

# 崔屿杰

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## 教育背景

同济大学	2021 年 9 月-2026 年 6 月 (预计)
自动化本科	
◦ GPA: 89.38, 综合排名: 1/67	
◦ 技能: 嵌入式开发, ROS, SLAM, PyTorch, 点云处理, CV, python/C++	

## 荣誉奖励

全国特等奖: 第十八届“挑战杯”全国大学生课外学术科技作品“黑科技”专项赛 (第一作者)	2023 年 10 月
全国银奖: 中国国际大学生创新创业大赛 (2024) (第二作者)	2024 年 10 月
我最喜爱的项目 (20/250): 第十七届全国大学生创新年会 (第一作者)	2024 年 11 月
全国二等奖: 第七届全国大学生嵌入式芯片与系统设计竞赛	2024 年 8 月
启迪奖学金 (电信学院最高荣誉), 同济大学一等奖奖学金, 优秀学生, 京川艺术奖学金	

## 项目经历

三指灵巧手通用操作学习框架	AIR/DISCOVER, 清华大学
◦ 设计同构三指灵巧手外骨骼与真机, 实现无需遥操的便携数据采集与训练框架。完成外骨骼采集设备的嵌入式开发设计, ORB3-SLAM 的 VIO 手腕定位以及从外骨骼到真机的 ACT 模仿学习框架, 同时搭建了 Mujoco 同构仿真平台, 满足外骨骼设备对虚拟灵巧手的运动迁移。	2025 年 1 月 - 至今
Dero——桥梁箱梁内部病害检测机器人 (DERO <a href="#">🔗</a> )	矩尺土木, 同济大学
◦ 技术: 使用 STM32 与树莓派完成了桥梁箱梁内部检测机器人全栈开发, 涵盖了建图、定位、数据采集、病害识别、网页展示与云台控制 APP 的开发, 并进行了实桥实验。针对箱梁内部建图问题, 设计退化环境检测算法, 自适应调节 Cartographer 算法点云匹配环节参数。发表一篇桥梁领域顶会文章, 授权两项专利。	2022 年 4 月-2024 年 4 月
◦ 商业: 进行成果转化与商业实践, 包括市场调研、竞品分析、商业模式设计、产品路演与宣传以及意向投资与订单争取。三大创新创业竞赛国奖。	
基于自监督的 2D 激光点云权重预测 (IROS 2025 审稿中)	RAIL, 同济大学
◦ 设计了一种基于自监督学习的二维点云重要性感知网络, 使用融合对比损失提取点云权重, 提升了 ICP, CSM 等点云匹配算法的精度。	2024 年 9 月-2025 年 3 月
◦ 提出了一种使用类 U-Net 结构与重建损失, 联合时空编码的通用二维点云编码器, 可有效挖掘二维点云特征。	
智绎心声——基于 STM32H7 的失语症患者辅助设备 (STM32H7 Aphasia Helper <a href="#">🔗</a> )	同济大学
◦ 人机交互: 基于 STM32H7 的失语症患者辅助设备, 采用姿态传感选控 + 红外触控确认 + 多模态反馈的病患友好型交互方式。获得嵌入式芯片与系统设计国赛二等奖。	2024 年 3 月-2024 年 7 月
◦ 边缘 AI: 使用 X-CUBE-AI 将图像识别模型 MCUNet 量化压缩, 并部署到 STM32H7, 实现了在内存 (1MB) 以及 Flash(2MB) 受限的微控制器上进行 ImageNet 类别的实时推理。	

## 文章发表

- Yujie Cui, Yue Pan, Dalei Wang, Mazeyu Ji, Sugong Cao “A smart robotic system for autonomous inspection of large-scale concrete girder,” International Association for Bridge Maintenance And Safety(IABMAS), 2024.
- Mazeyu Ji, Wenbo Shi, Yujie Cui, Chengju Liu, Qijun Chen “Adaptive Denoising-Enhanced LiDAR Odometry for Degeneration Resilience in Diverse Terrains,” IEEE Transaction on Instrumentation and Measurement, 2024.

# Yujie Cui

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## Education

<b>Tongji University</b> <i>B.E in Automation</i> <ul style="list-style-type: none"><li>◦ GPA: 89.38, <b>overall rank: 1/67</b></li><li>◦ Skills: Embedded Development, ROS, SLAM, PyTorch, Point Cloud Processing, Computer Vision, Python/C++</li></ul>	<i>Sep. 2021 – Jun. 2026(expected)</i>
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## Selected Honors and Awards

<b>National Grand Prize</b> in Challenge Cup National College Student Curricular Academic Science and Technology Works Competition - Black Technology Track ( <b>First Author</b> )	<i>Oct. 2023</i>
<b>National Silver Award</b> in China International College Students' Innovation Competition 2024( <b>Second Author</b> )	<i>Oct. 2024</i>
<b>Most Popular Project (20/250)</b> in National College Student Innovation Annual Conference 2024( <b>First Author</b> )	<i>Nov. 2024</i>
<b>National Second Prize</b> in National College Student Embedded System Design Competition	<i>Aug. 2024</i>
<b>Qidi Scholarship (the highest honor of the School of EE), Tongji University First-Class Scholarship, Excellent Student, Jingchuan Art Scholarship</b>	

## Project Experience

<b>Three-Fingered Dexterous Hand Universal Manipulation Interface</b> <ul style="list-style-type: none"><li>◦ Designed a homomorphic three-finger exoskeleton and real robotic hand, enabling portable data collection and training without teleoperation. Developed embedded systems, ORB3-SLAM-based wrist VIO, ACT imitation learning from exoskeleton to robot, and a Mujoco simulation for motion transfer.</li></ul>	<i>AIR/DISCOVER, Tsinghua University Jan. 2024 - Current</i>
<b>Dero——Bridge Box Girder Internal Detection Robot</b> ( <a href="#">DERO</a> <a href="#">🔗</a> ) <ul style="list-style-type: none"><li>◦ <b>Technology:</b> Developed a full-stack bridge box girder internal detection robot using STM32 and Raspberry Pi, including mapping, localization, data collection, defect detection, web display, and gimbal control, with real-bridge testing. A degradation environment detection algorithm was designed to adjust point cloud matching parameters in the Cartographer algorithm for internal mapping. <b>Published a top-tier conference paper in the field of bridge engineering and granted two patents.</b></li><li>◦ <b>Business:</b> Handled business practice, including market research, competitor analysis, business model design, product roadshows, and securing investments and orders. <b>Three National Innovation and Entrepreneurship Competition Awards.</b></li></ul>	<i>Juchi Civil Engineer, Tongji University Apr. 2022 – Apr. 2024</i>
<b>Self-Supervised Laser Scan Weight Prediction</b> (Under review at IROS 2025) <ul style="list-style-type: none"><li>◦ Designed a self-supervised learning-based 2D point cloud importance perception network, using fused contrastive loss to extract point cloud weights, which improved the accuracy of point cloud matching algorithms such as ICP and CSM.</li><li>◦ Proposed a universal 2D point cloud encoder using a U-Net-like structure with reconstruction loss and spatiotemporal encoding to effectively extract features.</li></ul>	<i>RAIL, Tongji University Sep. 2024 - Mar. 2025</i>
<b>STM32H7 based Aphasia Helper</b> ( <a href="#">STM32H7 Aphasia Helper</a> <a href="#">🔗</a> ) <ul style="list-style-type: none"><li>◦ <b>Human-Computer Interaction:</b> Developed an STM32H7-based assistive device for aphasia patients, featuring patient-friendly interaction via gesture-based selection, infrared touch confirmation, and multimodal feedback.</li><li>◦ <b>Edge AI:</b> The image recognition model MCUNet was compressed and deployed on the STM32H7 with X-CUBE-AI, enabling real-time inference for ImageNet categories on a microcontroller with memory (1MB) and Flash (2MB) constraints.</li></ul>	<i>Tongji University Mar. 2024 – Jul. 2024</i>

## Publication

1. **Yujie Cui**, Yue Pan, Dalei Wang, Mazeyu Ji, Sugong Cao “A smart robotic system for autonomous inspection of large-scale concrete girder,” International Association for Bridge Maintenance And Safety(IABMAS), 2024.
2. Mazeyu Ji, Wenbo Shi, **Yujie Cui**, Chengju Liu, Qijun Chen “Adaptive Denoising-Enhanced LiDAR Odometry for Degeneration Resilience in Diverse Terrains,” IEEE Transaction on Instrumentation and Measurement, 2024.