Yu Zhang（张 宇）

General Information

Date of birth: April 26, 1990
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Short Bio

Currently I work as a senior research scientist at SenseTime Research. I earned my Ph.D. degree from VRLab, Beihang University, under the supervision from Prof. Qinping Zhao and Prof. Jia Li. I did my postdoc advisded by Prof. Xiaogang Wang and Prof. Yebin Liu. I graduated with B.Eng degree from Beihang University at 2012. My research experience spans across computational photography, event-based vision, and image/video segmentation. At SenseTime I delivered DeepSR3.0, the commercial mobile superresolution algorithm that is shipped to world-level smartphone OEMs.

Education

Beihang University, Beijing, China

Ph.D., Computer Science, Fall 2012 - June 2018 (Outstanding Doctorial Dissertation)

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

Working Experience

SenseTime Research, (2018.07 $\sim$ Present)

Senior Researcher, AI Imaging Group

Project: Mobile Image Superresolution/Denoising, Event-based Imaging, Stereoscopic Image and Video Generation

Baidu Research, (2018.03 $\sim$ 2018.06)

Research Intern, Robotics and Autonomous Driving Lab (Mentor: Ruigang Yang)

Project: Semantic Segmentation of Highway Driving Scenes

Technical Skills

Familar with Python/C++/Matlab/PyTorch, partial experience in CUDA

Projects

Commercial Burst Image Superresolution (DeepSR3.0) SenseTime Research

- Aimed at developing robust and efficient algorithms suited for mobile device to denoise the captured image as well as enhance the resolution under unconstrained, practical conditions.
- Provided a fast algorithm that aligns and merges multiple images at subpixel level with a speed of 20ms/12MPix on modern handheld phones.
- Proposed a physical noise prior to accurately model noise after Camera ISP for better differentiation between image detail/noise.
- Provided lightweight yet effective denoising architectures as well as fast postprocessing algorithms for adaptive, edge-preserving enhancement.
- The whole pipeline, dilivered as the 3^{rd} Gen of SenseTime Mobile Superresolution product, runs within 500ms on consumer-level handheld phones. It is the basis of the superresolution feature of MI 11 (Xiaomi) smartphone, and now being shipped to VIVO and Honor.

Event-Based Imaging SenseTime Research

- Exploring high-quality learning-based computational imaging with event cameras.
- Proposed a deep learning approach for event-guided motion deblurring. Designed an event-driven boundary prior to improve image reconstruction quality. SotA performance achieved and demonstrated the generalizibility to enhancing real-world captures.
- Proposed an unsupervised domain adaptation approach for low-light imaging with event camera.
- Proposed a binocular view system that enables motion deblurring from low frame-rate RGB camera with the guidance of a side mounted high frame-rate event camera. Devised learning-based pipeline with robust motion and boundary-induced cross-modality matching. Currently working with Xiaomi and Sony to ship this technique to product.

Stereoscopic Image/Video Generation SenseTime Research

- Aimed at converting a single-view image/video to stereoscopic-view counterpart for video editing applications.
- Provided a real-time architecture for temporally stable stereo-effect generation for 720p video.
- Proposed an adversarial structure-aware prior to prevent structure degeneration and preserve plausible details in the generated novel views.
- Shipped as part of the video editing tools of SenseTime's AI teaching platform.

Video Object Segmentation Beihang University

- Aimed at addressing semantic object segmentation from video using weak form of supervision, *e.g.* web images tagged with semantic labels.
- Proposed a unified approach that combines video object detection, tracking and segmentation, using only the information from off-the-shelf object detectors. Proved its connection with the high-order network flow problem, and devised efficient dedicated algorithms. Showcase the accuracy of the proposed approach on several datasets and demonstrate state-of-the-art results.
- Proposed a video object segmentation approach via robust exemplar matching with large amounts of noisy web images. Devised a submodular formulation for efficient object co-localization on various video frames. Showcase the accuracy of the proposed approach on a variety of datasets and demonstrate its superiority over other weakly supervised approaches.

Selected Publications

*Corresponding author †Equal contribution

Luwei Hou†, **Yu Zhang***†, 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***†, Zhe Jiang, Dongqing Zou, Jimmy Ren, Bin Zhou*. Learning to See in the Dark with Events. ECCV, 2020.

Zhe Jiang†, **Yu Zhang***†, 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**†, 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)

Yu Zhang, Xiaowu Chen, Liang Lin, Changqun Xia, High-Level Representation Sketch for Video Event Retrieval. SCIENCE CHINA Information Sciences, 2016.

Co-authored Papers

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. (Oral)

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

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

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, Qinping 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, Qinping Zhao. Image Guided Video Semantic Segmentation Method and Apparatus. US Patent, 10354392, 2019.07.16

SERVICES/REWARDS

- Reviewer: TPAMI, TIP, TMM, CVPR, ICCV, ECCV, ACCV, ISMAR
- The Outstanding Doctorial Dissertation Awards, Beihang University, 2019
- The Best Paper Award of Computational Graphics International, 2018
- The Academic Excellence Foundation of BUAA for PhD Students, Beihang University, 2017
- The Best Paper Award of IEEE International Conference on Multimedia Big Data, 2015
- 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