

Yu Zhang (张宇)

GENERAL INFORMATION

Date of birth: April 26, 1990

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SHORT BIO

Currently I am a Staff Researcher with SenseTime Research, where I work on computer vision and machine learning.

At SenseTime I lead research projects and deliver products for [SensePhoto](#). I've developed TetrasSR, a market-leading snapshot photography technology shipped to various flagship phones of OEMs in mainland China. I did my Ph.D. at Beihang University, under the joint supervision from [Prof. Qingping Zhao](#) and [Prof. Jia Li](#). I did post-doc with Tsinghua university from 2019 to 2021, supervised by [Prof. Yebin Liu](#). I also hold an affiliate appointment with the [CVTEAM, Beihang University](#).

My interest lies in computer vision, event-based vision, machine learning, and optimization. Much of my research is about image and video processing with learning and optimization methods.

EDUCATION

Tsinghua University, Beijing, China

Postdoctoral researcher, March 2019 - March 2021 (supervisor: Prof. Yebin Liu)

Beihang University, Beijing, China

Ph.D., Computer Science (Outstanding Dissertation of the Year), Fall 2012 - June 2018

B.Eng., Computer Science and Engineering (Rank 3/200), Fall 2008 - July 2012

WORKING EXPERIENCE

SenseTime Research, (July 2018 ~ present)

Senior Researcher I (L7), 2018 ~ 2020

Senior Researcher II (L8), 2020 ~ 2022

Staff Researcher (L9), 2022 ~ Now

PROJECTS

TetrasSR

SenseTime Research

- Market-leading camera default mode snapshot feature (*a.k.a.* the snapshot feature on the first screen if one opens the camera of a mobile phone). Shipped to 100+ phones made by Xiaomi, VIVO, Honor and Transsion, including their flagship models (e.g. Mi 11 Ultra, Magic 3).
- Developed a robust and efficient burst frame stacking system, which is featured by:
 - 1) Fast and motion-robust frame alignment and pixel interpolation at sub-pixel grid;
 - 2) Realistic noise modeling and noise level estimation that accommodate the joint effect of sensor characteristics and commercial ISP;
 - 3) AI-based denoising module capable of effectively handling the spatially-varying noise with extremely lightweight architecture;
 - 4) Learning-based sharpening algorithm that adapts to sensor optical characteristics;
 - 5) Other necessary features: chroma denoising, face detail enhancement, tone enhancement, etc.
- Optimized with GPU and DSP, the system runs within 500ms on consumer phones to produce a 12MP snapshot. The algorithm is scored 139 points by DXO 2022 equipped with Sony IMX586 (1 point behind the winner, Huawei P50 Pro, which is powered by IMX800).

Hybrid RGB + Event-based Imaging

SenseTime Research

- Aimed at crafting the next-generation photography technology with hybrid RGB + event-based vision sensor, an advanced new type of sensor not yet available on the market. Collaborated with the sensor manufacturer, Sony Semiconductor Solutions, on this research.
- Proposed learning-based image deblurring method by realistically simulating the hybrid RGB+EVS behavior. Demonstrated practical IQ improvements in both good and bad lighting conditions.
- Proposed a novel efficient motion deblurring solution featured by uncertainty-aware RGB+EVS fusion and fast, learned iterative optimization. Achieved good image quality while maintaining extreme low cost that makes the algorithm practical to deploy on a companion chip.
- Still in the marketing phase, the proposed new techniques are under the co-working with SSS on making attractive demos and promoting around to OEM customers.

Academic Research

SenseTime Research & CVTEAM, Beihang

- Working on interesting academic research topics by myself, interns and graduated students that I supervise. Till far 20 papers published on top-tier journals and conferences, where I am the first or corresponding author for 12 of them, with 50% as oral papers. I've won Best Paper Awards of CGI at 2018 and IEEE BigMM at 2015 jointly with my co-authors. Recent topics include:
- Event-based vision and low-level vision, on which I study related topics at Sensetime with special interest on solving them through principled learning and optimization methods.
- High-level vision problems co-worked with CVTEAM, with particular interest in weakly supervised learning and semantic object segmentation.
- My Ph.D. research is mostly about object segmentation in images and videos, which were solved by weakly supervised and optimization-based methods.

SELECTED PUBLICATIONS

*Corresponding author † Interns

Zhiyang Yu[†], **Yu Zhang**^{*}, Xujie Xiang, Dongqing Zou, Xijun Chen, Jimmy Ren. Deep Bayesian Video Frame Interpolation. ECCV, 2022

Zhiyang Yu[†], **Yu Zhang**^{*}, Deyuan Liu, Dongqing Zou, Xijun Chen, Yebin Liu, Jimmy Ren. Training Weakly Supervised Video Frame Interpolation with Events. ICCV, 2021

Daxin Gu[†], Jia Li, **Yu Zhang**^{*}, Yonghong Tian. How to Learn a Domain-Adaptive Event Camera Simulator? ACM MM, 2021 (**Accepted as oral**).

Luwei Hou[†], **Yu Zhang**^{*} (equal contribution), Kui Fu, Jia Li. Informative and Consistent Correspondence Mining for Cross-Domain Weakly Supervised Object Detection. IEEE CVPR, 2021 (**Accepted as oral**).

Song Zhang[†], **Yu Zhang**^{*} (equal contribution), Zhe Jiang, Dongqing Zou, Jimmy Ren, Bin Zhou. Learning to See in the Dark with Events. ECCV, 2020.

Zhe Jiang[†], **Yu Zhang**^{*} (equal contribution), Dongqing Zou, Jimmy Ren, Jiancheng Lv, Yebin Liu. Learning Event-Based Motion Deblurring. IEEE CVPR, 2020.

Yifan Zhao[†], Jia Li^{*}, **Yu Zhang**^{*}, Yonghong Tian. Multi-class Part Parsing with Joint Boundary-Semantic Awareness. IEEE ICCV, 2019. (**Accepted as oral**)

Yu Zhang, Dongqing Zou, Jimmy Ren, Zhe Jiang, Xiaohao Chen. Structure-Preserving Stereoscopic View Synthesis with Multi-Scale Adversarial Correlation Matching. IEEE CVPR, 2019.

Yu Zhang, Xiaowu Chen, Jia Li, Wei Teng, Haokun Song. Exploring Weakly Labeled Images for Video Object Segmentation with Submodular Proposal Selection. IEEE TIP, 2018.

Yu Zhang, Xiaowu Chen, Jia Li, Chen Wang, Changqun Xia. Semantic Object Segmentation in Tagged Videos via Detection. IEEE TPAMI, 2017.

Wei Teng[†], **Yu Zhang** (equal contribution), Xiaowu Chen, Jia Li, Zhiqiang He. Local Shape Transfer for Image Co-segmentation. BMVC, 2016. **(Accepted as oral)**

Yu Zhang, Xiaowu Chen, Jia Li, Chen Wang, Changqun Xia. Semantic Object Segmentation via Detection in Weakly Labeled Video. IEEE CVPR, 2015. **(Accepted as oral)**

CO-AUTHORED
PAPERS

Yifan Zhao, Jia Li, **Yu Zhang**, Yonghong Tian. From Pose to Part: Weakly-Supervised Pose Evolution for Human Part Segmentation. IEEE TPAMI, 2022

Kui Fu, Jia Li, **Yu Zhang**, Hongze Shen, Yonghong Tian. Model-guided Multi-path Knowledge Aggregation for Aerial Saliency Prediction. IEEE TIP, 2020.

Shiming Ge, Shengwei Zhao, Chenyu Li, **Yu Zhang**, Jia Li. Efficient Low-Resolution Face Recognition via Bridge Distillation. IEEE TIP, 2020.

Yifan Zhao, Jia Li*, **Yu Zhang**, Yafei Song, Yonghong Tian. Ordinal Multi-task Part Segmentation with Recurrent Prior Generation. IEEE TPAMI, 2020.

Jinming Su, Jia Li, **Yu Zhang**, Changqun Xia, Yonghong Tian. Selectivity or Invariance: Boundary-aware Salient Object Detection. ICCV, 2019.

Jia Li*, Kaiwen Yu, Yifan Zhao, **Yu Zhang**, Long Xu. Cross-Reference Stitching Quality Assessment for 360° Omnidirectional Image. ACM MM, 2019. **(Accepted as oral)**

Feixiang Lu*, Bin Zhou, Feng Lu, **Yu Zhang**, Xiaowu Chen, Qinqing Zhao. Reconstructing Non-rigid Object with Large Movement using a Single Depth Camera. CAGD, 2018.

Feixiang Lu, Bin Zhou, **Yu Zhang**, Qinqing Zhao. Real-time 3D Scene Reconstruction with Dynamically Moving Object using a Single Depth Camera. TVC, 2018. Also appeared in Computational Graphics International, 2018 **(Best Paper Award)**

Changqun Xia, Jia Li, Xiaowu Chen, Anlin Zheng, **Yu Zhang**. What is and What is not a Salient Object? Learning Salient Object Detector by Ensembling Linear Exemplar Regressors. IEEE CVPR, 2017. **(Accepted as Spotlight)**

Yafei Song, Xiaowu Chen, Xiaogang Wang, **Yu Zhang**, Jia Li. 6-DOF Image Localization from Massive Geo-tagged Reference Images. IEEE TMM, 2016.

Yafei Song, Xiaowu Chen, Xiaogang Wang, **Yu Zhang**, Jia Li. Fast Estimation of Relative Poses for 6-DOF Image Localization. IEEE BigMM, 2015. **(Best Paper Award)**

Qing Li, Xiaowu Chen, Yafei Song, **Yu Zhang**. Geodesic Propagation for Semantic Labeling. IEEE TIP, 2014.

ISSUED
PATENTS

Xiaowu Chen, **Yu Zhang**, Jia Li, Qinqing Zhao, Chen Wang, Changqun Xia. Method for Object Segmentation in Videos Tagged with Semantic Labels. US Patent, US 9740956 B2, 2017.08.22

Xiaowu Chen, **Yu Zhang**, Jia Li, Wei Teng, Haokun Song, Qinpeng Zhao. Image Guided Video Semantic Segmentation Method and Apparatus. US Patent, 10354392, 2019.07.16

SERVICES AND
REWARDS

Academic services and awards

- Technical PC or Reviewer: TPAMI, TIP, TMM, CVPR, ICCV, ECCV, ACCV, ISMAR
- Best Paper Award: Computational Graphics International 2018
- Best Paper Award: IEEE International Conference on Multimedia Big Data 2015

Awards at SenseTime

- The Dean Innovation Award, 2022
- Excellent Employee of the Year, 2022
- Excellent Team of the Year, 2022
- Star Employee of the Year, 2020
- Excellent Employee of the Year, 2019

Awards before graduate

- The Outstanding Doctorial Dissertation Awards, Beihang University, 2019
- The Academic Excellence Foundation of BUAA for PhD Students, Beihang University, 2017
- The National Graduate Scholarship, 2015
- The Graduate Innovation Award, School of Computer Science, Beihang University, 2014
- The Changzhao Qian & Xingyuan Shen Scholarship (1st Prize), Beihang University, 2011
- The Excellent Student Award, Beihang University, 2010 - 2011
- The Undergraduate Mathematical Contest (1st Prize, Rank 1st), Beihang University, 2009
- The National Undergraduate Mathematical Contest (Second Prize in Beijing Region), 2009