The 2nd Learning from Imperfect Data (LID) Workshop

Opening Remark

Welcome!

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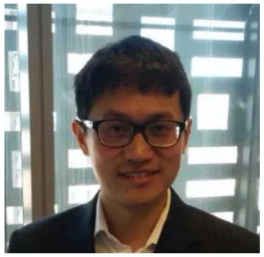

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Outline

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Sponsor

Motivation

We are often facing the problem that we are not able to acquire enough amount of perfect annotations (e.g., object bounding boxes and pixel-wise masks) for reliable training models.

A semantic segmentation system with 80+% mIOU performance on the benchmark dataset does not necessarily mean that it would not mislead the self-driving car crash into a white-flipped-over truck.

source: cityscape dataset.

source:https://www.slashgear.com/

Motivation

Ideal Machine Learning Problems	Real-world Applications
● IID (Independent and identically distributed) assumption ● Same distribution for training and test ● Distributions fixed over time	● Sample points are not drawn IID (e.g. lots of images are sampled from same video sequences) ● Training sample is biased (e.g. perception dataset rarely contains the flipped-over truck on the road) ● Training points with uncertain labels (e.g. imperfect polygon for segmentation, image-level label for object detection, mistakes in the annotations) ● Multiple training sources (e.g. combine multiple datasets together for training) ● Distribution may drift with time

Reference: Mehryar Mohri, Learning with Imperfect Data, https://cs.nyu.edu/~mohri/talks/mtv.pdf

Motivation

In the 2nd Learning from Imperfect Data challenge, we focus on Weakly supervised learning, which refers to address the challenging pattern recognition tasks by learning from weak or imperfect supervision, for example weakly supervised learning for semantic segmentation, scene parsing, or object localization.

Motivation

We organize this workshop to investigate current ways of building industry level AI system relying on learning from imperfect data.

Challenges: Weakly-supervised Semantic Segmentation (Track 1)

Dataset: ILSVRC-LID-200

Descriptions: This dataset is built upon the object detection track of ILSVRC, which totally includes 456,567 training images from 200 categories. We provide pixel-level annotations for 15K images, including 5,000 and 10,000 images for validation and testing, respectively.

Supervision in Training: Image-level labels

Target in Testing: Perform pixel-wise classification, i.e. semantic segmentation

The Key Eval Metric: mIoU

Challenges: Weakly-supervised Scene Parsing (Track 2)

Dataset: ADE20K-LID

Descriptions: This dataset is built upon the ADE20K dataset. There are 20,210 images in the training set, 2,000 images in the validation set, and 3,000 images in the testing set. We provide the additional point-based annotations on the training set.

Supervision in Training: one pixel annotation for each independent instance

Target in Testing: Perform pixel-wise classification, i.e. scene parsing

The Key Eval Metric: mIoU

Challenges: Weakly-supervised Object Localization (Track 3)

Dataset: ILSVRC

Descriptions: This dataset is built upon the ILSVRC dataset, including 1.2 million images for training. we annotate pixel-level masks of 44,271 images (validation/testing: 23,151/21,120)[1] to facilitate the evaluation to be performed in a direct way

Supervision in Training: Image-level labels

Target in Testing: Highlight the target object in the class activation map

The Key Eval Metric: Peak IoU

[1] Rethinking Localization Map: Towards Accurate Object Perception with Self-Enhancement Maps. X Zhang, etc. arXiv preprint.

Challenge Results

10 Participants

Track1: Weakly-supervised Semantic Segmentation Challenge	
1st	Guolei Sun, Wenguan Wang, Luc Van Gool. ETH Zurich
2nd	Wonho Bae*, Junhyug Noh*, Jinhwan Seo, and Gunhee Kim. Seoul National University, Vision & Learning Lab
3rd	Mariia Dobko, Ostap Viniavskyi, Oles Dobosevych. The Machine Learning Lab at Ukrainian Catholic University, SoftServe

1 Participants

Track2: Weakly-supervised Scene Parsing Challenge	
1st	Hao Zhao, Ming Lu, Anbang Yao, Yiwen Guo, Yurong Chen, Li Zhang. Tsinghua University

5 Participants

Track3: Weakly-supervised Object Localization Challenge	
1st	Wonho Bae*, Junhyug Noh*, Jinhwan Seo, and Gunhee Kim. Seoul National University, Vision & Learning Lab
2nd	Chuangchuang Tan [1*], Tao Ruan [1*], Guanghua Gu [2], Shikui Wei [1], Yao Zhao[1]. [1]Beijing Jiaotong University, [2]Yanshan University
3rd	Zhendong Wang, Zhenyuan Chen, Chen Gong. Nanjing University Of Science and Technology, LEAP Group@PCA Lab

Oral Presentations

Guolei Sun ETH Zurich
Oral 1: The 1st Place of Track-1 Mining Cross-Image Semantics for Weakly Supervised Semantic Segmentation

Mariia Dobko UCU & SoftServe Team
Oral 2: The 3rd Place of Track-1 NoPeopleAllowed: The 3 step approach to weakly supervised semantic segmentation

Hao Zhao Intel
Oral 3: The 1st Place of Track-2 Pointly supervised Scene Parsing with Uncertainty Mixture

Wonho Bae Seoul National University
Oral 4: The 1st Place of Track-3 & The 2nd Place of Track-1 Revisiting Class Activation Mapping for Learning from Imperfect Data

Chuangchuang Tan Beijing Jiaotong University & Mepro Team
Oral 5: The 2nd Place of Track-3 Dual Gradients Localization framework for Weakly Supervised Object Localization

Zhendong Wang Nanjing University Of Science and Technology & LEAP Group@PCA Lab
Oral 6: The 3rd Place of Track-3 Weakly Supervised Object Localization

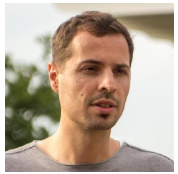
Best Paper Award

Sponsor

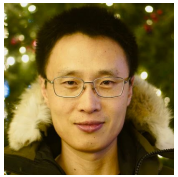
Invited Talks

Alan Yuille Professor at Johns Hopkins University
Invited talk 1: You Only Annotate Once, or Never

Iasonas Kokkinos CEO at Ariel AI Inc.
Invited talk 2: Learning 3D object models from 2D images.



Peter Kontschieder Director of Research at Mapillary
Invited talk 3: Computer Vision with Less Supervision



Boqing Gong Research Scientist at Google
Invited talk 4: Towards Domain Adaptation in the Wild: Long-Tailed Sources and Open Compound Targets

Invited Talks

Zhicheng Yan Staff Research Scientist at Facebook Research
Invited talk 5: Decoupling Representation and Classifier for Long-Tailed Recognition

Ming-Hsuan Yang Professor at University of California, Merced
Invited talk 6: Show, Match and Segment: Joint Weakly Supervised Learning of Semantic Matching and Object Co-segmentation

Chunhua Shen Professor at University of Adelaide
Invited talk 7: Single shot instance segmentation

Thank You!