ZE YANG

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EDUCATION

Peking University, Beijing, China *Sept. 2017 - Jun. 2020*
Master student (supervised by Liwei Wang) in Computer Science
School of Electronics Engineering and Computer Science

National University of Singapore, Singapore *Fall 2016*
Visiting Student in Learning and Vision Laboratory

National Tsinghua University, Taiwan *Fall 2015*
Exchange Student in Electrical Engineering and Computer Science

Xi'an Jiaotong University, China *Sept. 2013 - Jun. 2017*
The Honors Youth Program (Directly Enrolled from Middle School)
Bachelor student in Electrical Engineering and Automation

EXPERIENCE

Uber Advanced Technologies Group, Toronto, Canada *Oct. 2019 - Mar. 2020*
I started my internship in Uber ATG, Toronto since Oct 2019, supervised by Raquel Urtasun. I work on visual perception and simulation tasks.

Microsoft Research Asia, China *Dec. 2018 - Sep. 2019*
I had a wonderful internship in Microsoft Research Asia from Dec. 2018 to Sep. 2019. I am lucky to work with Han Hu, Jifeng Dai and Steve Lin. My research topics are focused on object detection, instance segmentation and pose estimation tasks.

1st Place in TianChi AI Competition for Healthcare 2017 *Fall 2017*
We won the 1st place among 2887 teams around world in TianChi AI competition for healthcare 2017 (lung cancer detection) hosted by Alibaba and Intel Corporation.

Sinovation Ventures, China *Summer 2017*
I had a three-month internship in the Sinovation Ventures. I worked on commodity recognition, which aims to recognize commodity from images or videos in complex environments effectively.

National University of Singapore, Singapore *Sept. 2016 - Dec. 2016*
I worked as a research student in the Learning and Vision Laboratory (Supervisor: Jiashi Feng, Shuicheng Yan) in NUS, my research topic is in generative models.

Institute of Artificial Intelligence and Robotics, China *Mar. 2016 - Sept. 2016*
I worked as a research student in the Institute of Artificial Intelligence and Robotics (Supervisor: Jinjun Wang, Nanning Zheng) at Xi'an Jiaotong University, I worked on low-level image super-resolution.

PUBLICATIONS

* indicates equal contribution.

- **Ze Yang** *et al.* *"Dense RepPoints: Representing Visual Objects with Dense Point Sets"*
  Under review. 2019
- Jinchen Xuan *et al.* *"On the Anomalous Generalization of GANs."*
  Under review. 2019
- **Ze Yang***, Shaohui Liu*, Han Hu, Liwei Wang, Stephen Lin. *"RepPoints: Point Set Representation for Object Detection."*
  Accepted by International Conference on Computer Vision (ICCV). 2019
- **Ze Yang**, Liwei Wang. *"Learning Relationships for Multi-view 3D Object Recognition."*
  Accepted by International Conference on Computer Vision (ICCV). 2019

- **Ze Yang**, Tiange Luo, Dong Wang, Zhiqiang Hu, Jun Gao, Liwei Wang. *"Learning to Navigate for Fine-grained Classification."*
  Accepted by European Conference on Computer Vision (ECCV). 2018
- **Ze Yang**, Kai Zhang, Yudong Liang, Jinjun Wang. *"Single Image Super-Resolution with a Parameter Economic Residual-Like Convolutional Neural Network."*
  Accepted by International Conference on Multimedia Modeling, **oral** representation. 2017

SELECTED PROJECTS

Recovering and Simulating Pedestrian LiDAR in the Wild. (on going)
Simulation is important for developing and validating self-driving systems, it plays a significant role in facilitating close-loop evaluation. We present a skinning-based algorithm for recovering human surface geometry, motion and producing realistic simulation of pedestrian LiDAR observations.

Representative Points: a New Representation for Object.
We propose a new object representation, called *Representative Points (RepPoints)* for flexible and detailed modeling of object appearance and geometry. In contrast to the coarse geometric localization and feature extraction of bounding boxes/grid points. The *RepPoints* adaptively distributes a set of points to semantically and geometrically significant positions on an object, providing informative cues for object analysis. This new representation can be exploited to model object structure over multiple levels of granularity. From coarse bounding box to finer object contour or foreground. We take a step towards learning a geometric, semantic and unified representation for object recognition pipelines, enabling explicit modeling between different visual entities.

Machine Learning for Medical Image Analysis.
We design algorithms to detect breast cancer from X-ray mammogram image and lung nodule from 3D CT scans. This is a joint project with Peking University and Beijing Cancer Hospital. Our system has been deployed in multiple hospitals around China.

Fine-grained Object Analysis.
Fine-grained classification aims at differentiating visually-similarly subordinate classes of a common superior class. This problem has great application in industry. The key-point to Fine-grained classification lies on localizing informative regions in the image. Motivated by the intrinsic consistency between informativeness of the regions in a image and their probability being ground-truth class, we propose a novel self-supervision mechanism to learn the informative regions in a image and achieve state-of-the-art performance in fine-grained classification benchmarks.

Learning Relationship in Multi-view Images.
The region-to-region and view-to-view relationships between different view images are crucial for multi-view 3D object analysis. We propose a Relation Network to effectively connect corresponding regions from different viewpoints, and design effective method to exploit the inter-relationships over a group of views for 3D object analysis.

Empirical and Theoretical Study on the Behaviors of Generative Adversarial Networks.
It is difficult to evaluate the performance of GANs since the natural images are in high dimensional space and it is intractable to model their distribution. However we can analyze the behavior of GANs by analyzing the generated geometric primitives in an image. *e.g.*, the number/shape of the primitives. Using this criterion, we show theoretically and empirically that GANs are unable to learn the target distribution in practice. We design algorithms to mitigate this anomalous generalization of GANs.

INVITED TALKS

Deformation Modeling of Objects. Peking University & Huawei Noah's Ark Lab AI Workshop, 2019
Fine-grained Classification. Peking University & Huawei Noah's Ark Lab AI Workshop, 2018

MISCELLANEOUS

- May 4th Scholarship (Highest Honor Scholarship in Peking University). 2019
- Merit Student, Peking University. 2019
- I will serve as the reviewer for CVPR 2020. 2019