

WEICHEN FAN

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EDUCATION

- National University of Singapore, Singapore** Aug 2021 - Aug 2022
Master of Electrical and Computer Engineering CAP:3.75/5.0 (Top 10%)
- 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 (Top 20%)
- University of Electronic Science and Technology of China, China** Dec 2017 - June 2021
Minor in Robotics Engineering GPA:3.82/4.0 (Top 10%)

WORK EXPERIENCE

- Sensetime -[Full time]** Aug 2022 - present
Computer Vision Researcher
- Participating in research of **SLAM** especially in **VO** and **3D reconstruction**.
- Sensetime -[Internship]** May 2021 - Aug 2022
Research Intern
- Participating in research and development of **Transfer Learning** algorithm especially in **Domain adaptation and Domain Generalization**.
- Lab Ren, National University of Singapore -[Part time]** Aug 2020 - Aug 2022
Research Assistant
- Participating in research and development of **Medical Robotics**. Supervised by Prof. Ren, Hongliang.
- Chinese Academy of Sciences & Taobao, Alibaba -[Internship]** Dec 2019 - July 2020
Research Assistant
- Participating in research and development of **face reconstruction**, I mainly worked on the construction of face 3D Morphable Model.
- Participating in research and development of **structured light AI chip**, I mainly worked on developing vision algorithm.
- Machine Sensing and Intelligent Systems Research Center, UESTC -[Part time]** Jan 2018 - Nov 2019
Research Assistant
- Participating in research and development of **construction site security monitoring**. I mainly worked on the face recognition.
- Participating in research and development of **primary screening of body scoliosis**. I mainly worked on the human body pose recognition.

PROJECTS

- 2021:

[Sensetime] **Transfer Learning(Domain Adaptation & Domain Generalization):**

During my work in Sensetime, I mainly concentrate on the **Unseen Domain Generation**. I proposed a new pipeline for strong data augmentation by generating unseen domain data without supervision. In specific business applications, our approach can reduce the cost of data collection by 99%. Our method has been patented as an invention.

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

This Research is in progress for **ICRA**. We mainly developed a pipeline for medical robotics control. We proposed a novel model to control the medical robots with visual attention(**task-based saliency detection**). With out proposed model, the robots could complete complex some complex missions without human interaction.

- 2020:

[Taobao, Alibaba & Chinese Academy of Science] **3D face Reconstruction:**

This project is supported by Alibaba and Chinese Academy of Sciences, it mainly focuses on the construction of the biggest Asian 3D pointcloud faces database(with **3DMM** model). And using this database to achieve more efficient 3D face reconstruction network.

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

This project is supported by Ubisoft Entertainment, it mainly focuses on reconstructing the urbans rapidly with low costs binocular cameras and IMU. We have proposed a new pipeline for transferring real scenes to simulation environment(Unity3D) (**from real to sim**). Our proposed method first turned the real world scenes to 3d point cloud, then we achieve the sim data generation through **CycleGAN**.

- 2019:

[Chip Design] **Design of CMOS two-stage operational amplifier:**

This project is supported by the department of Electrical Engineering, UESTC. We designed an amplifier from scratch, and finally successfully taped it out.

[Robocon Robotics Competition] **Tracking High-Speed Soccer Ball in real time**

This project is supported by **Machine Sensing and Intelligent Systems Research Center, UESTC**. It is a module of the soccer robot, which developed for commercial use. The module using a binocular camera with improved **FCN** combined with **ConvLSTM** to recognize soccer ball and predict the trajectory.

[Robocon Robotics Competition] **Adaptive Motor Based on Reinforcement Learning**

This project is supported by the department of **Mechanical and Electrical Engineering, UESTC**. This kind of motor is driven by independently designed chip and embedded adaptive program in advance. Our group is now trying to apply for a patent.

[Robocon Robotics Competition] **High-Precision Positioning Module**

This project is developed for rescue robot program supported by **Machine Sensing and Intelligent Systems Research Center, UESTC**. In some danger and complex conditions, we use rescue robots to replace people. And we use the LoRa technology to implement the communication and positioning between the robots. We proposed a new method to optimize the energy consumption of LoRa through **Reinforcement Learning**.

- 2018:

[Robomaster Robotics Competition] **High-Precision Visual Odometer:**

This project is developed for **Robomaster ICRA AI challenge**. For the data from code wheel will accumulate error, our group use a binocular camera and a 6 axes IMU to process data fusion to get high-precision location. We are now trying to port the Odometer to FPGA to reduce the computing costs.

[Robomaster Robotics Competition] **Robot Software Development Stack Based on ROS:**

During the development of different robot program, our group starts to build a robot software development stack combining several basic functional packages including SLAM, communication, data fusion etc. And we have already open sourced this development stack to the community.

[Robomaster Robotics Competition] **Tracking and Striking High-Speed Moving Targets Based on PTZ:**

This project is based on **Robomaster ICRA AI challenge**, it mainly focuses on tracking moving targets with improved Kalman filter and adaptive PID and reconstructing the trajectory of the targets. Then using the PTZ with shooting mechanism to aim and shoot the targets. For the tracking part, we have implemented **Kalman Filter** to control the PTZ with visual attention. For the object detection part, we use the **SIFT** for **object detection**.

[Robomaster Robotics Competition] **Attacks Against MNIST Dataset:**

This project is based on **Robomaster Robotics Competition**, In this competition, each robot has 4 armors with different numbers, and most teams implement digital recognition based on the MNIST dataset. So we use One-Pixel-Attack to reduce the CNN recognition accuracy. At the end of the competition, we can decline the accuracy from 98% to 50%.

[Robomaster Robotics Competition] **Cooperative Control of Multiple Robots Based on Reinforcement Learning:**

This project is based on **Robomaster Robotics Competition**. The competition contains 5 kinds of robots, and my

team combines Behavior tree with RL algorithm in ROS to realize autonomous distributed control.

AWARD

- **Kaggle** - RANZCR CLIP (Top 34%) — 2021
- **Robomaster Robotics Competition** - First Prize (3/173 worldwide) — 2019
- **Robomaster Robotics Competition** - First Prize (10/173 worldwide) — 2020
- **Robocon Robotics Competition** - First Prize — 2020
- **The Interdisciplinary Contest in Modeling** - Honorable Awards — 2019
- **Outstanding Students Scholarship** — 2018
- **Outstanding Students Scholarship** — 2019

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.**, Chen, J., Ma, J., Hou, J., & Yi, S. (2022). StyleFlow For Content-Fixed Image to Image Translation. arXiv preprint arXiv:2207.01909.
- [3]. **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.

PATENT

1. Virtual data rendering method based on style migration(**in progress**)