

# SC-LiDAR-SLAM: a Front-end Agnostic Versatile LiDAR SLAM System

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## Summary

- LiDAR SLAM open source project: **Ready-to-use** open source projects (C++, Python).
- Various LiDAR odometry** algorithms are supported (e.g., LeGO-LOAM, LIO-SAM, A-LOAM, FAST-LIO)
- Scan Context [1]** for fast and robust place recognition (loop detection).
- Utility** and useful applications such as dynamic point removal, long-term point cloud mapping.

Code Available!

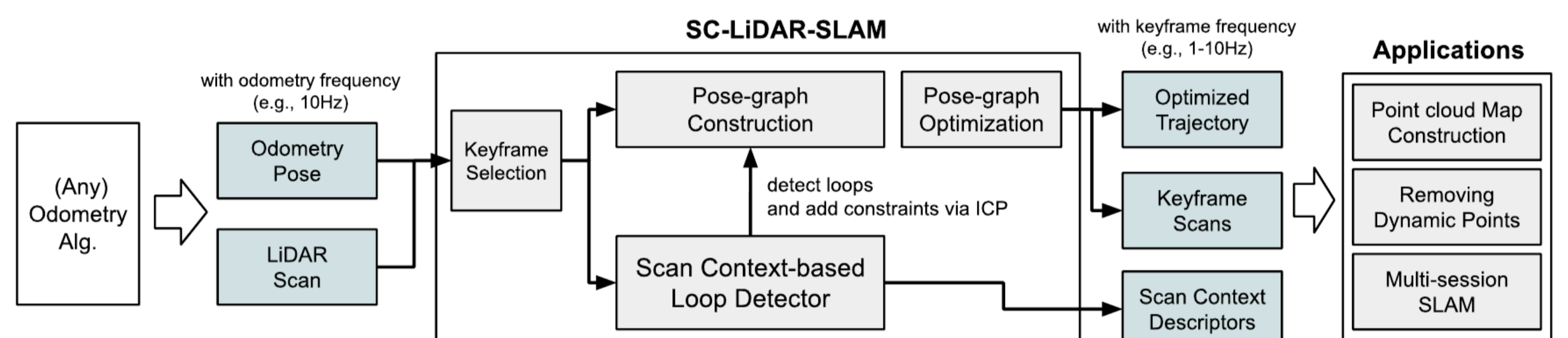
SC-LiDAR-SLAM



- [1] Giseop Kim, Sunwook Choi, and Ayoung Kim. "Scan Context++: Structural Place Recognition Robust to Rotation and Lateral Variations in Urban Environments." IEEE Transactions on Robotics (2021).
- [2] Giseop Kim, and Ayoung Kim. "Remove, then revert: Static point cloud map construction using multiresolution range images." 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2020.
- [3] Giseop Kim, and Ayoung Kim. "LT-mapper: A Modular Framework for LiDAR-based Lifelong Mapping." arXiv preprint arXiv:2107.07712 (2021).

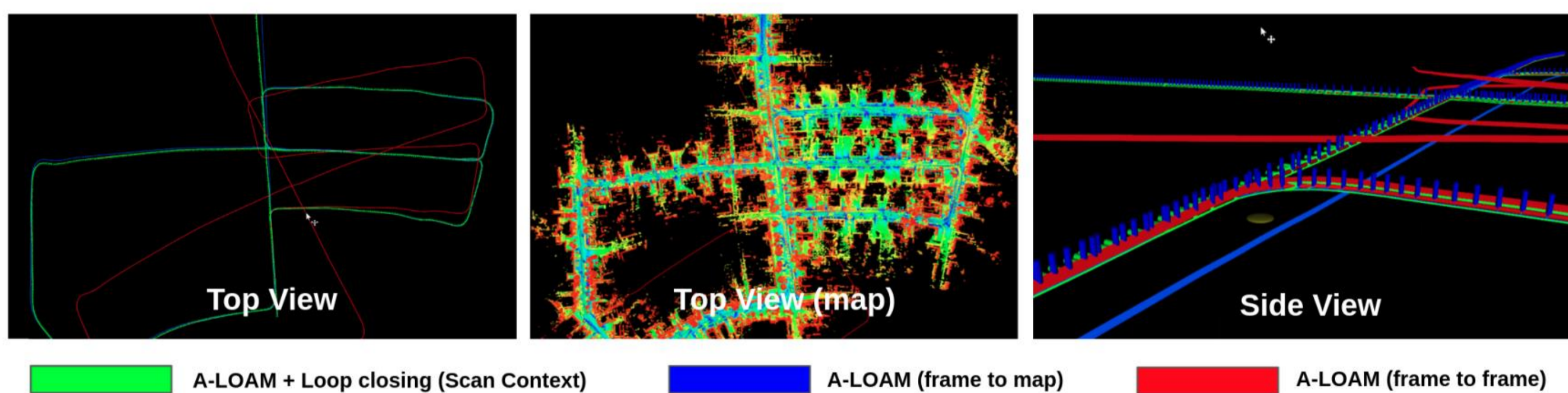
## LiDAR SLAM

- What is SLAM?  
 SLAM = Odometry  
 + **Place Recognition**  
 + **Pose-graph optimization**

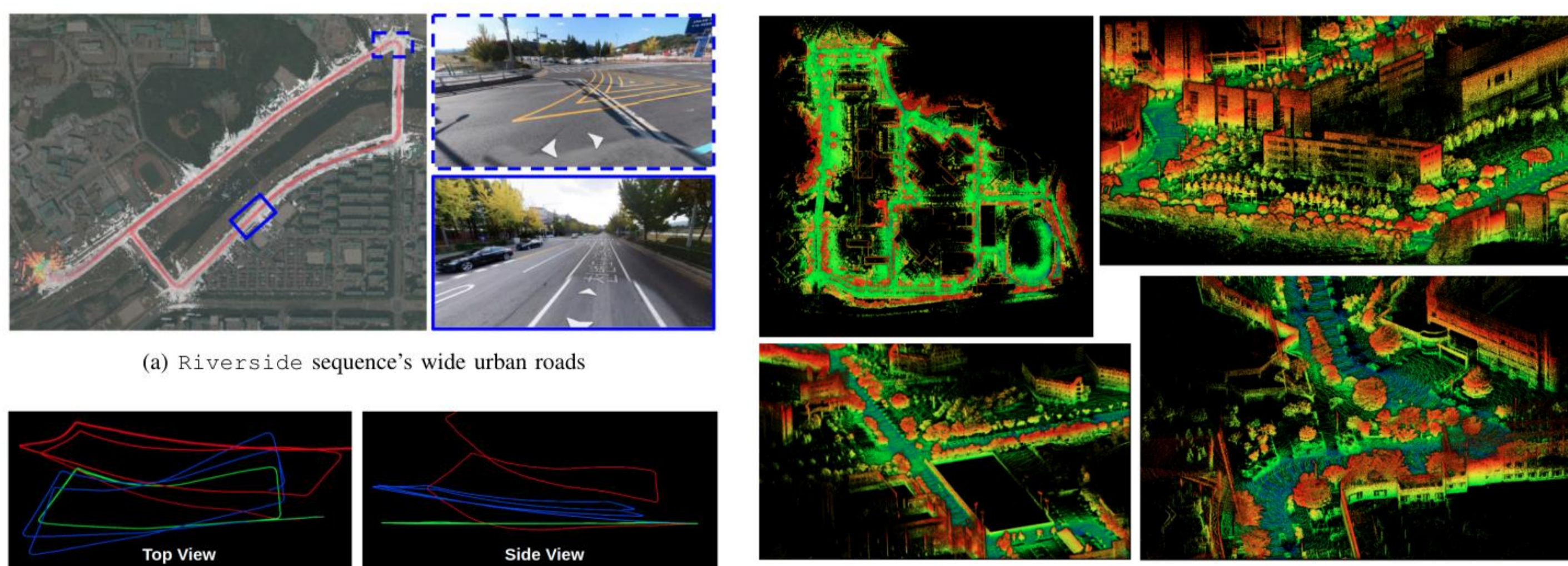


- SC-LiDAR-SLAM fully integrates above modules for a complete LiDAR SLAM system for accurate 3D urban mapping.

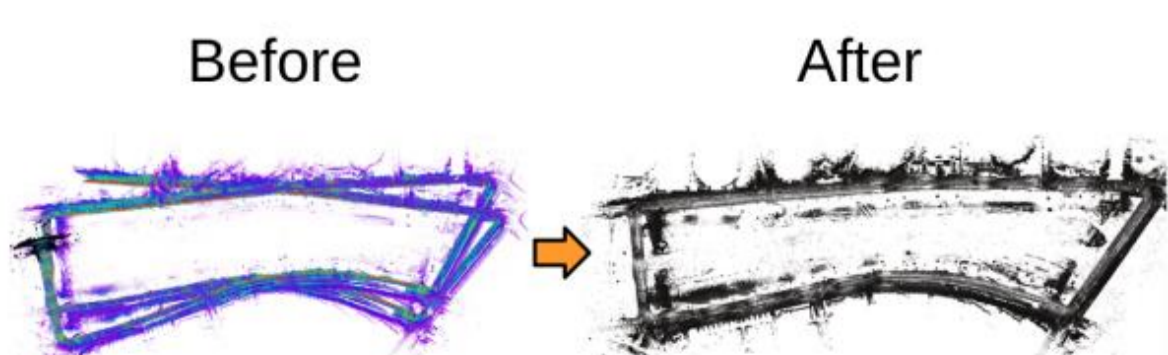
## Results



Datasets: ↑ KITTI 05, ↓ (left) MulRan - Riverside, ↓ (right) MulRan - KAIST



(b) Before-and-after trajectories of SC-LiDAR-SLAM (integrated with A-LOAM)



(c) Before-and-after point cloud maps of SC-LiDAR-SLAM (integrated with FAST-LIO)

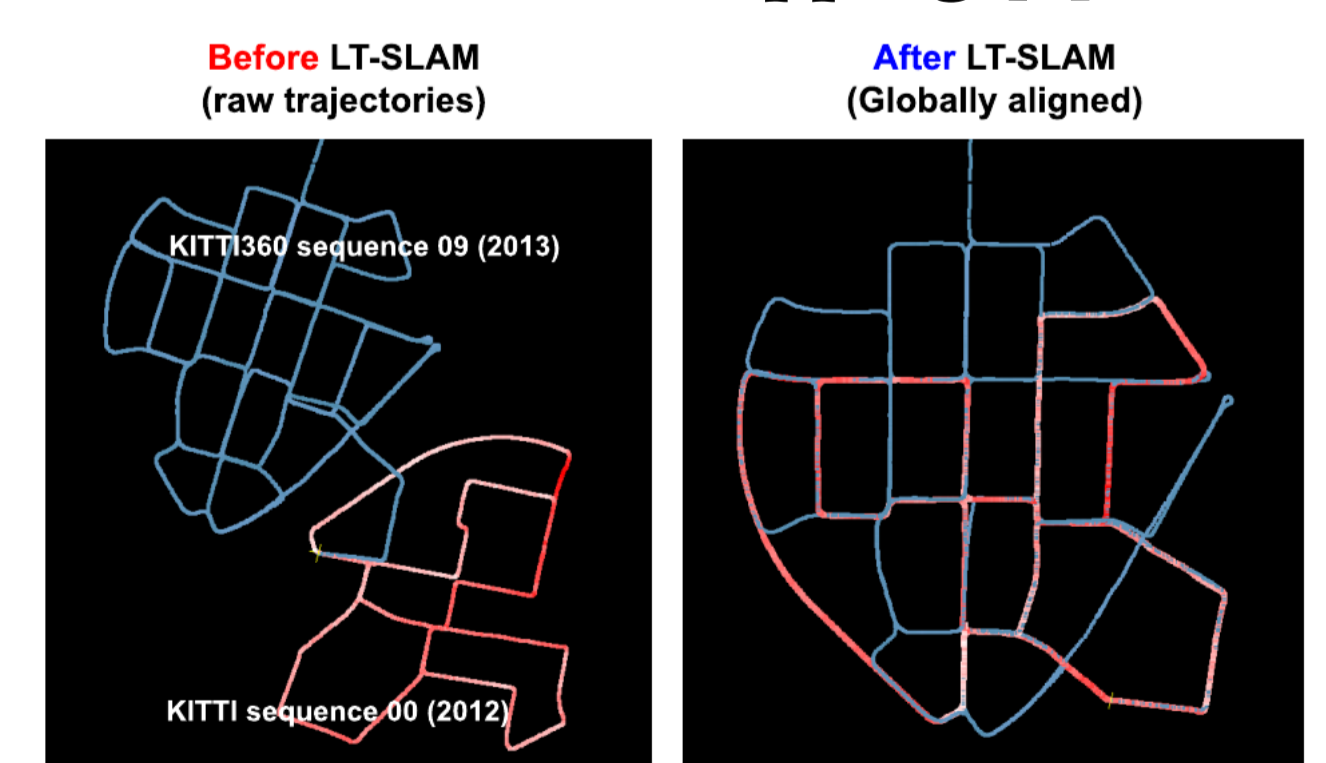
- As above, the globally consistent 3D point cloud maps can be constructed by using SC-LiDAR-SLAM, even in highly complex urban sites.
- Also, our file-based saver and utilities support a modular approach for the following applications (→) by piping the SLAM result.

## Applications

- Dynamic point removal [2]



- Multi-session Mapping [3]



- Radar SLAM

