

Xiangyu CHEN

☎ (+86) 133-9340-2613 | ✉ changerc77@gmail.com | 🏠 <https://changerc77.github.io/> | 📄 <https://github.com/ChangerC77>

EDUCATION

the Hong Kong University of Science and Technology (Guangzhou)
Master of Philosophy (General)

Sep. 2025 - Jun. 2027

Liverpool John Moores University, UK
BEng Electrical and Electronic Engineering (First Class Honour)

Sep. 2019 - Jun. 2023

RESEARCH INTERESTS

Embodied AI, Manipulation, VLA, Tactile, Mapping and Navigation

PUBLICATIONS

- **GaussianGrasper: 3D Language Gaussian Splatting for Open-vocabulary Robotic Grasping**
Yuhang Zheng, **Xiangyu Chen**, Yupeng Zheng, Songen Gu, Runyi Yang, Bu Jin, Pengfei Li, Chengliang Zhong, Zeng-mao Wang, Lina Liu, Chao Yang, Dawei Wang, Zhen Chen, Xiaoxiao Long, Meiqing Wang
RAL, 2024
- **Block-Map-Based Localization in Large-Scale Environment**
Yixiao Feng, Zhou Jiang, Yongliang Shi, Yunlong Feng, **Xiangyu Chen**, Hao Zhao, Guyue Zhou.
ICRA, 2024

RESEARCH EXPERIENCE

TARS Technology (Shanghai) Co., LTD.

Shanghai, China

RESEARCH INTERN | ADVISOR: **PROF. YILUN CHEN** AND **PROF. WENCHAO DING**

Dec 2024 - present

- **The First Prize in Google DeepMind & ICRA 2025 WBCD Challenge (Team Leader)**
 - Introduction:** : This challenge is jointly organized by Google DeepMind and ICRA, aiming to propose efficient data collection strategies and exploring the benchmark of bimanual manipulation in real-world scenarios, with evaluation metrics including execution speed, system reliability, and policy implementation.
 - Bimanual Manipulation System Implementation:** : Design a mobile manipulation system to efficiently collect real data and robustly perform tabletop manipulation and mobile tasks. Dual-arm can do tasks including unfold tablecloth, open the lid, place the pizza and close the lid tasks while mobile. Designed grippers can grasp cups and open boxes, etc.
 - Data Collection:** Benchmark data collection methods, such as teleoperations (e.g., VR and hand-held grippers) and learning from videos methods, propose methods suitable for collecting data in real scenarios.
 - Design Hierarchical Bimanual Manipulation Policy for Dining Room Service:** Propose Bimanual Manipulation Models (VLA) to execute long-horizon, complex and fine mobile manipulation tasks in real-world dining room service scenarios, with focus on designing models that can mitigate compounding errors and improve robustness against dynamic interference.
- **Champion in ManiSkill-ViTac 2025 Track 2**
 - Introduction:** The competition evaluated robots manipulation capabilities in complex environments, requiring them to determine object shapes and select correct insertion slots by integrating tactile and visual sensory inputs.
 - Methods:** The solution combined tactile encoders with 3D point cloud encoding, enhanced by positional embeddings, and employed a conditional diffusion policy for robust multi-modal action planning.
 - Contribution:** Implement sim2real transfer in real-world experiments, process tactile sensor data.

EncoSmart Technology (Beijing) Co., LTD.

Beijing, China

RESEARCH INTERN | ADVISORS: **PROF. XIAOXIAO LONG**

Nov 2023 - Feb 2024, Jul 2024 - Dec 2024

- **GaussianGrasper: 3D Language Gaussian Splatting for Robotic Grasping**
 - 3D Reconstruction based Manipulation Design:** proposed a method utilizes 3D Gaussian Splatting to explicitly represent the scene as a collection of Gaussian primitives. The method takes fewer views RGB-D to solve the inconsistency issue between geometry and semantic information in vision-based manipulation, as well as the inability to dynamically update the scenes.
 - Data Collection:** Hand-eye calibration of robotic arm and camera is performed to improve the accuracy of multi-view point cloud fusion during data collection
 - Method Design:** Using visual language models (VLMs) to achieve scene understanding and object grounding, and employ Grasp Models (AnyGrasp) to generate the 6-Dof pose for grasping.
 - Experiment:** Design strategies to operate robotic arm and gripper, enabling long-horizon and continuous manipulation, as well as update scenes.

• **Mobile Manipulation Policy based on Imitation Learning**

Learning-based Mobile Manipulation System Design: Proposed robot policies based on the ACT network for mobile manipulation to improve the robustness in performing long-horizon and fine manipulation tasks.

Data Collection: data collection by using whole-body teleoperation system.

Method Design: Increase the degrees of freedom of whole-body control to 17 and optimize the control strategy through position control and object-centered coordinate relationships to address the high task failure rate.

Navigation Module Design: Focus on learning-based navigation method and how to leverage VLMs to improve the indoor visual navigation efficiency and localization accuracy.

AIR, Tsinghua University

• **Block-Map-Based Localization in Large-Scale Environment** Sep 2021 – Nov.2023

Block Maps Localization System Design: Proposed a subgraph localization system based on generating block maps and corresponding switching strategies. The method can address the issue of easy loss of robot localization, improving localization accuracy by at least 3 times while increasing computational speed by 150.

Perception Module Design: Used multi-line LiDAR and LIO-SAM algorithms to create maps in large-scale scenes. Used C++ and PCL point cloud library to downsample point clouds for removing ground points.

Navigation Module Design: Using the A* algorithm and TEB algorithm as planners to enable robots to achieve dynamics obstacle avoidance. These planners assist robots in conducting localization experiments.

• **Multi-Agent Swarm Formation Navigation Algorithms** May 2022 - Feb 2023

Multi-Agent Navigation Strategies: Proposed multi-agent collaboration system is proposed to improve work efficiency through cooperation of multiple robots. localization accuracy by at least 3 times while increasing computational speed by 150.

Method Design: Develop Leader-follower, artificial potential field and pure pursuit algorithms to enable robots to flexibly achieve single-agent and multi-agent collaborative obstacle avoidance.

Sim2Real Pipeline: Use Gazebo and Isaac Sim simulators to test algorithms in simulation, then algorithms are fine-tuned and deployed to the real robots to ensure the desired instantaneity and robustness for multi-agent obstacle avoidance.

• **Obstacle Avoidance Algorithm for Indoor Racing Unmanned Vehicles** May 2022 - Feb 2023

Motivation and hardware: We aim to develop navigation system that can improve the robot's localization and real-time obstacle avoidance robustness in corridor and glass environments. The hardware includes single-line Lidar, IMU and depth camera, with differential drive model as the kinematic model.

SLAM Experiment: We benchmark the performance of Lidar-based SLAM (Gmapping, Cartographer) algorithms and vision-based SLAM algorithms (Rtabmap, ORB_SLAM) and design a multi-sensor fusion algorithm utilizing particle filtering, extended Kalman filtering and graph optimization to improve real-time localization accuracy during motion.

Navigation Experiment & Results: We benchmarked path planning algorithms based on graph search and sampling methods. Experiments revealed that using the A* algorithm and TEB algorithm as planners outperformed other methods in avoiding static and dynamic obstacles during long-horizon navigation, with robots successfully avoiding all tested obstacles

• **End-to-end Visual Navigation based on Reinforcement Learning** Jun 2021 - Sep 2021

Motivation: We explored the performance of end-to-end vision-based navigation for robots, drawing inspiration from the end-to-end approach used in autonomous driving.

Pipeline Design: We used a CNN network as the backbone for feature extraction and collected camera data and control data in a simulator to create the dataset. After fine-tuning, the system was deployed on a robot for real-world experiments. Results showed that the system successfully completed all obstacle avoidance tasks during the day, but many tasks failed at night due to factors such as low lighting.

Honors & Awards

INTERNATIONAL

2025	Champion , ICRA 2025 What Bimanuals Can Do (WBCD) Challenge	Atlanta, U.S.A
2025	Champion , ManiSkill-ViTac 2025: Challenge on Manipulation Skill Learning With Vision and Tactile Sensing	Beijing, China

DOMESTIC

2023	City Special Prize , "Unbounded·2023 Shanghai International Student - (Nationalized University Students) Innovation and Entrepreneurship Competition"	Shanghai, China
2017	First Prize (National Level) , 2017 International Youth Innovation Design Competition China Region	Beijing, China

Skills

Robotics Technology	ROS1/2
Software Technology	C/C++, Python, MATLAB, OpenCV, Linux and Git, PyTorch
Hardware Technology	Embedded Development (STM32, ESP32), SolidWorks, PCB Design
Language Proficiency	Mandarin (Native), English (Working Proficiency)