RUNJIA TAN

Automation, Robotics and Computer Vision

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Participated in several innovation competitions and projects with exploration about **computer vision, robotics and machine learning**; Won the prize in a programming competition and had half a year of internship experience, receiving **rich programming experience**; Excellent learning ability, won **several scholarships**; Published conference articles independently and had **certain academic research skills**; Participated in electronic design competitions and served as a training instructor for students, had **strong experimental and hands-on skills**.

Education

2021-01 - 2022-04

Master of Science: Computer Control & Automation

Nanyang Technology University (NTU) - Singapore

- GPA: 4.51/5.0;

2016-09 - 2020-06

Bachelor of Science: Automation

Hefei University of Technology (HFUT) - Hefei, Anhui, China

- GPA: 3.63/4.3(16/180);

Publication

2022.10

Template-Based Category-Agnostic Instance Detection for Robotic Manipulation.

- Zhongxu Hu; **Runjia Tan**; Yanxin Zhou; Junyang Woon; Chen Lv
- IEEE Robotics and Automation Letters

2019.05

An modeling Processing Method for Video Games Based On Deep Reinforcement Learning.

- **Runjia Tan**; Jun Zhou; Haibo Du; Suchen Shang; Lei Dai
- ITAIC 2019 (2019 IEEE 8th Joint International Information Technology and Artificial Intelligence Conference).

Work History

2022-02 - Now

Intern and Research Associate

Nanyang technological university, MAE

- Implement C++ to Python controller interface of **Franka Emika Robot** based on ROS2 and build interface between RL algorithm and real manipulator which has been tested in simple task.
- In Template-Based Category-Agnostic Instance Detection for Robotic Manipulation, be responsible to human guidance, robotic tracking, picking & placing and development of App for capturing and generating templates.
- Plan the sequence for unloading boxes from shelf in warehouse
  Build demos and do presentations for visitors of **NTU-Continental Corp Lab** and make project proposals.

2020-06 - 2020-12
&
2019-06 - 2019-08

Algorithm Engineer, Internship

Toycloud Technology Co., Ltd., Hefei, Anhui, China

- Tested the engine interface of the **IFLYTEK** face recognition, used the API interface to write the test APP, installed it on the samples, and obtained the relevant parameters (e.g., CPU and memory occupancy) to provide a reference.
- Wrote the supplement part of the instruction manual of the face-recognition engine.
- Transferred the work with the Android development team, delivered the API usage method and its considerations, and guided them to complete the function.

Research & Competition

2021.01-2021.12

Visual perception for human-robot manipulator coordination

Master dissertation

- Build the **UR Robot** control system equipped with calibrated global and local RGBD camera and then proceed visual servo experiment.
- Use the RGBD images or point cloud from camera to help robot compute a collision-free trajectory or replanning while potential collision can happen.
- Segment the point cloud of hand and then generate ROI for the object to be grasped so that arbitrary shape target to be handover can be segmented.
- Generate grasp pose according to generated segmentation and robot can grasp arbitrary object hold by hand and avoid colliding with human body to finish thus human-robot handover task.

2020.01-2020.06

Design and Implementation of foreign object detection algorithm for video stream

Diploma project

- The FCN structure based on void-based convolution and full connection condition random field is implemented, and an experiment is carried out on the standard data set Pascal VOC 2012.
- After image semantic segmentation was completed, the model was further expanded, LSTM network was added and convolved with 3D, and experiments were carried out on the Camvid data set.
- Create a semantically segmented data set on masks and experiment on it using the created network.

2019.04-2020.05

Ground-to-air Robot Coordination System Based on Visual Navigation

Provincial Innovation and Entrepreneurship Training Program for College Students

- Selected tracked vehicles as ground vehicles, carbon fiber racks for aerial drones, NVIDIA nano as the ground control board, and mounted the attachments such as laser radar and camera.
- Designed the positioning system for land and air in the collaborative system, with DWM1000 tags for locating.
- Undertook the machine vision part of the entire project, including traditional and depth image processing, involving the use of OpenCV library and convolutional neural network knowledge.

2019.04-2020.06

Sign Language Translator

- Determined the glove-integrated design and protocoled an intelligent wearable scheme that combined gloves with smartwatch.
- Adopted the machine learning algorithm to optimize the recognition rate, the KNN algorithm for cluster analysis and improving recognition accuracy.
- Completed the writing of the research report and patent application, conducted the sci-tech novelty retrieval, and won the third prize of the “Challenge Cup” National College Student Curricular Academic Science and Technology Works Competition.

2018.05-2019.04

System Design of Wireless Video Car Based on Brain-Machine Interface Control

Provincial Innovation and Entrepreneurship Training Program for College Students

- Developed an implementation plan for the entire project, including PC parsing EEG sensor data, PC returning control signal, and wireless video car, and selected cars and sensors.
- Used MATLAB to perform Fourier analysis and wavelet transform of brainwave raw data, and deep learning algorithm to build classification training model to carry out a specific classification of 14 channels of EEG signals.
- Used python script to realize the transmission of video stream and control stream signal between wireless video car and the host computer, reduced the interference of the external environment on the senso.

2018.05-2019.04

Design of Visual Bionic Hexapod Robot Based on Multi-processor

Provincial Innovation and Entrepreneurship Training Program for College Students

- Applied MATLAB to study the inverse kinematics and its difference of hexapod robot gait and used a python script to realize writing PC by QT5 in the Raspberry Pi to achieve simple manual control of the robot.
- Adopted ROS to construct SLAM maps through laser radar, enabling robots to navigate autonomously.
- Researched the related algorithms of depth camera based on ToF principle and planned to apply them to the crossing obstacles and climbing stairs of the hexapod robot.
- Studied the vision-based reinforcement learning algorithm, optimized the control of robots, and wrote a paper.

Skills

ROS, Python, C++ and MATLAB Programming	●●●●● Excellent
3D modelling and printing	●●●○○ Good
Hardwire design	●●●○○ Good
Android and Java Programming	●●○○○ Average

Honors & Awards

2020.06	HFUT excellent graduates
2019.09	Third Prize, the 16th "Challenge Cup" National Undergraduate curricular academic science and technology works competition
2019.09	Merit Student of Hefei University of Technology
2019.09	Second Prize Scholarship of Hefei University of Technology (Top 15%)
2019.10	The 5th “Automation 81” First-class Scholarship (1/183)
2019.08	School-level First Prize of the 5th “Internet Plus” Innovation and Entrepreneurship Competition
2019.04	Provincial Innovation and Entrepreneurship Training Program for College Students: Excellent
2019.04	Provincial Innovation and Entrepreneurship Training Program for College Students: Passed
2018.12	Second Prize Scholarship of Hefei University of Technology (Top 15%)
2018.12	First Prize Scholarship of Hefei University of Technology (Top 5%)
2018.12	Merit Student of Hefei University of Technology
2018.10	Third Prize of the 12th iCAN International Contest of innovAtioN, 2018
2018.03	Third Prize of the 8th Millions of College Students Science Popularization Creative Innovation Competition of 100 Universities in Anhui Province
2018.01	Third Prize of the 8th “Industry Cup of the Hefei University of Technology” Science

and Innovation Competition

2017.11 Third Prize of the 11th iCAN International Contest of innovAtioN, 2017

2017.10 The 4th Kewell Scholarship