Mingkang Yuan, B. E, M. E

Signal and Information Processing,
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Academic Curriculum Vitae

Personal

Full Name: Mingkang Yuan
Gender: male
Born: Nov 15, 1997 (Henan, China)
Citizenship: Chinese
Language: Chinese (fluent); English (IELTS 6.0, preparing for a higher IELTS score)

Education

2023 M. E, Signal and Information Processing, University of Chinese Academy of Sciences
2020 B. E, Flight Vehicle Propulsion Engineering, Northwestern Polytechnical University

Work Experience

Flight Control Engineer
I am currently a flight control engineer in a Chinese company working on UAV flight control system, proficient in robotics kinematics and intelligent control.

2024 **Developing UAV flight control system**
Up to now, I have systematically learnt the source codes of PX4 autopilot, Crazyflie and esp-drone, mastered their state estimation algorithms (Mahony, EKF, VIO) and code structures, and have experience in using the commonly used serial ports for robots (e.g., CAN, UART, SPI, I2C, COM, etc.) and communication protocols (e.g., UDP, TCP MavLink, uORB, etc.).
I have worked with a variety of sensors for robots (e.g. IMU, TOF, optical flow, GPS, barometer, magnetometer, etc.) and am familiar with PID, MPC and various filtering algorithms. Based on this, I have written a preliminary set of UAV flight control code that is capable of fusing IMU, Optical flow, and TOF sensor data to obtain the attitude, position, and velocity of the UAV through state estimation algorithms.

2024 **Drone formation**
Currently, I have been gradually refining the flight control code to make it more functional. For example, I am developing a UAV formation system using UWB based on my own flight control, and so far I have done most of the simulation work with Gazebo and ros2, and the core source code of the flight control has been further developed, and I am using Sky Brush and Blender to create the formation path. Thanks to my extensive previous machine learning experience, after this project I intend to apply reinforcement learning to my UAV clustering project, which is exciting, so stay tuned!

Research Experience

Master's Degree Programmes

2023 **Research on Nematode Image Segmentation**

In view of the problem that the instance segmentation accuracy of nematode images still needs to be improved, an instance segmentation model that adds a central skeleton head network is proposed to strengthen the model.

In this project, I am mainly responsible for extracting the centroskeleton information of nematode images and designing the centroskeleton head network, and adding the centroskeleton head network on the basis of Mask RCNN network. I use Pytorch and Mmdetection framework to make this project. The final result shows that the segmentation accuracy of nematode image instances is improved by about 1%.

Project Details: https://yuan-mingkang.github.io/post/01-nematode/

2022 **Research on Image Federated Learning Method Based on Distributed GAN Network**

Aiming at the problems of low data security and easy leakage of privacy in the process of multi-center image intelligent analysis, a distributed GAN network-based. The image federated learning framework realizes federated learning of multi-center remote sensing images without transmitting original data and model information, and integrates the GAN network.

In this project, I am mainly responsible for building and improving distributed GAN networks, building distributed GAN platforms, training central generators and distributed discriminators, based on synthesis images training segmentation model.

Project Details: https://yuan-mingkang.github.io/post/01-gan/

Bachelor's Degree Programmes

2020 **Research on modeling method of a certain type of aero-engine**

In this project, mathematical model of an aero engin are established through SIMULINK and C++, and the errors between the two are compared respectively to obtain a better mathematical model and improve the modeling accuracy of the engine model.

2020 **Gripping quadrotor based on mechanical claw**

I designed and assembled a drone with a mechanical claw that can be operated by FPV and a remote control to control the drone and the claw, and used it as the designated drone for a youth competition to get more students to learn about and love drones.

Project Details:https://yuan-mingkang.github.io/post/02-drone/

2019 **High-altitude glass curtain wall cleaning robot**

In order to solve the problem of cleaning glass at high altitude, we designed and manufactured a machine that can clean the glass curtain walls of high-rise buildings. I am mainly responsible for the design and development of the whole machine, including the robot model structure and adsorption function, assembly and debugging, control system and so on.

Project Details:https://yuan-mingkang.github.io/post/03-climb/

Project Details:https://yuan-mingkang.github.io/post/04-climb/

Publication

Mingkang Yuan, Ye Li, and Jiaxi Sun. Distributed Learning based on Asynchronized Discriminator GAN for remote sensing image segmentation. ICCIP'22: Proceedings of the 8th International Conference on Communication and Information Processing, Pages 33-40.

Paper URL:

https://yuan-mingkang.github.io/publication/distributed-learning-based-on-asynchronized-discriminator-gan-for-remote-sensing-image-segmentation/

Research Interests

Artificial Intelligence
Computer Vision
Machine Learning
Robotics

Awards

2022 Merit Student
Outstanding Student Cadre
2019 The First Prize Scholarship
National Encouragement scholarship
2018 The Second Prize College Scholarship
2017 The First Prize Scholarship
National Encouragement scholarship

Awards Detiles: https://yuan-mingkang.github.io/#talks

Hobbies

Riding, Tennis, Badminton, Jogging.