WEICHEN FAN

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EDUCATION

National University of Singapore, Singapore *Aug 2020 - Aug 2022*
Master of Electrical and Computer Engineering CAP:3.75/5.0

University of Electronic Science and Technology of China, China *Sep 2017 - June 2021*
Bachelor of Integrated Circuit Design and Integrated System GPA:3.65/4.0

University of Electronic Science and Technology of China, China *Dec 2017 - June 2020*
Minor in Robotics Engineering GPA:3.82/4.0

WORK EXPERIENCE

Sensetime
Computer Vision Researcher *July 2022 - Present*
- Conducting research on multimodal large language models(MLLMs).
- Conducting research on AI for Assembly Sequence Planning(ASP).
- Created a generic Sim2Real data engine that can be used for autonomous driving, gaming, and healthcare.
- Participating in research of SLAM especially in VO and 3D reconstruction.
- Collaborating with labs: MMLab@CUHK, S-Lab@NTU, etc.

Research Intern *May 2021 - July 2022*
- Participating in research of Transfer Learning algorithm especially in Domain Adaptation and Domain Generalization.
- Conducting research on out-of-distribution(OOD) detection.

Taobao, Alibaba
Research Intern *Dec 2019 - July 2020*
- Conducting research on 3D face reconstruction, proposed **Pixel-Face**, a large-scale benchmark for 3D face reconstruction.
- Participating in research and development of 3D vision algorithm for structured light AI chip.

DJI Innovation
Computer Vision Engineer Intern *June 2019 - Aug 2019*
- Co-developed **Robot-OS**, an open-source software stack for robot development based on ROS.

RESEARCH EXPERIENCE

Lab Ren, National University of Singapore
Research Assistant *Aug 2020 - Aug 2022*
- Conducting research on visual based autonomous control for surgical robots. Paper published at **IEEE T-ASE**.
- Co-developed a minimally invasive surgical robot for gastrointestinal endoscopy.

Machine Sensing and Intelligent Systems Research Center, UESTC
Research Assistant *Jan 2018 - Nov 2019*
- Conducting research on human posture estimation for the diagnosis of human scoliosis.

PUBLICATIONS

[1]. H. Gao*, **Fan, W.***, L. Qiu, X. Yang, Z. Li, X. Zuo, Y. Li, H. Ren, "SAVAnet: Surgical action-driven visual attention network for autonomous endoscope control", IEEE Transactions on Automation Science & Engineering (**T-ASE**), 2022.

[2]. **Fan,. W.**, H. Gao, Z. Qin, J. Liu, R. Zhao, H. Ren, H. Li. (2023). G2L-6D: Global-to-Local Self-supervised Framework for Monocular 6D Pose Estimation in Industry. Proceedings of the **ICCV** 2023.

[3]. **Fan,. W.**, Chen, J., J. Liu, R. Zhao, Hou, J, S. Yi, Z. Liu. (2023). Hierarchy Flow For High-Fidelity Image-to-Image Translation. Proceedings of the **ICCV** 2023.

[4]. **Fan, W.**, Chen, J., Ma, J., Hou, J., & Yi, S. (2022). StyleFlow For Content-Fixed Image to Image Translation. arXiv preprint arXiv:2207.01909.

[5]. **Fan, W.**, Yang, Y., Qiu, K., Wang, S., & Guo, Y. (2022). InvNorm: Domain Generalization for Object Detection in Gastrointestinal Endoscopy. arXiv preprint arXiv:2205.02842.

PROJECTS

- 2022:

[Sensetime] Industrial 6D Pose Estimation:

Our proposed self-supervised framework for 6D pose estimation addresses industrial scenes with limited data and heavy occlusions. By leveraging self-supervision and image-to-image translation techniques, our framework enables more accurate and efficient pose estimation, providing a valuable tool for a wide range of industrial applications.

- 2021:

[Sensetime] Sim2Real Data Engine:

We have developed a novel pipeline for robust data augmentation through unsupervised generation of previously unseen domain data. Our approach has demonstrated significant potential for reducing the cost associated with data collection, with a potential cost reduction of up to 99% in certain applications. Additionally, our method has been patented as an invention, reflecting its innovative and original contributions to the field.

[Lab Ren, National University of Singapore] Task-driven Attention for Autonomous Object-centered Endoscope:

Our project, which focused on the development of a robust pipeline for medical robot control, has been published in IEEE T-ASE. We have proposed a novel model for controlling medical robots, leveraging the power of visual attention through task-based saliency detection. With our proposed model, the robot is capable of autonomously performing complex tasks without requiring human interaction, reflecting a significant advancement in the field of medical robotics.

- 2020:

[Taobao, Alibaba] 3D face Reconstruction:

Our project, supported by Alibaba and the Chinese Academy of Sciences, aims to build Asia's largest 3D face database Pixel-Face. We have developed a novel 3D face reconstruction method, implemented in a mobile app, with potential applications in security, healthcare, and entertainment.

- 2019:

[Ubisoft Hacker Marathon] Rapid 3D Urban Reconstruction Based on Binocular Vision

Our project, backed by Ubisoft Entertainment, aims to rapidly reconstruct cities using low-cost binocular cameras and IMUs. We propose a pipeline to transfer real scenes to simulated environments (Unity3D) via dense point clouds and CycleGAN, with potential applications in game development and urban planning.

[Robocon Robotics Competition] Tracking High-Speed Soccer Ball in real time
Our project, supported by the Machine Sensing and Intelligent Systems Research Center at UESTC, aims to develop a commercial module for soccer robots. The module employs an improved FCN combined with ConvLSTM to recognize the ball and predict its motion trajectory.

[Robocon Robotics Competition] High-Precision Positioning Module
Our project, supported by the Machine Sensing and Intelligent Systems Research Center at UESTC, focuses on developing a multi-robot rescue system. We employ LoRa technology for communication and localization, and propose a new approach to optimize energy consumption through reinforcement learning.

AWARD

- **Silver Award in EMEDIC GLOBAL 2021** — 2021
- **Best presentation in EMEDIC GLOBAL 2021** — 2021

- **Robomaster Robotics Competition** - First Prize (10/173 worldwide) — 2020
- **Robocon Robotics Competition** - First Prize — 2020
- **Robomaster Robotics Competition** - First Prize (3/173 worldwide) — 2019