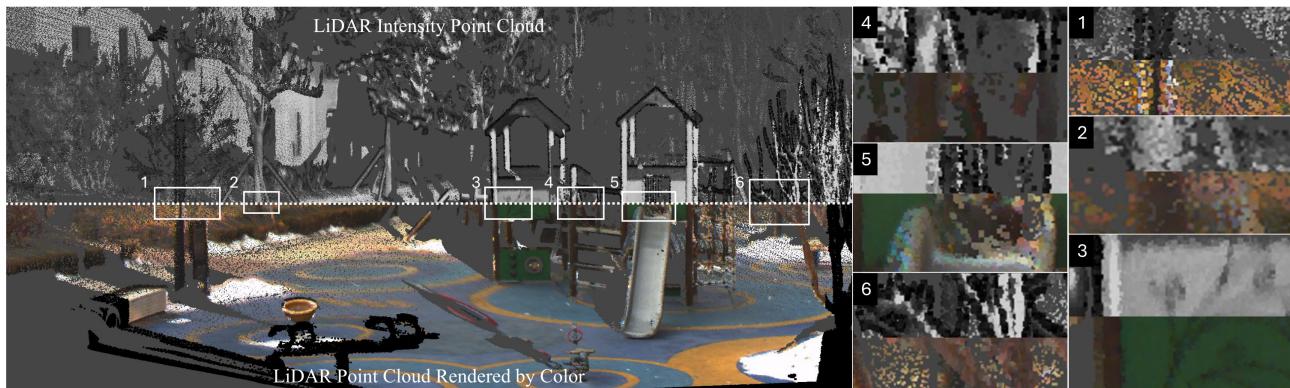


MIAS-LCEC



[MIAS Group](#) has developed a novel LiDAR-camera extrinsic calibration framework known as MIAS-LCEC and introduced a cross-modal mask matching (C3M) algorithm. To benefit the robotic community, we designed the MIAS-LCEC Toolbox, a versatile calibration toolbox with an interactive visualization interface, along with the MIAS-LCEC Datasets, which include three real-world datasets for evaluating LiDAR-camera extrinsic calibration algorithms.

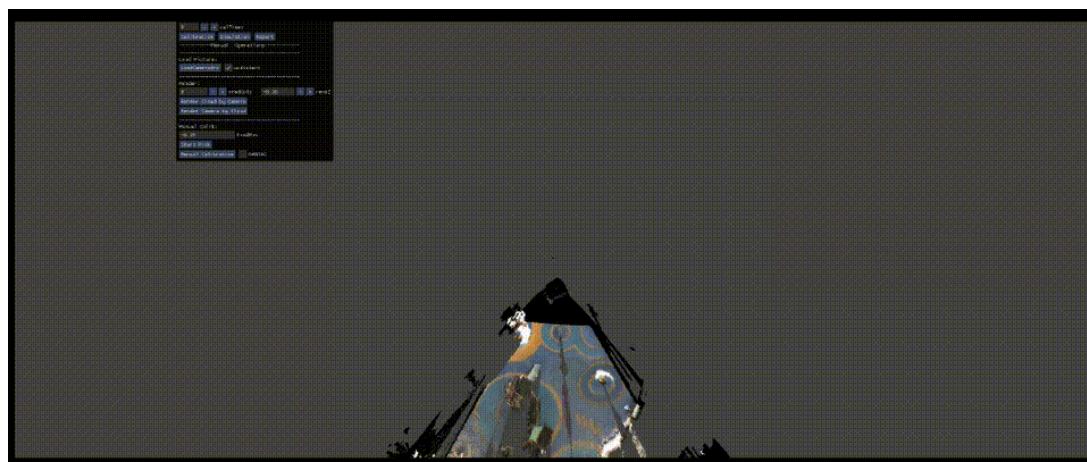
📌 *Online, Target-Free LiDAR-Camera Extrinsic Calibration via Cross-Modal Mask Matching*, available at [arXiv](#).

🍇 Toolbox versions

- **2024/07/1:** MIAS-LCEC Toolbox has been developed by Zhiwei Huang @Tongji University.

⭐ **What is our contribution?** We move one step forward in the field of online, target-free LCEC by unleashing the potential of SoTA large vision models (LVMs). Additionally, we introduce a novel cross-modal mask matching (C3M) algorithm, which enhances the robustness and accuracy of feature correspondence between LiDAR point clouds and camera images.

⭐ **What can MIAS-LCEC Toolbox do?** MIAS-LCEC Toolbox is a versatile calibration toolbox that supports **3D sensor data browsing, online, target-free LiDAR-camera extrinsic calibration and manual, offline calibration**. To begin calibration, simply load your point cloud and image source files into the GUI and click a button. After calibration, you can view the rendered RGB point cloud using the calibrated extrinsic parameters to verify the results.



Viewing rendered point cloud within the toolbox interface to check the visualization of calibration result

1. Publication:

This [paper](#) was accepted to IEEE Trans. on Intelligent Vehicles (T-IV). In this repository, we publish our toolbox software and its applicational tutorial. Please cite

```
@article{huang2024online,
  title={Online, Target-Free LiDAR-Camera Extrinsic Calibration via Cross-Modal Mask Matching},
  author={Huang, Zhiwei and Zhang, Yikang and Chen, Qijun and Fan, Rui},
  journal={arXiv preprint arXiv:2404.18083},
  year={2024}
}
```

when using our toolbox or datasets.

2. Demo Video:

In this video([Bilibili Link](#) | [YouTube Link](#)), we demonstrated:

- The proposed algorithm;
- The introduction of three real-world datasets;
- The calibration example using MIAS-LCEC Toolbox.

3. Datasets

We have created the following three real-world datasets: **MIAS-LCEC-TF70 (target-free)**, **MIAS-LCEC-CB70 (target-based)**, and **MIAS-LCEC-TF360 (target-free)**, which are now publicly available at [Google Drive](#) and [BaiduDuYun](#) for researchers to evaluate the performance of LCEC approaches. Two solid-state Livox LiDARs

(Livox Mid-70 and Livox Mid-360) and one MindVision camera are utilized for data acquisition. Point clouds and images in the datasets are collected from a variety of indoor and outdoor environments, under various scenarios as well as different weather and illumination conditions.



4. Installation

To install MIAS-LCEC Toolbox, please refer to the [Installation Introduction](#).

5. Getting Started

Please refer to the [User Guide](#) for application details of MIAS-LCEC Toolbox.

6. Contact

Please feel free to drop me emails zhiwei.huang@outlook.com if you have any questions.