\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Goldman_Precise_Detection_in_Densely_Packed_Scenes_CVPR_2019_paper.html)

**AUTHORS:** Eran Goldman, Roei Herzig, Aviv Eisenschat, Jacob Goldberger, Tal Hassner

**HIGHLIGHT:** We propose a novel, deep-learning based method for precise object detection, designed for such challenging settings.

**TITLE:** Panoptic Feature Pyramid Networks

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kirillov\\_Panoptic\\_Feature\\_Pyramid\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kirillov_Panoptic_Feature_Pyramid_Networks_CVPR_2019_paper.html)

**AUTHORS:** Alexander Kirillov, Ross Girshick, Kaiming He, Piotr Dollar

**HIGHLIGHT:** In this work, we aim to unify these methods at the architectural level, designing a single network for both tasks.

**TITLE:** Mask Scoring R-CNN

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Huang\\_Mask\\_Scoring\\_R-CNN\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Huang_Mask_Scoring_R-CNN_CVPR_2019_paper.html)

**AUTHORS:** Zhaojin Huang, Lichao Huang, Yongchao Gong, Chang Huang, Xinggang Wang

**HIGHLIGHT:** In this paper, we study this problem and propose Mask Scoring R-CNN which contains a network block to learn the quality of the predicted instance masks.

**TITLE:** Reasoning-RCNN: Unifying Adaptive Global Reasoning Into Large-Scale Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xu\\_Reasoning-RCNN\\_Unifying\\_Adaptive\\_Global\\_Reasoning\\_Into\\_Large-Scale\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xu_Reasoning-RCNN_Unifying_Adaptive_Global_Reasoning_Into_Large-Scale_Object_Detection_CVPR_2019_paper.html)

**AUTHORS:** Hang Xu, Chenhan Jiang, Xiaodan Liang, Liang Lin, Zhenguo Li

**HIGHLIGHT:** In this paper, we address the large-scale object detection problem with thousands of categories, which poses severe challenges due to long-tail data distributions, heavy occlusions, and class ambiguities.

**TITLE:** Cross-Modality Personalization for Retrieval  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Murrugarra-Llerena\\_Cross-Modality\\_Personalization\\_for\\_Retrieval\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Murrugarra-Llerena_Cross-Modality_Personalization_for_Retrieval_CVPR_2019_paper.html)

**AUTHORS:** Nils Murrugarra-Llerena, Adriana Kovashka

**HIGHLIGHT:** In this work, we propose a model for modeling cross-modality personalized retrieval.

**TITLE:** Composing Text and Image for Image Retrieval - an Empirical Odyssey  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Vo\\_Composing\\_Text\\_and\\_Image\\_for\\_Image\\_Retrieval\\_-\\_an\\_Empirical\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Vo_Composing_Text_and_Image_for_Image_Retrieval_-_an_Empirical_CVPR_2019_paper.html)

**AUTHORS:** Nam Vo, Lu Jiang, Chen Sun, Kevin Murphy, Li-Jia Li, Li Fei-Fei, James Hays

**HIGHLIGHT:** In this paper, we study the task of image retrieval, where the input query is specified in the form of an image plus some text that describes desired modifications to the input image.

**TITLE:** Arbitrary Shape Scene Text Detection With Adaptive Text Region Representation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Arbitrary\\_Shape\\_Scene\\_Text\\_Detection\\_With\\_Adaptive\\_Text\\_Region\\_Representation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Arbitrary_Shape_Scene_Text_Detection_With_Adaptive_Text_Region_Representation_CVPR_2019_paper.html)

**AUTHORS:** Xiaobing Wang, Yingying Jiang, Zhenbo Luo, Cheng-Lin Liu, Hyunsoo Choi, Sungjin Kim

**HIGHLIGHT:** To solve the problem, we propose a robust scene text detection method with adaptive text region representation.

**TITLE:** Adaptive NMS: Refining Pedestrian Detection in a Crowd  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Adaptive\\_NMS\\_Refining\\_Pedestrian\\_Detection\\_in\\_a\\_Crowd\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Adaptive_NMS_Refining_Pedestrian_Detection_in_a_Crowd_CVPR_2019_paper.html)

**AUTHORS:** Songtao Liu, Di Huang, Yunhong Wang

**HIGHLIGHT:** The contributions are threefold: (1) we propose adaptive-NMS, which applies a dynamic suppression threshold to an instance, according to the target density; (2) we design an efficient subnetwork to learn density scores, which can be conveniently embedded into both the single-stage and two-stage detectors; and (3) we achieve state of the art results on the CityPersons and CrowdHuman benchmarks.

**TITLE:** Point in, Box Out: Beyond Counting Persons in Crowds  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Point\\_in\\_Box\\_Out\\_Beyond\\_Counting\\_Persons\\_in\\_Crowds\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Point_in_Box_Out_Beyond_Counting_Persons_in_Crowds_CVPR_2019_paper.html)

**AUTHORS:** Yuting Liu, Miaoqing Shi, Qijun Zhao, Xiaofang Wang

**HIGHLIGHT:** In this work, we instead propose a new deep detection network with only point supervision required.

**TITLE:** Locating Objects Without Bounding Boxes  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Ribera\\_Locating\\_Objects\\_Without\\_Bounding\\_Boxes\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Ribera_Locating_Objects_Without_Bounding_Boxes_CVPR_2019_paper.html)

**AUTHORS:** Javier Ribera, David Guera, Yuhao Chen, Edward J. Delp

**HIGHLIGHT:** In this paper, we address the task of estimating object locations without annotated bounding boxes which are typically hand-drawn and time consuming to label.

**TITLE:** FineGAN: Unsupervised Hierarchical Disentanglement for Fine-Grained Object Generation and Discovery  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Singh\\_FineGAN\\_Unsupervised\\_Hierarchical\\_Disentanglement\\_for\\_Fine-Grained\\_Object\\_Generation\\_and\\_Discovery\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Singh_FineGAN_Unsupervised_Hierarchical_Disentanglement_for_Fine-Grained_Object_Generation_and_Discovery_CVPR_2019_paper.html)

**AUTHORS:** Krishna Kumar Singh, Utkarsh Ojha, Yong Jae Lee

**HIGHLIGHT:** We propose FineGAN, a novel unsupervised GAN framework, which disentangles the background, object shape, and object appearance to hierarchically generate images of fine-grained object categories.

**TITLE:** Mutual Learning of Complementary Networks via Residual Correction for Improving Semi-Supervised Classification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wu\\_Mutual\\_Learning\\_of\\_Complementary\\_Networks\\_via\\_Residual\\_Correction\\_for\\_Improving\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wu_Mutual_Learning_of_Complementary_Networks_via_Residual_Correction_for_Improving_CVPR_2019_paper.html)

AUTHORS: Si Wu, Jichang Li, Cheng Liu, Zhiwen Yu, Hau-San Wong  
HIGHLIGHT: In this paper, we explore how to capture the complementary information to enhance mutual learning.

TITLE: Sampling Techniques for Large-Scale Object Detection From Sparsely Annotated Objects  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Niitani\\_Sampling\\_Techniques\\_for\\_Large-Scale\\_Object\\_Detection\\_From\\_Sparsely\\_Annotated\\_Objects\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Niitani_Sampling_Techniques_for_Large-Scale_Object_Detection_From_Sparsely_Annotated_Objects_CVPR_2019_paper.html)  
AUTHORS: Yusuke Niitani, Takuya Akiba, Tommi Kerola, Toru Ogawa, Shotaro Sano, Shuji Suzuki  
HIGHLIGHT: In this study, we propose part-aware sampling, a method that uses human intuition for the hierarchical relation between objects.

TITLE: Curls & Whey: Boosting Black-Box Adversarial Attacks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Shi\\_Curls\\_\\_Whey\\_Boosting\\_Black-Box\\_Adversarial\\_Attacks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Shi_Curls__Whey_Boosting_Black-Box_Adversarial_Attacks_CVPR_2019_paper.html)  
AUTHORS: Yucheng Shi, Siyu Wang, Yahong Han  
HIGHLIGHT: In this work, we propose Curls & Whey black-box attack to fix the above two defects.

TITLE: Barrage of Random Transforms for Adversarially Robust Defense  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Raff\\_Barrage\\_of\\_Random\\_Transforms\\_for\\_Adversarially\\_Robust\\_Defense\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Raff_Barrage_of_Random_Transforms_for_Adversarially_Robust_Defense_CVPR_2019_paper.html)  
AUTHORS: Edward Raff, Jared Sylvester, Steven Forsyth, Mark McLean  
HIGHLIGHT: In this paper, we explore the idea of stochastically combining a large number of individually weak defenses into a single barrage of randomized transformations to build a strong defense against adversarial attacks.

TITLE: Aggregation Cross-Entropy for Sequence Recognition  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xie\\_Aggregation\\_Cross-Entropy\\_for\\_Sequence\\_Recognition\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xie_Aggregation_Cross-Entropy_for_Sequence_Recognition_CVPR_2019_paper.html)  
AUTHORS: Zecheng Xie, Yaoxiong Huang, Yuanzhi Zhu, Lianwen Jin, Yuliang Liu, Lele Xie  
HIGHLIGHT: In this paper, we propose a novel method, aggregation cross-entropy (ACE), for sequence recognition from a brand new perspective.

TITLE: LaSO: Label-Set Operations Networks for Multi-Label Few-Shot Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Alfassy\\_LaSO\\_Label-Set\\_Operations\\_Networks\\_for\\_Multi-Label\\_Few-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Alfassy_LaSO_Label-Set_Operations_Networks_for_Multi-Label_Few-Shot_Learning_CVPR_2019_paper.html)  
AUTHORS: Amit Alfassy, Leonid Karlinsky, Amit Aides, Joseph Shtok, Sivan Harary, Rogerio Feris, Raja Giryes, Alex M. Bronstein  
HIGHLIGHT: In this work, we propose a novel technique for synthesizing samples with multiple labels for the (yet unhandled) multi-label few-shot classification scenario.

TITLE: Few-Shot Learning With Localization in Realistic Settings  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wertheimer\\_Few-Shot\\_Learning\\_With\\_Localization\\_in\\_Realistic\\_Settings\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wertheimer_Few-Shot_Learning_With_Localization_in_Realistic_Settings_CVPR_2019_paper.html)  
AUTHORS: Davis Wertheimer, Bharath Hariharan  
HIGHLIGHT: We introduce three parameter-free improvements: (a) better training procedures based on adapting cross-validation to meta-learning, (b) novel architectures that localize objects using limited bounding box annotations before classification, and (c) simple parameter-free expansions of the feature space based on bilinear pooling.

TITLE: AdaGraph: Unifying Predictive and Continuous Domain Adaptation Through Graphs  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Mancini\\_AdaGraph\\_Unifying\\_Predictive\\_and\\_Continuous\\_Domain\\_Adaptation\\_Through\\_Graphs\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Mancini_AdaGraph_Unifying_Predictive_and_Continuous_Domain_Adaptation_Through_Graphs_CVPR_2019_paper.html)  
AUTHORS: Massimiliano Mancini, Samuel Rota Buló, Barbara Caputo, Elisa Ricci  
HIGHLIGHT: Our contribution is the first deep architecture that tackles predictive domain adaptation, able to leverage over the information brought by the auxiliary domains through a graph.

TITLE: Few-Shot Adaptive Faster R-CNN  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Few-Shot\\_Adaptive\\_Faster\\_R-CNN\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Few-Shot_Adaptive_Faster_R-CNN_CVPR_2019_paper.html)  
AUTHORS: Tao Wang, Xiaopeng Zhang, Li Yuan, Jiashi Feng  
HIGHLIGHT: To mitigate the detection performance drop caused by domain shift, we aim to develop a novel few-shot adaptation approach that requires only a few target domain images with limited bounding box annotations.

TITLE: VRSTC: Occlusion-Free Video Person Re-Identification

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hou\\_VRSTC\\_Occlusion-Free\\_Video\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hou_VRSTC_Occlusion-Free_Video_Person_Re-Identification_CVPR_2019_paper.html)

AUTHORS: Ruibing Hou, Bingpeng Ma, Hong Chang, Xinqian Gu, Shiguang Shan, Xilin Chen

HIGHLIGHT: In this paper, we propose a novel network, called Spatio-Temporal Completion network (STCnet), to explicitly handle partial occlusion problem.

TITLE: Compact Feature Learning for Multi-Domain Image Classification

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Compact\\_Feature\\_Learning\\_for\\_Multi-Domain\\_Image\\_Classification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Compact_Feature_Learning_for_Multi-Domain_Image_Classification_CVPR_2019_paper.html)

AUTHORS: Yajing Liu, Xinmei Tian, Ya Li, Zhiwei Xiong, Feng Wu

HIGHLIGHT: Therefore, we propose an end-to-end network to obtain the more optimal features, which we call compact features.

TITLE: Adaptive Transfer Network for Cross-Domain Person Re-Identification

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Adaptive\\_Transfer\\_Network\\_for\\_Cross-Domain\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Adaptive_Transfer_Network_for_Cross-Domain_Person_Re-Identification_CVPR_2019_paper.html)

AUTHORS: Jiawei Liu, Zheng-Jun Zha, Di Chen, Richang Hong, Meng Wang

HIGHLIGHT: In this work, we propose a novel adaptive transfer network (ATNet) for effective cross-domain person re-identification.

TITLE: Large-Scale Few-Shot Learning: Knowledge Transfer With Class Hierarchy

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Large-Scale\\_Few-Shot\\_Learning\\_Knowledge\\_Transfer\\_With\\_Class\\_Hierarchy\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Large-Scale_Few-Shot_Learning_Knowledge_Transfer_With_Class_Hierarchy_CVPR_2019_paper.html)

AUTHORS: Aoxue Li, Tiange Luo, Zhiwu Lu, Tao Xiang, Liwei Wang

HIGHLIGHT: To overcome the challenge, we propose a novel large-scale FSL model by learning transferable visual features with the class hierarchy which encodes the semantic relations between source and target classes.

TITLE: Moving Object Detection Under Discontinuous Change in Illumination Using Tensor Low-Rank and Invariant Sparse Decomposition

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Shakeri\\_Moving\\_Object\\_Detection\\_Under\\_Discontinuous\\_Change\\_in\\_Illumination\\_Using\\_Tensor\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Shakeri_Moving_Object_Detection_Under_Discontinuous_Change_in_Illumination_Using_Tensor_CVPR_2019_paper.html)

AUTHORS: Moein Shakeri, Hong Zhang

HIGHLIGHT: We show that they can be detected by a k-support norm.

TITLE: Pedestrian Detection With Autoregressive Network Phases

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Brazil\\_Pedestrian\\_Detection\\_With\\_Autoregressive\\_Network\\_Phases\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Brazil_Pedestrian_Detection_With_Autoregressive_Network_Phases_CVPR_2019_paper.html)

AUTHORS: Garrick Brazil, Xiaoming Liu

HIGHLIGHT: We present an autoregressive pedestrian detection framework with cascaded phases designed to progressively improve precision.

TITLE: All You Need Is a Few Shifts: Designing Efficient Convolutional Neural Networks for Image Classification

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chen\\_All\\_You\\_Need\\_Is\\_a\\_Few\\_Shifts\\_Designing\\_Efficient\\_Convolutional\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chen_All_You_Need_Is_a_Few_Shifts_Designing_Efficient_Convolutional_CVPR_2019_paper.html)

AUTHORS: Weijie Chen, Di Xie, Yuan Zhang, Shiliang Pu

HIGHLIGHT: To put this direction forward, a new and novel basic component named Sparse Shift Layer (SSL) is introduced in this paper to construct efficient convolutional neural networks.

TITLE: Stochastic Class-Based Hard Example Mining for Deep Metric Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Suh\\_Stochastic\\_Class-Based\\_Hard\\_Example\\_Mining\\_for\\_Deep\\_Metric\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Suh_Stochastic_Class-Based_Hard_Example_Mining_for_Deep_Metric_Learning_CVPR_2019_paper.html)

AUTHORS: Yumin Suh, Bohyung Han, Wonsik Kim, Kyoung Mu Lee

HIGHLIGHT: To alleviate this limitation, we propose a stochastic hard negative mining method.

TITLE: Revisiting Local Descriptor Based Image-To-Class Measure for Few-Shot Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Revisiting\\_Local\\_Descriptor\\_Based\\_Image-To-Class\\_Measure\\_for\\_Few-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Revisiting_Local_Descriptor_Based_Image-To-Class_Measure_for_Few-Shot_Learning_CVPR_2019_paper.html)

AUTHORS: Wenbin Li, Lei Wang, Jinglin Xu, Jing Huo, Yang Gao, Jiebo Luo

HIGHLIGHT: In this paper, we argue that a measure at such a level may not be effective enough in light of the scarcity of examples in few-shot learning.

TITLE: Towards Robust Curve Text Detection With Conditional Spatial Expansion  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liu\\_Towards\\_Robust\\_Curve\\_Text\\_Detection\\_With\\_Conditional\\_Spatial\\_Expansion\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liu_Towards_Robust_Curve_Text_Detection_With_Conditional_Spatial_Expansion_CVPR_2019_paper.html)  
AUTHORS: Zichuan Liu, Guosheng Lin, Sheng Yang, Fayao Liu, Weisi Lin, Wang Ling Goh  
HIGHLIGHT: Instead of regarding the curve text detection as a polygon regression or a segmentation problem, we formulate it as a sequence prediction on the spatial domain.

TITLE: Revisiting Perspective Information for Efficient Crowd Counting  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Shi\\_Revisiting\\_Perspective\\_Information\\_for\\_Efficient\\_Crowd\\_Counting\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Shi_Revisiting_Perspective_Information_for_Efficient_Crowd_Counting_CVPR_2019_paper.html)  
AUTHORS: Miaoqing Shi, Zhaohui Yang, Chao Xu, Qijun Chen  
HIGHLIGHT: In this work, we propose a perspective-aware convolutional neural network (PACNN) for efficient crowd counting, which integrates the perspective information into density regression to provide additional knowledge of the person scale change in an image.

TITLE: Towards Universal Object Detection by Domain Attention  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Towards\\_Universal\\_Object\\_Detection\\_by\\_Domain\\_Attention\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Towards_Universal_Object_Detection_by_Domain_Attention_CVPR_2019_paper.html)  
AUTHORS: Xudong Wang, Zhaowei Cai, Dashan Gao, Nuno Vasconcelos  
HIGHLIGHT: In this paper, we develop an effective and efficient universal object detection system that is capable of working on various image domains, from human faces and traffic signs to medical CT images.

TITLE: Ensemble Deep Manifold Similarity Learning Using Hard Proxies  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Aziere\\_Ensemble\\_Deep\\_Manifold\\_Similarity\\_Learning\\_Using\\_Hard\\_Proxies\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Aziere_Ensemble_Deep_Manifold_Similarity_Learning_Using_Hard_Proxies_CVPR_2019_paper.html)  
AUTHORS: Nicolas Aziere, Sinisa Todorovic  
HIGHLIGHT: We introduce a new time- and memory-efficient method for estimating the manifold similarities by using a closed-form convergence solution of the Random Walk algorithm.

TITLE: Quantization Networks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Yang\\_Quantization\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Yang_Quantization_Networks_CVPR_2019_paper.html)  
AUTHORS: Jiwei Yang, Xu Shen, Jun Xing, Xinmei Tian, Houqiang Li, Bing Deng, Jianqiang Huang, Xian-sheng Hua  
HIGHLIGHT: In this paper, we provide a simple and uniform way for weights and activations quantization by formulating it as a differentiable non-linear function.

TITLE: RES-PCA: A Scalable Approach to Recovering Low-Rank Matrices  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Peng\\_RES-PCA\\_A\\_Scalable\\_Approach\\_to\\_Recovering\\_Low-Rank\\_Matrices\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Peng_RES-PCA_A_Scalable_Approach_to_Recovering_Low-Rank_Matrices_CVPR_2019_paper.html)  
AUTHORS: Chong Peng, Chenglizhao Chen, Zhao Kang, Jianbo Li, Qiang Cheng  
HIGHLIGHT: To combat this drawback, in this paper we propose a new type of RPCA method, RES-PCA, which is linearly efficient and scalable in both data size and dimension.

TITLE: Occlusion-Net: 2D/3D Occluded Keypoint Localization Using Graph Networks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Reddy\\_Occlusion-Net\\_2D3D\\_Occluded\\_Keypoint\\_Localization\\_Using\\_Graph\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Reddy_Occlusion-Net_2D3D_Occluded_Keypoint_Localization_Using_Graph_Networks_CVPR_2019_paper.html)  
AUTHORS: N. Dinesh Reddy, Minh Vo, Srinivasa G. Narasimhan  
HIGHLIGHT: We present Occlusion-Net, a framework to predict 2D and 3D locations of occluded keypoints for objects, in a largely self-supervised manner.

TITLE: Efficient Featureized Image Pyramid Network for Single Shot Detector  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Pang\\_Efficient\\_Featureized\\_Image\\_Pyramid\\_Network\\_for\\_Single\\_Shot\\_Detector\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Pang_Efficient_Featureized_Image_Pyramid_Network_for_Single_Shot_Detector_CVPR_2019_paper.html)  
AUTHORS: Yanwei Pang, Tiancai Wang, Rao Muhammad Anwer, Fahad Shahbaz Khan, Ling Shao  
HIGHLIGHT: In this paper, we introduce a light-weight architecture to efficiently produce featureized image pyramid in a single-stage detection framework.

TITLE: Multi-Task Multi-Sensor Fusion for 3D Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Liang\\_Multi-Task\\_Multi-Sensor\\_Fusion\\_for\\_3D\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Liang_Multi-Task_Multi-Sensor_Fusion_for_3D_Object_Detection_CVPR_2019_paper.html)  
AUTHORS: Ming Liang, Bin Yang, Yun Chen, Rui Hu, Raquel Urtasun  
HIGHLIGHT: In this paper we propose to exploit multiple related tasks for accurate multi-sensor 3D object detection.

**TITLE:** Domain-Specific Batch Normalization for Unsupervised Domain Adaptation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chang\\_Domain-Specific\\_Batch\\_Normalization\\_for\\_Unsupervised\\_Domain\\_Adaptation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chang_Domain-Specific_Batch_Normalization_for_Unsupervised_Domain_Adaptation_CVPR_2019_paper.html)  
**AUTHORS:** Woong-Gi Chang, Tackgeun You, Seonguk Seo, Suha Kwak, Bohyung Han  
**HIGHLIGHT:** We propose a novel unsupervised domain adaptation framework based on domain-specific batch normalization in deep neural networks.

**TITLE:** Grid R-CNN  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Lu\\_Grid\\_R-CNN\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Lu_Grid_R-CNN_CVPR_2019_paper.html)  
**AUTHORS:** Xin Lu, Buyu Li, Yuxin Yue, Quanquan Li, Junjie Yan  
**HIGHLIGHT:** This paper proposes a novel object detection framework named Grid R-CNN, which adopts a grid guided localization mechanism for accurate object detection.

**TITLE:** MetaCleaner: Learning to Hallucinate Clean Representations for Noisy-Labeled Visual Recognition  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_MetaCleaner\\_Learning\\_to\\_Hallucinate\\_Clean\\_Representations\\_for\\_Noisy-Labeled\\_Visual\\_Recognition\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_MetaCleaner_Learning_to_Hallucinate_Clean_Representations_for_Noisy-Labeled_Visual_Recognition_CVPR_2019_paper.html)  
**AUTHORS:** Weihe Zhang, Yali Wang, Yu Qiao  
**HIGHLIGHT:** To alleviate this problem, we propose a conceptually simple but effective MetaCleaner, which can learn to hallucinate a clean representation of an object category, according to a small noisy subset from the same category.

**TITLE:** Mapping, Localization and Path Planning for Image-Based Navigation Using Visual Features and Map  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Thoma\\_Mapping\\_Localization\\_and\\_Path\\_Planning\\_for\\_Image-Based\\_Navigation\\_Using\\_Visual\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Thoma_Mapping_Localization_and_Path_Planning_for_Image-Based_Navigation_Using_Visual_CVPR_2019_paper.html)  
**AUTHORS:** Janine Thoma, Danda Pani Paudel, Ajad Chhatkuli, Thomas Probst, Luc Van Gool  
**HIGHLIGHT:** A contribution of this paper is to formulate such a set of requirements for the two sub-tasks involved: compact map construction and accurate self localization.

**TITLE:** Triply Supervised Decoder Networks for Joint Detection and Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cao\\_Triply\\_Supervised\\_Decoder\\_Networks\\_for\\_Joint\\_Detection\\_and\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cao_Triply_Supervised_Decoder_Networks_for_Joint_Detection_and_Segmentation_CVPR_2019_paper.html)  
**AUTHORS:** Jiale Cao, Yanwei Pang, Xuelong Li  
**HIGHLIGHT:** In this paper, we propose a framework called TripleNet to deeply boost these two tasks.

**TITLE:** Leveraging the Invariant Side of Generative Zero-Shot Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Leveraging\\_the\\_Invariant\\_Side\\_of\\_Generative\\_Zero-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Leveraging_the_Invariant_Side_of_Generative_Zero-Shot_Learning_CVPR_2019_paper.html)  
**AUTHORS:** Jingjing Li, Mengmeng Jing, Ke Lu, Zhengming Ding, Lei Zhu, Zi Huang  
**HIGHLIGHT:** In this paper, we take the advantage of generative adversarial networks (GANs) and propose a novel method, named leveraging invariant side GAN (LisGAN), which can directly generate the unseen features from random noises which are conditioned by the semantic descriptions.

**TITLE:** Exploring the Bounds of the Utility of Context for Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Barnea\\_Exploring\\_the\\_Bounds\\_of\\_the\\_Utility\\_of\\_Context\\_for\\_Object\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Barnea_Exploring_the_Bounds_of_the_Utility_of_Context_for_Object_CVPR_2019_paper.html)  
**AUTHORS:** Ehud Barnea, Ohad Ben-Shahar  
**HIGHLIGHT:** In this work we seek to improve our understanding of this phenomenon, in part by pursuing an opposite approach.

**TITLE:** Deep Multimodal Clustering for Unsupervised Audiovisual Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hu\\_Deep\\_Multimodal\\_Clustering\\_for\\_Unsupervised\\_Audiovisual\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hu_Deep_Multimodal_Clustering_for_Unsupervised_Audiovisual_Learning_CVPR_2019_paper.html)  
**AUTHORS:** Di Hu, Feiping Nie, Xuelong Li  
**HIGHLIGHT:** To settle this problem, we propose to adequately excavate audio and visual components and perform elaborate correspondence learning among them.

**TITLE:** Dense Classification and Implanting for Few-Shot Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Lifchitz\\_Dense\\_Classification\\_and\\_Implanting\\_for\\_Few-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Lifchitz_Dense_Classification_and_Implanting_for_Few-Shot_Learning_CVPR_2019_paper.html)  
**AUTHORS:** Yann Lifchitz, Yannis Avrithis, Sylvaine Picard, Andrei Bursuc

**HIGHLIGHT:** We propose two simple and effective solutions: (i) dense classification over feature maps, which for the first time studies local activations in the domain of few-shot learning, and (ii) implanting, that is, attaching new neurons to a previously trained network to learn new, task-specific features.

**TITLE:** Class-Balanced Loss Based on Effective Number of Samples  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cui\\_Class-Balanced\\_Loss\\_Based\\_on\\_Effective\\_Number\\_of\\_Samples\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cui_Class-Balanced_Loss_Based_on_Effective_Number_of_Samples_CVPR_2019_paper.html)  
**AUTHORS:** Yin Cui, Menglin Jia, Tsung-Yi Lin, Yang Song, Serge Belongie  
**HIGHLIGHT:** In this work, we argue that as the number of samples increases, the additional benefit of a newly added data point will diminish.

**TITLE:** Discovering Visual Patterns in Art Collections With Spatially-Consistent Feature Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Shen\\_Discovering\\_Visual\\_Patterns\\_in\\_Art\\_Collections\\_With\\_Spatially-Consistent\\_Feature\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Shen_Discovering_Visual_Patterns_in_Art_Collections_With_Spatially-Consistent_Feature_Learning_CVPR_2019_paper.html)  
**AUTHORS:** Xi Shen, Alexei A. Efros, Mathieu Aubry  
**HIGHLIGHT:** Our goal in this paper is to discover near duplicate patterns in large collections of artworks.

**TITLE:** Min-Max Statistical Alignment for Transfer Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Herath\\_Min-Max\\_Statistical\\_Alignment\\_for\\_Transfer\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Herath_Min-Max_Statistical_Alignment_for_Transfer_Learning_CVPR_2019_paper.html)  
**AUTHORS:** Samitha Herath, Mehrtash Harandi, Basura Fernando, Richard Nock  
**HIGHLIGHT:** We question the capability of this school of thought and propose to minimize the maximum disparity between domains.

**TITLE:** Spatial-Aware Graph Relation Network for Large-Scale Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xu\\_Spatial-Aware\\_Graph\\_Relation\\_Network\\_for\\_Large-Scale\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xu_Spatial-Aware_Graph_Relation_Network_for_Large-Scale_Object_Detection_CVPR_2019_paper.html)  
**AUTHORS:** Hang Xu, Chenhan Jiang, Xiaodan Liang, Zhenguo Li  
**HIGHLIGHT:** In this work, we introduce a Spatial-aware Graph Relation Network (SGRN) to adaptive discover and incorporate key semantic and spatial relationships for reasoning over each object.

**TITLE:** Deformable ConvNets V2: More Deformable, Better Results  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhu\\_Deformable\\_ConvNets\\_V2\\_More\\_Deformable\\_Better\\_Results\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhu_Deformable_ConvNets_V2_More_Deformable_Better_Results_CVPR_2019_paper.html)  
**AUTHORS:** Xizhou Zhu, Han Hu, Stephen Lin, Jifeng Dai  
**HIGHLIGHT:** To address this problem, we present a reformulation of Deformable ConvNets that improves its ability to focus on pertinent image regions, through increased modeling power and stronger training.

**TITLE:** Interaction-And-Aggregation Network for Person Re-Identification  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hou\\_Interaction-And-Aggregation\\_Network\\_for\\_Person\\_Re-Identification\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hou_Interaction-And-Aggregation_Network_for_Person_Re-Identification_CVPR_2019_paper.html)  
**AUTHORS:** Ruibing Hou, Bingpeng Ma, Hong Chang, Xinqian Gu, Shiguang Shan, Xilin Chen  
**HIGHLIGHT:** In this paper, we propose a novel network structure, Interaction-and-Aggregation (IA), to enhance the feature representation capability of CNNs.

**TITLE:** Rare Event Detection Using Disentangled Representation Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hamaguchi\\_Rare\\_Event\\_Detection\\_Using\\_Disentangled\\_Representation\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hamaguchi_Rare_Event_Detection_Using_Disentangled_Representation_Learning_CVPR_2019_paper.html)  
**AUTHORS:** Ryuhei Hamaguchi, Ken Sakurada, Ryosuke Nakamura  
**HIGHLIGHT:** This paper presents a novel method for rare event detection from an image pair with class-imbalanced datasets.

**TITLE:** Shape Robust Text Detection With Progressive Scale Expansion Network  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Shape\\_Robust\\_Text\\_Detection\\_With\\_Progressive\\_Scale\\_Expansion\\_Network\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Shape_Robust_Text_Detection_With_Progressive_Scale_Expansion_Network_CVPR_2019_paper.html)  
**AUTHORS:** Wenhai Wang, Enze Xie, Xiang Li, Wenbo Hou, Tong Lu, Gang Yu, Shuai Shao  
**HIGHLIGHT:** To address these two challenges, in this paper, we propose a novel Progressive Scale Expansion Network (PSENet), which can precisely detect text instances with arbitrary shapes.

**TITLE:** Dual Encoding for Zero-Example Video Retrieval  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Dong\\_Dual\\_Encoding\\_for\\_Zero-Example\\_Video\\_Retrieval\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Dong_Dual_Encoding_for_Zero-Example_Video_Retrieval_CVPR_2019_paper.html)

**AUTHORS:** Jianfeng Dong, Xirong Li, Chaoxi Xu, Shouling Ji, Yuan He, Gang Yang, Xun Wang  
**HIGHLIGHT:** In contrast, this paper takes a concept-free approach, proposing a dual deep encoding network that encodes videos and queries into powerful dense representations of their own.

**TITLE:** MaxpoolNMS: Getting Rid of NMS Bottlenecks in Two-Stage Object Detectors  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cai\\_MaxpoolNMS\\_Getting\\_Rid\\_of\\_NMS\\_Bottlenecks\\_in\\_Two-Stage\\_Object\\_Detectors\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cai_MaxpoolNMS_Getting_Rid_of_NMS_Bottlenecks_in_Two-Stage_Object_Detectors_CVPR_2019_paper.html)  
**AUTHORS:** Lile Cai, Bin Zhao, Zhe Wang, Jie Lin, Chuan Sheng Foo, Mohamed Sabry Aly, Vijay Chandrasekhar  
**HIGHLIGHT:** In this paper, we introduce MaxpoolNMS, a parallelizable alternative to the NMS algorithm, which is based on max-pooling classification score maps.

**TITLE:** Character Region Awareness for Text Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Baek\\_Character\\_Region\\_Awareness\\_for\\_Text\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Baek_Character_Region_Awareness_for_Text_Detection_CVPR_2019_paper.html)  
**AUTHORS:** Youngmin Baek, Bado Lee, Dongyoon Han, Sangdoon Yun, Hwalsuk Lee  
**HIGHLIGHT:** In this paper, we propose a new scene text detection method to effectively detect text area by exploring each character and affinity between characters.

**TITLE:** Effective Aesthetics Prediction With Multi-Level Spatially Pooled Features  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hosu\\_Effective\\_Aesthetics\\_Prediction\\_With\\_Multi-Level\\_Spatially\\_Pooled\\_Features\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hosu_Effective_Aesthetics_Prediction_With_Multi-Level_Spatially_Pooled_Features_CVPR_2019_paper.html)  
**AUTHORS:** Vlad Hosu, Bastian Goldlucke, Dietmar Saupe  
**HIGHLIGHT:** We propose an effective deep learning approach to aesthetics quality assessment that relies on a new type of pre-trained features, and apply it to the AVA data set, the currently largest aesthetics database.

**TITLE:** Attentive Region Embedding Network for Zero-Shot Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Xie\\_Attentive\\_Region\\_Embedding\\_Network\\_for\\_Zero-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Xie_Attentive_Region_Embedding_Network_for_Zero-Shot_Learning_CVPR_2019_paper.html)  
**AUTHORS:** Guo-Sen Xie, Li Liu, Xiaobo Jin, Fan Zhu, Zheng Zhang, Jie Qin, Yazhou Yao, Ling Shao  
**HIGHLIGHT:** In this paper, to discover (semantic) regions, we propose the attentive region embedding network (AREN), which is tailored to advance the ZSL task.

**TITLE:** Explicit Spatial Encoding for Deep Local Descriptors  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Mukundan\\_Explicit\\_Spatial\\_Encoding\\_for\\_Deep\\_Local\\_Descriptors\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Mukundan_Explicit_Spatial_Encoding_for_Deep_Local_Descriptors_CVPR_2019_paper.html)  
**AUTHORS:** Arun Mukundan, Giorgos Tolias, Ondrej Chum  
**HIGHLIGHT:** We propose a kernelized deep local-patch descriptor based on efficient match kernels of neural network activations.

**TITLE:** Panoptic Segmentation  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kirillov\\_Panoptic\\_Segmentation\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kirillov_Panoptic_Segmentation_CVPR_2019_paper.html)  
**AUTHORS:** Alexander Kirillov, Kaiming He, Ross Girshick, Carsten Rother, Piotr Dollar  
**HIGHLIGHT:** The aim of our work is to revive the interest of the community in a more unified view of image segmentation.

**TITLE:** You Reap What You Sow: Using Videos to Generate High Precision Object Proposals for Weakly-Supervised Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Singh\\_You\\_Reap\\_What\\_You\\_Sow\\_Using\\_Videos\\_to\\_Generate\\_High\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Singh_You_Reap_What_You_Sow_Using_Videos_to_Generate_High_CVPR_2019_paper.html)  
**AUTHORS:** Krishna Kumar Singh, Yong Jae Lee  
**HIGHLIGHT:** We propose a novel way of using videos to obtain high precision object proposals for weakly-supervised object detection.

**TITLE:** Explore-Exploit Graph Traversal for Image Retrieval  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Chang\\_Explore-Exploit\\_Graph\\_Traversal\\_for\\_Image\\_Retrieval\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Chang_Explore-Exploit_Graph_Traversal_for_Image_Retrieval_CVPR_2019_paper.html)  
**AUTHORS:** Cheng Chang, Guangwei Yu, Chundi Liu, Maksims Volkovs  
**HIGHLIGHT:** We propose a novel graph-based approach for image retrieval.

**TITLE:** Dissimilarity Coefficient Based Weakly Supervised Object Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Arun\\_Dissimilarity\\_Coefficient\\_Based\\_Weakly\\_Supervised\\_Object\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Arun_Dissimilarity_Coefficient_Based_Weakly_Supervised_Object_Detection_CVPR_2019_paper.html)

AUTHORS: Aditya Arun, C.V. Jawahar, M. Pawan Kumar  
HIGHLIGHT: We consider the problem of weakly supervised object detection, where the training samples are annotated using only image-level labels that indicate the presence or absence of an object category.

TITLE: Kernel Transformer Networks for Compact Spherical Convolution  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Su\\_Kernel\\_Transformer\\_Networks\\_for\\_Compact\\_Spherical\\_Convolution\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Su_Kernel_Transformer_Networks_for_Compact_Spherical_Convolution_CVPR_2019_paper.html)

AUTHORS: Yu-Chuan Su, Kristen Grauman  
HIGHLIGHT: We present the Kernel Transformer Network (KTN) to efficiently transfer convolution kernels from perspective images to the equirectangular projection of 360deg images.

TITLE: Object Detection With Location-Aware Deformable Convolution and Backward Attention Filtering

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_Object\\_Detection\\_With\\_Location-Aware\\_Deformable\\_Convolution\\_and\\_Backward\\_Attention\\_Filtering\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_Object_Detection_With_Location-Aware_Deformable_Convolution_and_Backward_Attention_Filtering_CVPR_2019_paper.html)

AUTHORS: Chen Zhang, Joohee Kim  
HIGHLIGHT: In this paper, we propose a location-aware deformable convolution and a backward attention filtering to improve the detection performance.

TITLE: Variational Prototyping-Encoder: One-Shot Learning With Prototypical Images

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kim\\_Variational\\_Prototyping-Encoder\\_One-Shot\\_Learning\\_With\\_Prototypical\\_Images\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kim_Variational_Prototyping-Encoder_One-Shot_Learning_With_Prototypical_Images_CVPR_2019_paper.html)

AUTHORS: Junsik Kim, Tae-Hyun Oh, Seokju Lee, Fei Pan, In So Kweon  
HIGHLIGHT: We propose a new approach called variational prototyping-encoder (VPE) that learns the image translation task from real-world input images to their corresponding prototypical images as a meta-task.

TITLE: Unsupervised Domain Adaptation Using Feature-Whitening and Consensus Loss

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Roy\\_Unsupervised\\_Domain\\_Adaptation\\_Using\\_Feature-Whitening\\_and\\_Consensus\\_Loss\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Roy_Unsupervised_Domain_Adaptation_Using_Feature-Whitening_and_Consensus_Loss_CVPR_2019_paper.html)

AUTHORS: Subhankar Roy, Aliaksandr Siarohin, Enver Sangineto, Samuel Rota Buló, Nicu Sebe, Elisa Ricci  
HIGHLIGHT: In this work we introduce a novel deep learning framework which unifies different paradigms in unsupervised domain adaptation.

TITLE: Exploring Object Relation in Mean Teacher for Cross-Domain Detection

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cai\\_Exploring\\_Object\\_Relation\\_in\\_Mean\\_Teacher\\_for\\_Cross-Domain\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cai_Exploring_Object_Relation_in_Mean_Teacher_for_Cross-Domain_Detection_CVPR_2019_paper.html)

AUTHORS: Qi Cai, Yingwei Pan, Chong-Wah Ngo, Xinmei Tian, Lingyu Duan, Ting Yao  
HIGHLIGHT: In this work, we advance this Mean Teacher paradigm to be applicable for cross-domain detection.

TITLE: Hierarchical Disentanglement of Discriminative Latent Features for Zero-Shot Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Tong\\_Hierarchical\\_Disentanglement\\_of\\_Discriminative\\_Latent\\_Features\\_for\\_Zero-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Tong_Hierarchical_Disentanglement_of_Discriminative_Latent_Features_for_Zero-Shot_Learning_CVPR_2019_paper.html)

AUTHORS: Bin Tong, Chao Wang, Martin Klinkigt, Yoshiyuki Kobayashi, Yuuichi Nonaka  
HIGHLIGHT: In this paper, we discuss two questions about generalization that are seldom discussed.

TITLE: R2GAN: Cross-Modal Recipe Retrieval With Generative Adversarial Network

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhu\\_R2GAN\\_Cross-Modal\\_Recipe\\_Retrieval\\_With\\_Generative\\_Adversarial\\_Network\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhu_R2GAN_Cross-Modal_Recipe_Retrieval_With_Generative_Adversarial_Network_CVPR_2019_paper.html)

AUTHORS: Bin Zhu, Chong-Wah Ngo, Jingjing Chen, Yanbin Hao  
HIGHLIGHT: R2GAN: Cross-Modal Recipe Retrieval With Generative Adversarial Network

TITLE: Rethinking Knowledge Graph Propagation for Zero-Shot Learning

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Kampffmeyer\\_Rethinking\\_Knowledge\\_Graph\\_Propagation\\_for\\_Zero-Shot\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Kampffmeyer_Rethinking_Knowledge_Graph_Propagation_for_Zero-Shot_Learning_CVPR_2019_paper.html)

AUTHORS: Michael Kampffmeyer, Yinbo Chen, Xiaodan Liang, Hao Wang, Yujia Zhang, Eric P. Xing  
HIGHLIGHT: In order to still enjoy the benefit brought by the graph structure while preventing dilution of knowledge from distant nodes, we propose a Dense Graph Propagation (DGP) module with carefully designed direct links among distant nodes.

TITLE: Learning to Learn Image Classifiers With Visual Analogy

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhou\\_Learning\\_to\\_Learn\\_Image\\_Classifiers\\_With\\_Visual\\_Analogy\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhou_Learning_to_Learn_Image_Classifiers_With_Visual_Analogy_CVPR_2019_paper.html)

AUTHORS: Linjun Zhou, Peng Cui, Shiqiang Yang, Wenwu Zhu, Qi Tian

**HIGHLIGHT:** In this paper, we attempt to investigate a new human-like learning method by organically combining these two mechanisms.

**TITLE:** Where's Wally Now? Deep Generative and Discriminative Embeddings for Novelty Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Burlina\\_Wheres\\_Wally\\_Now\\_Deep\\_Generative\\_and\\_Discriminative\\_Embeddings\\_for\\_Novelty\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Burlina_Wheres_Wally_Now_Deep_Generative_and_Discriminative_Embeddings_for_Novelty_CVPR_2019_paper.html)

**AUTHORS:** Philippe Burlina, Neil Joshi, I-Jeng Wang

**HIGHLIGHT:** We address these challenges via the following contributions: We make a proposal for a novel framework to measure the performance of novelty detection methods using a trade-space demonstrating performance (measured by ROCAUC) as a function of problem complexity.

**TITLE:** Weakly Supervised Image Classification Through Noise Regularization  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Hu\\_Weakly\\_Supervised\\_Image\\_Classification\\_Through\\_Noise\\_Regularization\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Hu_Weakly_Supervised_Image_Classification_Through_Noise_Regularization_CVPR_2019_paper.html)

**AUTHORS:** Mengying Hu, Hu Han, Shiguang Shan, Xilin Chen

**HIGHLIGHT:** In this work, we propose an effective approach for weakly supervised image classification utilizing massive noisy labeled data with only a small set of clean labels (e.g., 5%).

**TITLE:** Data-Driven Neuron Allocation for Scale Aggregation Networks  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Li\\_Data-Driven\\_Neuron\\_Allocation\\_for\\_Scale\\_Aggregation\\_Networks\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Li_Data-Driven_Neuron_Allocation_for_Scale_Aggregation_Networks_CVPR_2019_paper.html)

**AUTHORS:** Yi Li, Zhanghui Kuang, Yimin Chen, Wayne Zhang

**HIGHLIGHT:** In this paper, we propose to learn the neuron allocation for aggregating multi-scale information in different building blocks of a deep network.

**TITLE:** Graphical Contrastive Losses for Scene Graph Parsing  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhang\\_Graphical\\_Contrastive\\_Losses\\_for\\_Scene\\_Graph\\_Parsing\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhang_Graphical_Contrastive_Losses_for_Scene_Graph_Parsing_CVPR_2019_paper.html)

**AUTHORS:** Ji Zhang, Kevin J. Shih, Ahmed Elgammal, Andrew Tao, Bryan Catanzaro

**HIGHLIGHT:** We propose a set of contrastive loss formulations that specifically target these types of errors within the scene graph parsing problem, collectively termed the Graphical Contrastive Losses.

**TITLE:** Deep Transfer Learning for Multiple Class Novelty Detection  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Perera\\_Deep\\_Transfer\\_Learning\\_for\\_Multiple\\_Class\\_Novelty\\_Detection\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Perera_Deep_Transfer_Learning_for_Multiple_Class_Novelty_Detection_CVPR_2019_paper.html)

**AUTHORS:** Pramuditha Perera, Vishal M. Patel

**HIGHLIGHT:** We propose a transfer learning-based solution for the problem of multiple class novelty detection.

**TITLE:** QATM: Quality-Aware Template Matching for Deep Learning  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Cheng\\_QATM\\_Quality-Aware\\_Template\\_Matching\\_for\\_Deep\\_Learning\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Cheng_QATM_Quality-Aware_Template_Matching_for_Deep_Learning_CVPR_2019_paper.html)

**AUTHORS:** Jiaxin Cheng, Yue Wu, Wael AbdAlmageed, Premkumar Natarajan

**HIGHLIGHT:** In this paper, we propose a novel quality-aware template matching method, which is not only used as a standalone template matching algorithm, but also a trainable layer that can be easily plugged in any deep neural network.

**TITLE:** Retrieval-Augmented Convolutional Neural Networks Against Adversarial Examples  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Zhao\\_Retrieval-Augmented\\_Convolutional\\_Neural\\_Networks\\_Against\\_Adversarial\\_Examples\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Zhao_Retrieval-Augmented_Convolutional_Neural_Networks_Against_Adversarial_Examples_CVPR_2019_paper.html)

**AUTHORS:** Jake Zhao (Junbo), Kyunghyun Cho

**HIGHLIGHT:** We propose a retrieval-augmented convolutional network (RaCNN) and propose to train it with local mixup, a novel variant of the recently proposed mixup algorithm.

**TITLE:** Learning Cross-Modal Embeddings With Adversarial Networks for Cooking Recipes and Food Images  
[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Wang\\_Learning\\_Cross-Modal\\_Embeddings\\_With\\_Adversarial\\_Networks\\_for\\_Cooking\\_Recipes\\_and\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Wang_Learning_Cross-Modal_Embeddings_With_Adversarial_Networks_for_Cooking_Recipes_and_CVPR_2019_paper.html)

**AUTHORS:** Hao Wang, Doyen Sahoo, Chenghao Liu, Ee-peng Lim, Steven C. H. Hoi

**HIGHLIGHT:** In this paper, we investigate an open research task of cross-modal retrieval between cooking recipes and food images, and propose a novel framework Adversarial Cross-Modal Embedding (ACME) to resolve the cross-modal retrieval task in food domains.

**TITLE:** FastDraw: Addressing the Long Tail of Lane Detection by Adapting a Sequential Prediction Network

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Philion\\_FastDraw\\_Addressing\\_the\\_Long\\_Tail\\_of\\_Lane\\_Detection\\_by\\_Adapting\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Philion_FastDraw_Addressing_the_Long_Tail_of_Lane_Detection_by_Adapting_CVPR_2019_paper.html)

AUTHORS: Jonah Philion

HIGHLIGHT: In this paper, we use lane detection to study modeling and training techniques that yield better performance on real world test drives.

TITLE: Weakly Supervised Video Moment Retrieval From Text Queries

[http://openaccess.thecvf.com/content\\_CVPR\\_2019/html/Mithun\\_Weakly\\_Supervised\\_Video\\_Moment\\_Retrieval\\_From\\_Text\\_Queries\\_CVPR\\_2019\\_paper.html](http://openaccess.thecvf.com/content_CVPR_2019/html/Mithun_Weakly_Supervised_Video_Moment_Retrieval_From_Text_Queries_CVPR_2019_paper.html)

AUTHORS: Niluthpol Chowdhury Mithun, Sujoy Paul, Amit K. Roy-Chowdhury

HIGHLIGHT: In order to cope with this issue, in this work, we introduce the problem of learning from weak labels for the task of text to video moment retrieval.