Lei Sun

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EDUCATION

Visiting Ph.D. student at Computer Vision Lab, ETH Zurich
September 2021 to present, Supervisor: Luc Van Gool

Ph.D. student, Zhejiang University
September 2018 to present, Supervisor: Kaiwei Wang

B.S. in Optical Engineering, Beijing Institution of Technology
September 2014 to June 2018

COMPUTER SKILLS & LANGUAGES

- Languages: C/C++, Python, Matlab
- Framework: Deep learning (Pytorch), Computer Vision (OpenCV, PIL, PointCloudLibrary)
- Others: ROS, Git, SolidWorks, Zemax, Unity3D

RESEARCH INTERESTS

My research is in real-time computer vision for intelligent vehicles and wearable systems to support real-world navigation of visually impaired people; environment perception in adverse conditions; event-based vision; video semantic segmentation.

RESEARCH EXPERIENCE

Robust nighttime sematic segmentation (2018-2019)

- Proposed a main frame to improve the sematic segmentation accuracy with nighttime images.
- The proposed method outperforms SOTA nighttime sematic segmentation methods.

Real-time RGB-D fusion semantic segmentation incorporating unexpected obstacle detection for road-driving images (2019-2020)

- The proposed RFNet outperforms all other real-time SOTA RGB-D fusion methods on *Cityscapes*.
- Designed a multi-dataset training strategy for incompatible datasets.

- Designed an RGB-D fusion module to extract complementary information from depth maps.

Event-based Image Deblurring (2021-2022, ECCV'2022 Oral)

- Proposed a SOTA event-based image deblurring model, surpassing previous best by 2.47dB.
- Proposed a novel event representation for image deblurring.
- Introduce a blurry-sharp paired image dataset from event camera.

Video Semantic Segmentation (VSS) (2022)

- Designed a SOTA VSS model.
- Proposed global feature compacting method to compact the redundant features in VSS.

Event-based Neural Radiance Field (2022-present)

- Use event camera to improve Nerf (Neural radiance field).

Event-based blurry frame interpolation (2022-present)

- Deblur and frame interpolation with events.

HONORS / AWARDS
- First grade scholarship (TOP 5%), 2017
- First Prize in the "Challenge Cup" University Graduates Innovation and Entrepreneurship competition of Zhejiang province, 2020
- Graduate of Merit (TOP 10%), 2019, 2020
- Xiaomi Special Scholarship (TOP 2%), 2020

SELECTED PUBLICATIONS

1. Lei Sun, Christos Sakaridis, Jingyun Liang, Qi Jiang, Kailun Yang, Peng Sun, Yaozu Ye, Kaiwei Wang, and Luc Van Gool. Event-Based Fusion for Motion Deblurring with Cross-modal Attention. *ECCV 2022. Oral presentation* (rate:2.7%).
2. L. Sun, K. Yang, X. Hu, W. Hu and K. Wang, "Real-time Fusion Network for RGB-D Semantic Segmentation Incorporating Unexpected Obstacle Detection for Road-driving Images." *IEEE Robotics and Automation Letters, and IROS 2020.*
3. *L. Sun, K. Wang, K. Yang, and K. Xiang, "See clearer at night: towards robust nighttime semantic segmentation through day-night image conversion." Artificial Intelligence and Machine Learning in Defense Applications, vol. 11169. International Society for Optics and Photonics, 2019, p. 111690A.*
4. L. Sun, J. Wang, K. Yang, K. Wu, X. Zhou, K. Wang, and J. Bai, "Aerial-pass: panoramic annular scene segmentation in drone videos," *in 2021 European Conference on Mobile Robots (ECMR)*