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我现于陈浩耀教授带领的nROS-Lab(NRSL) 攻读学术型研究生学位，目前的研究兴趣聚焦于**机器人自主系统、定位与建图与基于深度学习的隐式地图表达**，致力于实现机器人的高效环境感知。
欢迎到我的个人主页<https://jianhengliu.github.io>了解更多的个人信息以及项目经历！

Education

- 哈尔滨工业大学（深圳）推免生
控制科学与工程 (研究生学位), 2021/09–Present
- 哈尔滨工业大学（深圳）
自动化 (学士学位), 2017/09–2021/06

Publications

- **Active Implicit Reconstruction for Unknown Objects**
Jianheng Liu*, Dongyu Yan* and Haoyao Chen. **Submitted to ICRA, 2023**
- **RGB-D Inertial Odometry for a Resource-restricted Robot in Dynamic Environments**
Jianheng Liu, XuanFu Li, Yueqian Liu and Haoyao Chen. **RA-L and IROS, 2022**
- **Sampling-Based View Planning for MAVs in Active Visual-inertial State Estimation**
Zhengyu Hua, Jiabi Sun, Fengyu Quan, Haoyao Chen, Jianheng Liu, Yunhui Liu. **IROS, 2022**
- **Vision-encoder-based Payload State Estimation for Autonomous MAV With a Suspended Payload**
Jianheng Liu*, Yunfan Ren*, Haoyao Chen and Yunhui Liu. **IROS, 2021**
* equal contribution

Honor & Awards

- 研究生学业一等奖学金 (2022-2023, 2021-2022), 本科生学业一等奖学金 (2019-2020), 三等奖学金 (2018-2019), 二等奖学金 (2017-2018)
- 全国大学生机器人竞赛 ROBOCON 一等奖 (2020), 二等奖 (2019)
- 2019 挑战杯国家三等奖, 2019 互联网 + 黑龙江省铜奖, 2019 哈工大“祖光杯”深圳校区金奖
- 2018 全国大学生英语竞赛 C 类二等奖
- 2018 国际青少年无人机大赛大满贯特等奖

Research Experiences

- **Active Implicit Reconstruction for Unknown Objects:**

Jianheng Liu, Dongyu Yan and Haoyao Chen. **Submitted to ICRA, 2023**

We manage to transplant active reconstruction methods into implicit representation, which has advantages over traditional explicit representation in resolution, model size, and continuity. Our proposed information gain metric is based on spatial point sampling rather than voxel traversing, which can be seamlessly integrated into the implicit model. The metric is also differentiable, resulting in smoother and better view selection. An implicit reconstruction method for bounded objects considering free space is also proposed to use information fully.

- **RGB-D Inertial Odometry for a Resource-restricted Robot in Dynamic Environments:**

Jianheng Liu, XuanFu Li, Yueqian Liu and Haoyao Chen. **RA-L and IROS, 2022**

Dynamic-VINS is a real-time RGB-D Visual Inertial Odometry (VIO) system for resource-restricted robots in dynamic environments. It is extended based on VINS-Mono. It combines object detection and RGB-D cameras for dynamic feature recognition to reduce the computational cost, achieving an effect comparable to semantic segmentation. It adopts grid-based feature detection and proposes a fast and efficient method to extract high-quality FAST feature points. A competitive localization accuracy and robustness in dynamic environments are shown in a real-time application on resource-restricted platforms.

- **VINS-RGBD-FAST:** VINS-RGBD-FAST is a SLAM system based on VINS-RGBD. I do refinements both in frontend and backend to improve the system's efficiency in resource-constrained embedded platform, like HUAWEI Atlas 200DK, Raspberry Pi. Furthermore, we made this system as a module and applied it into UAV as a state feedback to track a generative trajectory stably.

- **Vision-encoder-based Payload State Estimation for Autonomous MAV With a Suspended Payload:**

Jianheng Liu, Yunfan Ren, Haoyao Chen and Yunhui Liu. **IROS, 2021**

A novel real-time system for estimating the payload position; the system consists of a monocular fisheye camera and an encoder-based device. A Gaussian fusion-based estimation algorithm is developed to obtain the payload state estimation. Based on the robust payload position estimation, a payload controller is presented to ensure the reliable tracking performance on aggressive trajectories.

- **MatRix:** A extremely interesting prototype developed in 2020 XBOT PARK Smart Product Innovation Boot Camp. An interactive smart carpet, which can achieve infinite splicing through the magnetic suction connector with anti-dull design. MatRix can be used as your home intelligent terminal, game console, decoration and so on.

- **quad-controller-SE3 & FlightController:** quadrotor controller based on PX4/mavros and SE3 geometric control. And a simulation based on CoppeliaSim software to compute the desired thrust and torque of quadrotor according to dynamic modelling, and use distribution matrix to decide the motor's speed.

- **BezierTrajGenerator & MinimumSnapTrajGenerator & MapManager:** Trajectory Generator based on Bezier Curve and Minimum Snap for autonomous robot. And I develop a 2D Map Manager for the verification and visualization for different algorithms.