

# Yikang LI

AN INCURABLE OPTIMIST · RESEARCHER IN AUTONOMOUS DRIVING · LEGO ENTHUSIAST

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“Make the change that you want to see in the world.”

## Education

### Department of Electronic Engineering, The Chinese University of Hong Kong

Hong Kong SAR

PH.D. IN COMPUTER VISION AND MACHINE LEARNING

Aug. 2016 - May. 2020

- Supervised by Prof. Xiaogang WANG and Prof. Xiaoou TANG.
- Awardee of Hong Kong PhD Fellowship Scheme(HKPFS) and Microsoft Research Asia (MSRA) PhD Fellowship.

### Department of Electronic Engineering, Tsinghua University

Beijing, China

B.S. IN ELECTRONIC ENGINEERING & ECONOMICS (2<sup>nd</sup> major)

Aug. 2011 - July. 2016

- GPA: 92/100. Ranking: 1/18 or 8/181. National Scholarship awardee and Class monitor.
- The 2nd Major equipped me with economic thinking and the fundamental knowledge about finance, business and economics.

### Telecommunications, University of New South Wales

Sydney, Australia

EXCHANGE STUDENT

July. 2013 - Nov. 2013

- National exchange scholarship awardee. Funded by State Scholarship Council(CSC).
- Supervised by Prof. Jayantha Katupitiya on the 4WD4WS Quadbike Project.

## Research & Project

### $\beta$ -DARTS: Beta-Decay Regularization for Differentiable Architecture Search

CVPR 2022 (Oral)

PENG YE, BAOPU LI, YIKANG LI, TAO CHEN, JIAYUAN FAN, WANLI OUYANG

Sep. 2021 - Feb. 2022

- A simple-but-efficient regularization method, termed as Beta-Decay, is proposed to regularize the DARTS-based NAS searching process.
- Experimental results on NAS-Bench-201 show that our proposed method can help to stabilize the searching process and makes the searched network more transferable across different datasets.

### Point-to-Voxel Knowledge Distillation for LiDAR Semantic Segmentation

CVPR 2022

YUENAN HOU, XINGE ZHU, YUEXIN MA, CHEN CHANGE LOY, YIKANG LI\*

June. 2021 - Jan. 2022

- This article addresses the problem of distilling knowledge from a large teacher model to a slim student network for LiDAR semantic segmentation.
- We propose the Point-to-Voxel Knowledge Distillation (PVD), which transfers the hidden knowledge from both point level and voxel level.
- On nuScenes and semantic KITTI, our PVD consistently outperforms previous distillation approaches by a large margin on Cylinder3D, SPVNAS and MinkowskiNet.

### PasteGAN: A Semi-Parametric Method to Generate Image from Scene Graph

NeurIPS 2019

YIKANG LI, TAO MA, YE QI BAI, NAN DUAN, SINING WEI, XIAOGANG WANG

Oct. 2018 - Apr. 2019

- We propose a semi-parametric method, denoted as PasteGAN, to generate the image from the scene graph.
- A crop selector is also proposed to pick the most-compatible crops from our external object tank by encoding the interactions around the objects in the scene graph.
- Evaluated on Visual Genome and COCO-Stuff, our proposed method significantly outperforms the SOTA methods on both Inception Score and Diversity Score with a huge margin.

### Disentangling Pose from Appearance in Monochrome Hand Images

ICCV Workshop 2019

YIKANG LI, CHIRS TWIGG, YUTING YE, LINGLING TAO, XIAOGANG WANG

May. 2018 - Oct. 2018

- A novel method that disentangles the representation of pose from a complementary appearance factor without using paired data.
- Our method successfully decomposes the hand image into the pose and its complementary appearance features of comparable quality as the method using paired data.
- Training the model with extra synthesized images with unseen hand-appearance combinations by re-mixing pose and appearance factors from different images can improve the 2D pose estimation performance.

## Perceive Where to Focus: Learning Visibility-aware Part-level Features for Re-ID

CVPR 2019

YIFAN SUN, YALI LI, QIN XU, CHI ZHANG, **YIKANG LI**, SHENGJIN WANG, JIAN SUN

April. 2018 - Nov. 2018

- We propose a Visibility-aware Part Model for partial re-ID, which learns to perceive the visibility of regions through self-supervision.
- Experimental results confirm that our method significantly improves the learned feature representation and the achieved accuracy is on par with the state of the art.

## Factorizable Net: An Efficient Framework for Scene Graph Generation

ECCV 2018

**YIKANG LI**, WANLI OUYANG, BOLEI ZHOU, JIANPING SHI, CHAO ZHANG, XIAOGANG WANG

Dec. 2017 - April. 2018

- A bottom-up clustering method is proposed to factorize the image into subgraphs. By sharing the region representations within the subgraph, our method could significantly reduce the redundant computation and accelerate the inference speed
- Experiments on Visual Relationship Detection and Visual Genome show our method outperforms the state-of-the-art method with significantly faster inference speed.

## Question-Guided Hybrid Convolution for Visual Question Answering

ECCV 2018

PENG GAO, HONGSHENG LI, SHUANG LI, PAN LU, **YIKANG LI**, STEVEN C.H. HOI, XIAOGANG WANG

July. 2017 - April. 2018

- We propose a novel Question-Guided Hybrid Convolution (QGHC) network for Visual Question Answering (VQA).
- Extensive experiments on public VQA datasets validate the effectiveness of QGHC.

## Visual Question Generation as Dual Task of Visual Question Answering

Spotlight of CVPR 2018

**YIKANG LI**, NAN DUAN, BOLEI ZHOU, XIAO CHU, WANLI OUYANG, XIAOGANG WANG, MING ZHOU

June. 2017 - Dec. 2017

- we propose an end-to-end unified framework, the Invertible Question Answering Network (iQAN), to leverage the complementary relations between questions and answers in images by jointly training the model on VQA and VQG tasks.
- Evaluated on the large scale visual question answering datasets CLEVR and VQA2, our iQAN improves the VQA accuracy over the baselines. We also show the dual learning framework of iQAN can be generalized to other VQA architectures and consistently bring improvements.

## Semantically Consistent Image Completion with Fine-grained Details

arXiv preprint 1711.09345

PENGPENG LIU, XIAOJUAN QI, PINJIA HE, **YIKANG LI**, MICHAEL R. LYU, IRWIN KING

June. 2017 - Nov. 2017

- We focus on the Image Inpainting Problem and propose an GAN-based image inpainting method.
- Evaluated on CelebA Face and Paris StreetView dataset, our proposed method significantly outperforms existing methods.

## ICRA Mobile Manipulation Challenge 2017

Final List (5/13)

DELONG ZHU, TINGGUANG LI, **YIKANG LI**, JIN PAN, HU CHENG

Mar. 2017 - May. 2017

- The challenge is one of the four robot challenges held at the top conference of Automation and Robotics, ICRA.
- The team is challenged to develop a lightweight mobile manipulator that can autonomously pick, transport and stack building blocks. The final score are measured on the bases of completion time and assembly height, while meeting the specified weight and size constraints of the robot.
- Our team CUApes won the **5th place** out of the 13 teams from all over the world.

## Scene Graph Generation from Objects, Phrases and Caption Regions

ICCV 2017

**YIKANG LI**, WANLI OUYANG, XIAOGANG WANG, BOLEI ZHOU, KUN WANG

Jan. 2017 - April. 2017

- We benchmark the learned model on three tasks, and show the joint learning across three tasks with our proposed method can bring mutual improvements over previous models.
- Experimental results shows that our proposed model successfully leverage the complementary effect of different vision tasks. Particularly, on scene graph generation task, our proposed method outperforms the state-of-art method by 3.63%~4.31%

## ViP-CNN: Visual Phrase Guided Convolutional Neural Network

CVPR 2017

**YIKANG LI**, WANLI OUYANG, XIAOGANG WANG, XIAOOU TANG

Aug. 2016 - Dec. 2016

- We formulate the visual relationship detection as three inter-connected recognition problems and propose a Visual Phrase Guided Convolutional Neural Network (ViP-CNN) to address them simultaneously.
- Our proposed model outperforms the state-of-art method in both speed and accuracy.

## Working Experience

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### Autonomous Driving Group, Shanghai AI Laboratory

Shaanghai, China

RESEARCH SCIENTIST

Apr. 2021 till now

- Principle Investigator of Autonomous Driving Research, leading 15 researchers.
- We focus on designing a simulation engines that can reflect the real-world performance of an autonomous driving system.
- We also work on the auto-labelling techniques for efficient data collection.
- Research interest covers 3D Scene Reconstruction, 3D Scene Perception, Behavior & Scene Simulation, etc.

## Autonomous Driving Group, SenseTime Group Ltd.

SENIOR R&D MANAGER

Shanghai, China

Feb. 2019 till now

- Reporting to Jianping Shi, executive director of Autonomous Driving Group.
- Leading the Level-4 Autonomous Driving Product Team (25+ members).
- Leading the projects like C-V2X autonomous minibus development, L4 license testing, the reference system development, etc.
- Leading the testing department of the Autonomous Driving and ADAS Projects.
- Research on multi-sensor platform including calibrations, time synchronization, sensor fusion algorithm research, etc.

## Natural Language Computing Group, Microsoft Research Asia (MSRA)

RESEARCH INTERN

Beijing, China

Oct. 2018 - Jan. 2019

- Supervised by Nan Duan and Ming Zhou, in the area of Language and Vision.
- We worked on generating image from scene graph in a semi-parametric manner.

## Nimble VR, Facebook Reality Labs (FRL)

RESEARCH INTERN

Sausalito CA, USA

May. 2018 - Sep. 2018

- Mentored by Chris Twigg, Yuting YE and Lingling TAO.
- We focus on generating more hand images with various pose-appearance combinations by using the factor disentanglement and image generation techniques.

## Natural Language Computing Group, Microsoft Research Asia (MSRA)

RESEARCH INTERN

Beijing, China

June. 2017 - Oct. 2017

- Supervised by Nan Duan and Ming Zhou, in the area of Language and Vision.
- We explore the possibility to apply both NLP and CV techniques to do some interesting and promising works.
- We had one paper on Visual Question Answering and Visual Question Generation accepted as Spotlight paper of CVPR-2018.

## Object Detection Group, SenseTime Group Ltd.

INTERN RESEARCHER

Beijing, China

Dec. 2015 - July. 2016

- Follow the state-of-art research in the area of Machine Learning and Computer Vision.
- Object detection in videos: optimizing Faster R-CNN for videos by introducing optical flow to utilize the temporal information.

## Visual Computing Group, Microsoft Research Asia (MSRA)

RESEARCH INTERN

Beijing, China

Jul. 2014 - May. 2015

- Supervised by Lead Researcher, Lu Yuan, in the area of Computational Photography on following two projects.
- **HDR automatic detection:** to help mobile phones detect whether the current scene is the HDR-scene using light-weight classifier. Evaluated on our collected data: 91.1% accuracy.
- **Burst HDR with Intelligent Capture:** we proposed a novel pipeline to recover the HDR image using burst-captured images with predicted exposure settings. 86% images are predicted with less than 0.5eV error, and 99% images with less than 1eV error

## Selected Activities

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2017 - now	<b>Conference PC Member</b> , ICML, ICLR, CVPR, AACL, NeurIPS, ICML, ICCV, ECCV, IJCAI, etc.	World-wide
2018 - now	<b>Journal Reviewer</b> , TPAMI, IJCV, TIP, R-AL, etc.	World-wide
2021 - now	<b>Committee Member</b> , Shanghai Intelligent & Connected Vehicle Standardization Committee	Shanghai, China
2021	<b>Editorial Board Member</b> , White Paper for Technique Innovations in Autonomous Industry (2021)	Shanghai, China
2021	<b>Group Standard Editor</b> , General Technique Requirements for Autonomous Minibus	Shaanxi, China
2020	<b>Review Panelist</b> , Shanghai's Intelligent & Connected Vehicle Specialist Committee	Shanghai, China
2019	<b>Review Panelist</b> , Wuhan's Intelligent & Connected Vehicle Specialist Committee	Wuhan, China
2018	<b>Student Volunteer</b> , CVPR 2018	Salt Lake City, USA
2016-2018	<b>Associate Vice President</b> , CUHK Chinese Students and Scholars Association (CSSA)	Hong Kong SAR
2016-2018	<b>Vice President</b> , CUHK Postgraduate Hall Residents' Association (PGHRA)	Hong Kong SAR
2016	<b>Student Volunteer</b> , Siggraph Asia 2016	Macau SAR
2013-2014	<b>Activity Department Minister</b> , Business Association of Tsinghua Entrepreneurial Students	Beijing, China
2012-2016	<b>Senior volunteer</b> , Disabled Federation of Haidian District	Beijing, China

## Honors & Awards

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2021	<b>Outstanding Group for L4 RoboBus Product Team</b> , Sensetime Group	<i>Shanghai, China</i>
2020	<b>Outstanding Employee</b> , Sensetime Group	<i>Shanghai, China</i>
2019	<b>Overseas High-Caliber Personnel</b> , C-class	<i>Shenzhen, China</i>
2019	<b>CVPR 2019 Doctoral Consortium</b> , 40 Ph.D. Candidates world-wide	<i>Long Beach, USA</i>
2018	<b>Microsoft Research Asia PhD Fellowship</b> , 11 awardees in Asia-Pacific Area.	<i>Beijing, China</i>
2018	<b>Outstanding Student Award (Team Award)</b> , The Chinese University of Hong Kong	<i>Hong Kong, China</i>
2017	<b>Award of Excellence</b> , Stars of Tomorrow Internship Program at Microsoft Research Asia	<i>Beijing, China</i>
2016	<b>Hong Kong PhD Fellowship</b> , about 230 awardees per year in Hong Kong	<i>Hong Kong, China</i>
2016	<b>Outstanding Final-Year Project</b> , Top 10% student in EE Department	<i>Beijing, China</i>
2013/14/15	<b>ST Engineering Scholarship</b> , Top 5% student in EE Department	<i>Singapore</i>
2014	<b>National Scholarship</b> , Top 1% student in EE Department	<i>Beijing, China</i>
2013	<b>Integrated Excellence Scholarship</b> , Excellence in study and extracurricular activities	<i>Beijing, China</i>
2013	<b>Exchange Student Scholarship</b> , National Excellent Undergraduate Exchange Scheme	<i>Sydney, Australia</i>
2012	<b>Special Award</b> , Tsinghua Universty 7th Automobile Design Competition	<i>Beijing, China</i>