

# 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: 4.44/5.0    绩点排名: 23/67    学年综合排名: 2/67	
◦ 辅修创新创业, 2023 年参与意大利暑期夏令营	

## 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
同济大学一等奖奖学金, 优秀学生	

## 项目经历

Dero——桥梁箱梁胃镜机器人 (DERO 🔗)	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。	
智绎心声——基于 STM32H7 的失语症患者辅助设备 (STM32H7 Aphasia Helper 🔗)	同济大学
◦ 人机交互: 基于 STM32H7 的失语症患者辅助设备, 我提出项目创意, 设计实现方案。负责开发了使用陀螺仪选择选项, 红外传感器确认选项, 蜂鸣器与振动马达反馈确认的病患友好型交互方案。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 级别的实时推理。	
基于自监督的 2D 激光点云权重预测 (论文撰写中, 即将开源)	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 - 至今
◦ 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。	
基于 Diffusion 模型的 3D 激光点云生成算法的优化 (img2depth2Lidar 🔗)	RAIL, 同济大学
◦ 将基于几何特征的约束, 引入了 Diffusion 模型的一阶段点云编码环节, 增强点云特征表示的置信度。将 Depth-Anything 模型引入二阶段, 对图像进行深度估计, 优化以图像为引导的生成点云质量。	2024 年 7 月–2024 年 10 月

## 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.

## Education

<b>Tongji University</b>	<i>Sep. 2021 – Jun. 2026(expected)</i>
<i>B.E in Automation</i>	
◦ GPA: 4.44/5.0    GPA rank: 23/67 <b>Academic year overall rank: 2/67</b>	
◦ Minored in Innovation and Entrepreneurship, participated in the Italy Summer Camp in 2023.	

## 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>Tongji University First-Class Scholarship, Excellent Student</b>	

## Project Experience

<b>Dero——Bridge Box Girder Inspection Robot</b> ( <a href="#">DERO</a> 🔗)	<i>Juchi Civil Engineer, Tongji University Apr. 2022 – Apr. 2024</i>
◦ <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>	
◦ <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>	
<b>STM32H7 based Aphasia Helper</b> ( <a href="#">STM32H7 Aphasia Helper</a> 🔗)	<i>Tongji University Mar. 2024 – Jul. 2024</i>
◦ <b>Human-Computer Interaction:</b> Developed an STM32H7-based assistive device for aphasia patients. I proposed the idea, designed the plan, and created a patient-friendly interaction system using a gyroscope, infrared sensor, and feedback via a buzzer and vibration motor. <b>Won second prize in National Embedded System Design Competition.</b>	
◦ <b>Edge AI:</b> Used X-CUBE-AI to compress the image recognition model MCUNet, and deployed it on the STM32H7. Achieved real-time inference at ImageNet level on a microcontroller with memory (1MB) and flash (2MB) constraints.	
<b>Self-Supervised Laser Scan Weight Prediction</b> (Paper in Progress)	<i>RAIL, Tongji University Sep. 2024 - Current</i>
◦ 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.	
◦ Proposed a universal 2D point cloud encoder using a U-Net-like structure with reconstruction loss and spatiotemporal encoding to effectively extract features.	
<b>Diffusion-based 3D LiDAR Point Cloud Generation</b> ( <a href="#">img2depth2Lidar</a> 🔗)	<i>RAIL, Tongji University Jul. 2024 – Oct. 2024</i>
◦ Introduced geometry-based constraints in the first-stage point cloud encoding of the Diffusion model to enhance feature representation. Used the Depth-Anything model in the second stage for depth estimation, improving image-guided point cloud generation.	

## Publication

- 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.